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An Analysis of Reasonably Possible Occurrences

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P. 10, Table 5, footnote 1: Change "MI-3" to "MI-1."
P. 11, Table 6, footnote 1: Change "MI-3" to "MI-1."
P. 23, Table 9, footnote 2: Change "ration" to "ratio."
P. 53, line 23: Delete "Foreign exports related to"
P. 57, Table 14: In columns 3 and 4, change A-4 and B-4 to A-2 and B-2.
Under WESTERN OREGON, change 1954 to 1975, and in second column after 1985-1995 change 1.10 to 1.01.
In footnote 1, change "employment" to "payments."
P. 63, Figures 16 and 17: Transpose the captions.
P. 100, Table A 11: In column 1 above North Coast Timbershed, add "OTHER PRIVATE OWNER CLASS."
P. 110, Table A 17: In columns 5 and 6, change A-4 and B-4 to A-2 and B-2.

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PREFACE

This is an analysis of timber availability in Oregon, now and in the future. The focus is on local areas within the state and what is likely to happen to timber flows in those areas if certain reasonably possible courses of action are followed.

This analysis should be viewed as a beginning—a benchmark from which to discuss timber availability in Oregon. It can be used to identify problems and opportunities and as a starting place for further analyses aimed at solving problems and capitalizing on opportunities.

This report is intended to give an overview of what was done and a detailed discussion of the results. Many details on data, assumptions, and the mechanics of how the computer model works are omitted. But enough details are presented to provide necessary understanding of what went on in setting up the projections and in making the calculations.

A supplement to this report containing more details about the data and assumptions is available on request. Subsequent reports are planned to document the computer model and provide for its use by others.

ACKNOWLEDGEMENTS

A comprehensive analysis such as this cannot be done without the cooperation of many. For data, we are indebted to the following **public agencies**: Pacific Northwest Forest and Range Experiment Station, Region Six, and individual National Forest offices of the Forest Service, U.S. Department of Agriculture; Bureau of Land Management, State and District Offices; Oregon Department of Forestry; and Oregon Department of Revenue. **Private Companies** (alphabetically) were Boise Cascade (Independence and Medford); Crown Zellerbach; Georgia-Pacific Corporation; International Paper Company; Longview Fibre Company; Publisher's Paper Corporation; U.S. Plywood Division of Champion International; Weyerhaeuser Company (Tacoma, Washington, and the Research Center at Centralia, Washington); and Willamette Industries, Inc. In addition, thanks are due the Forestry Committee of Associated Oregon Industries for helping establish industry contacts and encouraging cooperation.

Many individuals contributed. Among them, certain ones stand out as particularly helpful in providing, or helping to secure, data. They are Donald Gedney and his associates at the Pacific Northwest Forest and Range Experiment Station, Peter O'Brien and Garry Jebousek of the Oregon Department of Revenue, William Voelker of the Oregon Department of Forestry, Kirby Fritchman of the Bureau of Land Management, Robert Brandes of Crown Zellerbach, and Gilbert Baker and David Bower of Weyerhaeuser Company.

Other individuals made significant contributions in other ways: Professor Robert Marty of Michigan State University was a major force in planning the analysis and served as a reviewer of this publication; Professor John Zivnuska of the University of California, Dr. Carl Newport of Mason, Bruce, and Girard, and Dr. Donald Flora of the Pacific Northwest Forest and Range Experiment Station all contributed significantly as reviewers while the analysis was in progress and as reviewers of this publication. Dr. Con Schallau of the Intermountain Forest and Range Experiment Station also contributed a very helpful review.

Richard Gustafson deserves special notice for his role over the past year in helping prepare computer input for the projections and sharing in the agony of sifting through endless reams of computer output trying to figure out what it all meant.

Finally, thanks are due Dean Carl Stoltenberg, who in his roles as Dean of the School of Forestry and member of the Oregon Board of Forestry, was instrumental in encouraging that this analysis be done and in seeing that it be adequately supported; to State Forester Edward Schroeder and other members of the Oregon Board of Forestry who provided encouragement and strong support throughout the analysis; and to Dr. Richard Dilworth, Head of the Forest Management Department, who juggled personnel and budgets to provide the persons and money needed for this study.

TABLE OF CONTENTS

SUMMARY OF THE FINDINGS

This study was conducted by the School of Forestry at Oregon State University to provide some of the information needed by the Oregon Board of Forestry to develop a forestry program for Oregon. The study makes three contributions: One, a data base that provides an up-to-date timber inventory and information on timber management practices and growth needed for projecting future timber availability; two, a computer simulation model that provides a unique capability for policy-makers to examine the projected effects of various courses of action as a step in developing a preferred action program; and three, specific projections of possible changes in future timber harvests in Oregon and their contributions to the economies of local areas (timbersheds) within the state. This report focuses on the projections.

Oregon provides many contrasts in the availability of timber, now and in the future. The situation varies by geographic area within the state and by the resources, policies, and actions of the owners of Oregon's forest lands. For this analysis, the state was divided into ten timbersheds: seven in western Oregon (west of the Cascade Mountains); three in eastern Oregon (east of the Cascade Mountains). Each timbershed contains at least one major timber processing center that is heavily dependent on timber harvested within the timbershed. Currently, at least two-thirds of the timber processed in each timbershed is harvested in the same timbershed.

Five owner classes were recognized in each western Oregon timbershed: National Forest; Bureau of Land Management (BLM); State and Other Public; Forest Industry; and Other Private. In eastern Oregon, BLM and State and Other Public were combined into "Other Public;" all other classes were the same as for western Oregon.

The contrasts of conditions among owner classes in the state are interesting. In general, National Forest and BLM lands are characterized by large inventories of old-growth timber, which provide various opportunities for near-future harvests, but low growth rates of timber. On the other hand, the private lands contain little old-growth but a considerable amount of timber in the younger age classes (less than 40 years). Thus, these lands provide less of an opportunity for near-future harvest, but high current growth rates and, thus, various opportunities for harvests in the more distant future. The contrast will be clearly evident in our projections.

Several projections were made for each owner class in each timbershed. The projections were aimed at representing a reasonably possible range of occurrences, from the continuation of current harvest under current policies and actions among owner classes to an "ability to harvest" for each owner class based on assumed changes in forest management policies and actions among the owner classes. The intensity of timber management, by owner class, was an explicit variable in the projections.

The projections are not intended to be forecasts of what will happen; they should not be interpreted as such. A projection simply indicates what **would** happen if its assumed set of conditions did indeed occur.

Results of the Timber Harvest Projections

Broadly speaking, there are reasonably possible conditions under which the timber harvest in Oregon can continue at or above the current level. This is true for both western and eastern Oregon. Under conditions that more closely reflect current policies and actions among owner classes, however, a significant decline in harvest could occur in western Oregon between now and the year 2000. Thus, there is a range of possibilities. They can be understood better by looking closely at the projections.

For each timbershed, projections were set up to answer four questions. The following summarizes the results with regard to those questions.

1. Can the current annual harvest (based on the annual average for 1968-1973) be maintained to the year 2000 if the public

owners maintain their current allowable cuts and the private owners continue to try to fill the gap between the public harvest and the total?

Only in the North Coast timbershed in western Oregon and in the three eastern Oregon timbersheds could harvesting continue at the current level for the next 30 years, under the conditions specified. In all other timbersheds, the private forests would be unable to continue to fill the gap between the total harvest and the public allowable cuts. Declines in harvest would be expected as soon as 1985 in some timbersheds; in others, declines would come during the 1990's. For western Oregon as a whole, this projection indicates a decline of 22 percent by the year 2000.

2. What is the capability for timber harvest after the year 2000 if the policies and actions among owner classes in question 1 are continued until the year 2000?

This is a continuation of the first question. It is aimed at determining the potential timber harvest by each owner class from 2000 to 2075, given that the policies and actions of question 1 have been followed from 1975 to 2000. The results showed declines in Forest Industry harvests after 2000 in most western Oregon timbersheds, a continuation of a trend begun in the 1980's or 1990's. Increases, compared to current harvests, occurred for all other owner classes. The potential increase for harvest from western Oregon National Forests in the fourth decade (2005-2015) was between 22 and 30 percent, depending on management intensities; for BLM, the increase was between 15 and 26 percent; for State and Other Public, between 72 and 109 percent. The decline for Forest Industry was between 49 and 59 percent, but the Other Private owner class, whose current harvesting rate is far below its growth rate, could cut four times as much as the current harvest. The net result for all owners combined in western Oregon would be a capability to harvest during 2005-2015, depending on management intensity, from 3 percent less to 7 percent more than the current harvest. The harvest capability thereafter rises gradually to about the current harvest level for lower management intensities, to 15 percent more for higher management intensities. The timbershed results in western Oregon vary around these average results.

In eastern Oregon, results were similar, except that the harvest capability in the fourth decade was even greater relative to the current harvest—from 53 to 93 percent more than current harvest for all owners combined. This capability for increase lies entirely on the public lands, with Forest Industry showing a decline of from 12 to 24 percent after the year 2000.

3. How would increases in timber management intensity change the results of the projections?

For the period 1975-2000, the answer is: Not much. Because public harvests are held at the current allowable cut, we're really asking only whether management intensification on private lands would make a difference over the next 25 years. For western Oregon as a whole, the possible decline by the third decade (1995-2005) is 22 percent for our lower management intensities and 21 percent for our higher ones. Thus, a significant decline in harvest could occur during the next 25 years, even with higher management intensities on private lands.

After the year 2000, however, harvests will reflect the long-run potential for management intensification for all owner classes. In the long run, higher management intensities in western Oregon could yield about 14 percent more timber than the lower ones.

In eastern Oregon, the higher management intensities would yield about 20 percent more timber in the long run.

4. Assuming that the various owner classes are willing to change some of their policies and actions, what is the capability for timber harvest over the next 100 years?

The projections regarding this question were set up to calculate the maximum harvest each owner class could produce in each decade, and still meet specified sustained-yield conditions. That is, no owner class was constrained by its current harvest—the projections set out to maximize the sustainable harvest for 1975-1985 based on current inventories, growth potential, and the specified sustained-yield

conditions. The same was done each subsequent decade (decade by decade). The resulting trajectory is a smooth transition from harvests based on the present condition of the forest, to those representing the long-run sustained-yield capability of the forest.

The results showed the capability of raising the harvest in western Oregon by as much as 7 percent during 1975-1985, with harvests during the next 100 years never less than the current harvest. By owner class, we find a capability during 1975-1985 for cutting 25 to 30 percent more from National Forests; 13 to 19 percent more from BLM; 34 to 48 percent more from State and Other Public; and three times as much from Other Private. Only the Forest Industry harvests dropped (by as much as 33 percent) for the same period.

For eastern Oregon, the capability exists for increasing harvests above current levels during 1975-1985 between 40 and 60 percent. As in western Oregon, the increases occurred on public lands and for the Other Private owner class. Lower harvests occurred on Forest Industry lands. The average increase for public lands, however, is greater than in western Oregon (60 or 90 percent, depending on management intensity), and the average decrease is less for Forest Industry lands (10 or 17 percent, depending on management intensity).

This projection was intended to show capability under reasonably possible, but significant, shifts in forest management action and policies. These changes in policy by both public and private forest managers, though definitely feasible, might be hard to bring about. Furthermore, a portion of the result requires a uniform shift in actions of the highly diffused Other Private owner class. If the Other Private owner class does not change its level of harvest as projected, the western Oregon harvest during 1975-1985 for these projections would drop to from 3 to 7 percent less than current harvest. For eastern Oregon, the capability for increase in 1975-1985 would drop to between 32 and 52 percent more than current harvest.

Thus, the current harvest in both western and eastern Oregon could be maintained for the next 25 years with the indicated changes in policies and actions. No fall-off would occur after that period in either half of the state. Similar conclusions are not so valid, however, for each individual timbershed. In western Oregon, the overall result is made up of "surplus" and "deficit" timbersheds. For example, even if all owner classes cut at full capability, the Eugene timbershed shows a deficit of 17 percent for the decade 1985-1995. In contrast, the North Coast timbershed projection shows a surplus, relative to current harvest, of 19 percent in the same period. Thus, the results suggest both problems and opportunities.

Again, these projections are not forecasts of what will happen, but they do suggest the leeway for feasible changes in policy and action that can influence future availability of timber.

Employment, Timber-Related Taxes, and In-Lieu Payments

Projections were made of timber-dependent employment, public in-lieu payments, and private timber taxes for the next 25 years, corresponding to the timber harvest projections.

Our projections of timber-dependent employment in Oregon showed declines ranging from 3 to 25 percent by the year 2000, depending on the harvest projection. Assumed increases in the productivity of logging and timber-processing activities caused reductions to occur despite significant harvest increases of some projections.

Public in-lieu payments would rise for all projections, even when an even-flow harvest prevailed. This is because of an assumed increase in the real value of timber. The only factor tending to decrease in-lieu payments is the trend toward smaller timber, which it was assumed would have a lower unit value.

Private tax payments were calculated based on the current mix of timber tax types in Oregon. In general, timber taxes were projected to rise during the next 25 years, despite declines in both private harvest and inventory. It is difficult to generalize about the magnitude of the tax changes because of the interaction among the tax types, and the factors that determine the tax under each.

INTRODUCTION

Oregon possesses a varied, extensive, and commercially important forest resource. On her 24 million acres of commercial forest land stands about 23 percent of the nation's softwood sawtimber inventory. The annual timber harvest in Oregon amounts to 20 percent of the nation's softwood harvest. Locally, more than one-third of Oregon's economy is directly or indirectly dependent on the timber industries. Over 75,000 workers in the lumber and wood products sector account for about 10 percent of Oregon's wage and salary employment. Timber is the bellwether of Oregon's economy.

But what about the future?

Published reports have raised the specter of declining timber harvests in some parts of Oregon (U.S. Forest Service 1969; Gedney *et al.* 1975). This has caused concern by many about the future of the forest industries and the economic well-being of the state.

In response to these concerns, the Oregon Board of Forestry has begun work on a forestry program for Oregon, scheduled for completion in 1976. The efforts of the Board began with public hearings throughout the state to seek citizens' thoughts on the program. Typically, the hearings yielded questions such as the following: Will timber harvest decline? If so, when will declines occur? What communities will be affected? What will be the effect on employment; on tax revenues for local governments? Are there any measures that can be taken to ameliorate the situation?

To answer these questions the Board needs an accurate assessment of the timber situation today and projections of its future development. In addition, it should have the capability to evaluate alternative forestry programs and policies. The State Forester, the State Department of Forestry, and the School of Forestry at Oregon State University are working with the Board to develop the data and capability needed. This is a report of work that has been done by the School of Forestry.

Role of the O.S.U. School of Forestry

The School of Forestry at Oregon State University was asked to contribute to the Board's efforts by analyzing existing information on timber inventory and growth and by making projections of future availability of timber within Oregon. A study plan was written (Marty 1973), and the request evolved into a team effort to accomplish the following objective:

> To provide projections of reasonably possible changes in future timber harvests and their contribution to the economies of major economic areas within Oregon—under varying assumptions about land-use changes, timber growth rates, harvest regulation policies, and utilization efficiencies.

Four major tasks were undertaken: First, provide a framework for analyzing Oregon's forest resources to meet the stated objective; that is, build a computer simulation model. Second, develop the best possible data base from existing forest inventories, including information on management intensification, growth responses, and other factors that will affect timber availability. Third, make projections of timber availability to reflect reasonably possible occurrences during the time covered by the projections. Fourth, publish reports on the results of the above tasks.

The simulation model. Only brief mention will be made of the simulation model in this report—it will be covered in detail in subsequent reports. The model provides a unique capability for simulating forest management activities and projecting forest conditions and yields into the future. The model should prove useful for testing alternative policies for timber management and for planning timber management in general. It provides the capability for varying assumptions about harvest goals, timber regulation methods, intensity of timber management, logging utilization, shifts in land use, and others. It reports details about inventory, harvests, and cultural activities over the projection span. The model can be used to simulate either even-age or uneven-age forest management. Some of the model

capability will be evident in the discussion of the assumptions and projections presented in this report.

The data base. Many types of data were needed to make the analysis to be reported here. In addition to data on timber inventory, information was needed about the yields associated with different intensities of management and the intentions of forest managers to practice management intensity. Furthermore, evidence and professional opinion were needed to make the many assumptions needed for the projections.

These data were obtained wherever and from whomever they were available. An important source for data on timber inventory was the Forest Survey Project of the Pacific Northwest Forest and Range Experiment Station, U.S. Forest Service. In addition, detailed information was obtained from other public agencies or private owners who manage Oregon's forests. Data for the national forests were obtained from the regional and local offices of the U.S. Forest Service. The BLM and Oregon Department of Forestry provided data for the lands under their jurisdiction. For private lands in western Oregon, supplemental data were obtained from the Oregon Department of Revenue and the forest industry. Nine of the largest forest industry landowners, comprising about 65 percent of the forest industry acreage in western Oregon, supplied inventory data and other management information for the analysis. The Oregon Department of Revenue provided inventory data for all private forest lands subject to ad valorem taxes.

Bringing data together from these varied sources is not easy. Considerable professional judgment is needed to make the necessary conversions from various standards to a common base and to adjust for differences in time of inventory. Careful analysis and cross checking are needed to avoid using data that cannot be supported by a test of reasonableness. And, after the data have been aggregated, nothing can be said about statistical accuracy in the usual sense, even though the individual bits and pieces may have been based on sound statistical methods.

Thus, professional judgment weighs heavily in the O.S.U. data base. The analysts did the best they could with what was available and sincerely believe the data represent the best available for an analysis of Oregon's timber availability and potential. If analyses such as this are to be done in the future, better means of collecting data will have to be devised. This is part of the Board of Forestry's consideration in developing a forestry program for Oregon.

The projections. The projections of timber availability for this analysis are intended to be a benchmark–a place to start, not a complete presentation of all possible situations. Nor are they intended to be firm forecasts of what will happen. Rather, they represent what **could** happen, **if** the specified conditions of the projection were to come about. The specified conditions are considered reasonably possible. Viewed in this way, the projections can be the starting place for discussing alternative forestry programs and policies. Problems and opportunities should become evident, as should possibilities for policy modification to achieve desired ends.

Several projections were made for each of ten local timber-dependent areas within the state. These areas are called timbersheds. Each set of projections focused on the following questions:

1. Can the present annual harvest (based on the annual average for 1968-1973) be maintained to the year 2000 if public owners maintain their current allowable cuts and private owners continue to try to fill the gap between the public harvest and the total?
2. What is the capability for timber harvest after the year 2000 if policies and actions among owner classes in question 1 are continued until the year 2000?
3. How would increases in intensity of timber management change the results of the projection?
4. Assuming that the various owner classes are willing to change some of their policies and actions, what is the capability for timber harvest over the next 100 years?

These four questions represent an Oregon perspective. In recognition of Oregon's role as a supplier of the nation's timber, another question was asked from a national perspective:

5. Given a rise of 47 percent in U.S. softwood consumption by the year 2000

compared to 1970, can Oregon continue to supply her relative share?[1]

The analyses regarding question 5 were made at the half-state level, that is, western Oregon and eastern Oregon. They are reported in the Appendix.

The reports. This is the first of several reports on the work done at the School of Forestry. This report describes results of the projections. Subsequent reports are planned that will include more details about data and the model used in this analysis.

Reader's Guide to This Report

This report is aimed at a wide audience. It is the report of the O.S.U. study team to the Oregon Board of Forestry, and at the same time, a report for the citizens of Oregon. The intent is that enough information be presented to allow forest resource analysts to evaluate the methods and data used, as well as the results.

There are twelve geographic focuses for this report: ten individual timbersheds, western Oregon (comprised of seven timbersheds), and eastern Oregon (comprised of three timbersheds) (Figure 1). The report begins with a general discussion of what was done. Next comes an overview for western Oregon followed by a discussion of each timbershed in western Oregon. Then, the same for eastern Oregon and each timbershed in eastern Oregon. The overviews for western and eastern Oregon include only projections of timber harvest. The discussions for individual timbersheds include projections of timber harvest and also information about size of harvested material, amount of softwood and hardwood, method of harvest, and number of acres over time subjected to hardwood conversion, stocking control, fertilization, and genetic planting.

Following the results of the harvest projections for each geographic area is a section on economic implications of the projections.

The Appendix includes a report on question 5 regarding Oregon's ability to increase timber harvest by 47 percent by the year 2000. It also contains tables summarizing the data base for the projections, some assumptions, and some of the results. The footnotes for these tables contain many definitions and explanations that will be of interest to readers interested in details of the analysis.

Because the report is aimed at a broad audience and has so many geographic focuses, it inevitably contains more information and detail than needed by some readers.

At one extreme is the reader wanting only an overview of the results in as short a time as possible. The Summary of the Findings should suffice for this reader, with the caution that it reveals little about what was done.

At the other extreme is the professional forest resource analyst who wants to know all the details. This person should read the entire report carefully, with special attention to the section on what was done, the graphs for individual timbersheds, and the tables in the Appendix. As noted, the footnotes to the tables in the Appendix contain many definitions and explanations that will be useful for resource analysts.

The readers falling between these extremes can have many interests, but recommendations for them are the same: At least skim A Description of What Was Done to note locations of the timbersheds, types of projections, and assumptions that were made. Pay particular attention to the notation used to designate the various projections—it is continued throughout the remainder of the report. Before reading the analysis for a particular timbershed, the reader should read The Situation For Western Oregon or The Situation for Eastern Oregon, depending on the timbershed in question. This is recommended because the timbersheds are not totally independent and the analysis for the larger area helps to put them in perspective. Also, some of the discussion in the analysis for the larger area pertains to the timbersheds and is not repeated for each timbershed.

The section on Economic Implications of the Projections follows from the projections for timber harvest, so we recommend that at least The Situation For Western Oregon and The Situation For Eastern Oregon be read before this section.

[1] The rise in consumption is based on Table 150, page 207, of the Timber Outlook Study by the U.S. Forest Service (U.S. Forest Service 1973).

A DESCRIPTION OF WHAT WAS DONE

The Timbersheds

The designation of timbersheds was based on our objective relating to timber production within "economic areas" of the state. A place to start was provided by two previous analyses that had divided western Oregon into economic areas for the purpose of studying timber-based employment (Schallau *et al.* 1969; Maki and Schweitzer, 1973). These economic areas were modified for this analysis by considering timber-flow information (Austin 1969; Schuldt and Howard 1974). As a result, ten timbersheds were designated: seven in western Oregon and three in eastern Oregon (Figure 1). Each timbershed contains at least one major timber-processing center that is heavily dependent on timber harvested within the timbershed. At least two-thirds of the timber processed in each timbershed was harvested in the same timbershed (Table 1).

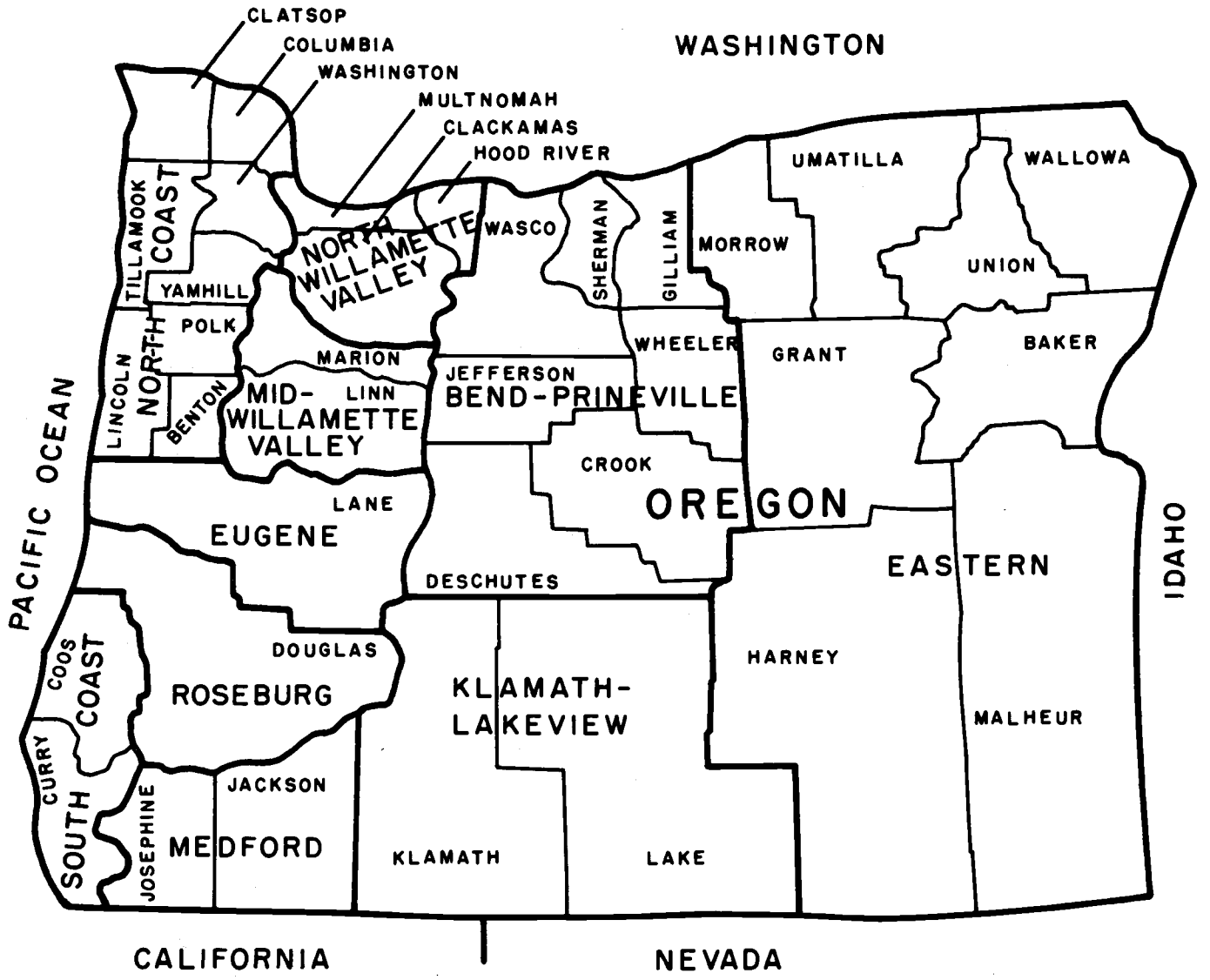


Figure 1. For study of timber availability in Oregon, the state was divided along the summit of the Cascade Mountains into eastern and western parts. The western part was subdivided into seven timbersheds and the eastern part into three timbersheds.

Table 1. Source of Timber Used in Each Timbershed in 1966 and 1972.[1]

Timbershed	Within the timbershed		Another Ore. timbershed		Outside Oregon	
	1966	1972	1966	1972	1966	1972
	%	%	%	%	%	%
North Coast	81	74	8	8	11	18
North Willamette Valley	63	66	17	14	20	20
Mid-Willamette Valley	75	83	25	16	0	1
Eugene	78	78	22	22	0	0
Roseburg	97	88	3	12	0	0
South Coast	87	80	12	20	1	0
Medford	76	78	19	18	5	4
Klamath-Lakeview	--[2]	90	--	3	--	7
Bend-Prineville	--	81	--	18	--	1
Eastern	--	99	--	1	--	0

[1]Data for 1972 were adapted from Table 4 by Schuldt *et al.* (1974). Data for 1966 were adapted from Table 24 by Austin (1969).
[2]Data not available.

The Data

Five owner classes are recognized in western Oregon: National Forest, Bureau of Land Management (BLM), State and Other Public, Forest Industry, and Other Private. In eastern Oregon, there are only four owner classes because BLM, along with State and Other Public, are combined into a class called Other Public.

The type of data needed and the intensity of effort in collecting data differed significantly between western and eastern Oregon. For western Oregon, a model for even-age timber management was used for the projections, so acres and volume were needed by age class, along with other data related to even-age stand projection. For eastern Oregon, a model for uneven-age timber management was used, so numbers of trees by diameter class were needed, along with appropriate growth rate, volume tables, and other information.

The effort made to collect data was much greater in western Oregon. As mentioned in the introduction, a variety of sources was contacted for inventory data and information on management practices: the U.S. Forest Service, the BLM, the Oregon Department of Forestry, the Oregon Department of Revenue, and individual forest industry timberland owners.

The details of all the data used will not be shown in this report—a supplemental report containing details will be available upon request from the School of Forestry, Oregon State University. The intent, however, is that enough data be presented so the projections can be understood and evaluated. The key types of data are starting inventory, growth assumptions, and management assumptions.

A profile of total acres and volume by owner class, location, and land class for western Oregon can be found in the Appendix (Table A 1). Also shown in the Appendix is the distribution of acres and volume by age classes for each owner class by location in western Oregon (Table A 2). Data for growth and management assumptions will be referenced later when these items are discussed.

The data collection effort in eastern Oregon was not nearly as intensive as in western Oregon because of time limitations. In general, only Forest Survey data were used, except for supplemental information on the Klamath Indian Trust (now Winema National Forest) and some Forest Industry

lands in the Klamath-Lakeview timbershed. A profile of the total acres and volume by owner class, location and land class for eastern Oregon is in the Appendix (Table A 3). Also shown in the Appendix is distribution of trees by diameter class, growth, and mortality rates for each owner class, by location, in eastern Oregon (Table A 4).

There are two important kinds of limitations on timber production for a given tract of commercial forest land: the inherent productivity potential of the land, and the limitations placed on timber production because of other land uses or environmental considerations. The former is represented by **site class**: the latter by **land class** in this analysis. Although detailed information on site class and land class appears in the Appendix (Tables A 1, A 3), it should be useful to summarize some of the information before discussing the projections.

In brief, the land classes have the following meanings: **Standard**—no restrictions on timber growing beyond standard environmental considerations; **special**—land suitable for timber growing, but on which yields are restricted because of other use considerations, for example, scenic roadsides; **marginal**—land suitable for timber growing in the long run but not now part of the timber production base because of technical or economic limitations; **other objectives**—potential timber-growing areas now being used for something other than timber production.

The land classes are of greatest significance on public lands, particularly National Forest. Only 63 percent of the commercial forest area of the national forests in western Oregon is in the standard land class; 86 percent of the total commercial forest land in western Oregon is classed as standard, reflecting the fact that all private commercial forest area is classed as standard (Table 2). Sixty-six percent of the standard commercial forest land in western Oregon is medium site or better (Table 2), that is, has site index greater than 120 (McArdle *et al.* 1961).

In eastern Oregon, 72 percent of National Forest and 81 percent of all commercial forest lands are classed as standard (Table 3). Site classes were not delineated in eastern Oregon, although site differences are reflected in the empirical growth data used in the projections.

More will be said about how different land classes were handled throughout the discussion of the assumptions that were made for the projections.

Developing the Projections

The projections were set up on the assumption that this analysis is a benchmark—a place to start, not a complete presentation of all possible situations. Thus, an objective was to minimize the number of projections necessary to answer the questions being asked. It followed that the number of assumptions allowed to vary between projections also should be minimized to avoid clouding the interpretation of results by interaction among variables.

The key assumptions chosen to vary between projections were management intensities and harvest control. Before discussing these variants, it is necessary to understand the concept of an administrative unit as used in this analysis.

An Administrative Unit

This is a unit to which either a requested or a calculated harvest level applies in the projections. In the language of public forest managers, it might be called an allowable cut unit. The administrative unit is a flexible concept in the model used for this analysis. It can be specified to be some subset of an owner class, an entire owner class, a grouping of owner classes, a timbershed, or a grouping of timbersheds.

The basic set of administrative units used in the projections is as follows: For the Forest Industry and Other Private owner classes, the individual owner class within each timbershed is an administrative unit. Thus, for example, Forest Industry in the North Coast timbershed is an administrative unit, as is Forest Industry or Other Private in each timbershed.

There are two administrative units for each national forest: one for the standard land class, that is, acres with no yield restrictions, and one for the special land class, that is, acres with yields restricted for environmental reasons. Thus, there are 12 administrative units for 6 national forests in western Oregon and 14 for the 7 national forests in eastern Oregon.

Table 2. Area of Commercial Forest Land in Thousands of Acres by Land and Site Class for Each Owner Class in Western Oregon, 1975.

Site class[1]	National Forest	BLM	State, Other Public	Forest Industry	Other Private	All Owners
STANDARD LAND CLASS						
High	333.05	261.19	103.25	1,912.00	862.00	3,471.49
Medium	688.08	912.21	694.05	1,657.00	774.00	4,725.34
Low	1,568.93	634.93	--	510.00	574.00	3,287.86
Very low	275.11	--	--	--	--	275.11
All	2,865.17	1,808.33	797.30	4,079.00	2,210.00	11,759.80
SPECIAL LAND CLASS						
High	105.67	15.19	--	--	--	120.86
Medium	219.49	61.26	--	--	--	280.75
Low	350.29	45.78	--	--	--	396.07
Very low	89.73	---	--	--	--	89.73
All	765.18	122.23	--	--	--	887.41
MARGINAL LAND CLASS						
High	118.73	--	--	--	--	118.73
Medium	117.69	--	--	--	--	117.69
Low	378.54	--	--	--	--	378.54
Very low	58.81	--	--	--	--	58.81
All	673.77	--	--	--	--	673.77
OTHER OBJECTIVES LAND CLASS						
High	36.22	13.74	8.81	--	--	58.77
Medium	37.38	49.99	59.61	--	--	146.98
Low	116.49	35.73	--	--	--	152.22
Very low	39.39	--	--	--	--	39.39
All	229.48	99.46	68.42	--	--	397.36
ALL LAND CLASSES						
High	593.67	290.12	112.02	1,912.00	862.00	3,769.85
Medium	1,062.64	1,023.46	753.66	1,657.00	774.00	5,270.76
Low	2,414.25	716.44	--	510.00	574.00	4,214.69
Very low	463.04	--	--	--	--	463.04
All	4,533.60	2,030.02	865.72	4,079.00	2,210.00	13,718.34

[1]For land class definitions, see footnote 2 for Table A1 in the Appendix. For site class definitions, see footnote 3 for Table A1 in the Appendix.

The BLM owner class also is represented by two administrative units, standard and special, in locations where the special class has at least 20,000 acres. Otherwise, there is only one BLM administrative unit.

The State and Other Public owner class has only one administrative unit for each location. Note that most National Forest and BLM administrative units and some Other Public administrative units overlap timbershed boundaries (Table A 7, Appen-

Table 3. Area of Commercial Forest Land in Thousands of Acres by Land Class for Each Owner Class in Eastern Oregon, 1975.

Land class[1]	National Forest	Other Public	Forest Industry	Other Public	All owners
Standard	4,882.13	556.92	1,630.29	1,246.87	8,316.21
Special	766.56	--	--	--	766.56
Marginal	1,030.15	--	--	--	1,030.15
Other objectives	79.01	29.30	--	--	108.31
All	6,757.86	586.23	1,630.29	1,246.87	10,221.25

[1]For land class definitions, see footnote 2 for Table A3 in the Appendix.

dix). This complicates the analysis somewhat because the results for these administrative units have to be allocated to the appropriate timbersheds from the location of the administrative unit assumed in the projection. The method for doing this will be discussed later. Specific administrative units can be identified in the Appendix by the standard and special land class designations. (Table A 1 for western Oregon and Table A 3 for eastern Oregon).

Now, back to management intensities and harvest control.

Management Intensities

These are the levels at which timber is, or will be, managed. They can be viewed as indicators of future timber yields that reflect different management practices and their anticipated results. This analysis recognizes seven management intensities (Table 4). As a rule, the higher the management intensity (MI) number, the higher the yields anticipated. Thus, MI-4, which includes commercial thinning, is expected to have higher yields than MI-3, which presumes no cultural treatment beyond stand establishment.

Here is how the management intensities for an administrative unit are accounted for in the projections: **First.** The starting inventory is entered by management intensity. If for example, there were 100 acres in the administrative unit, 70 might be in MI-3 and 30 in MI-4, as of 1975. **Second.** Also

Table 4. Management Intensity Options. Management Increases from MI-1 to MI-7.

Management intensity		Regime					
No.	Description	Re-forest-ation	Regener-ation harvest	Com-mercial thin-ning	Pre-com-mercial thin-ning	Fer-tili-zation	Genetic improve-ment
MI-1	Low, with reduced yields[1]	Yes	Yes	No	No	No	No
MI-2	Low, for conversion species[2]	--	Yes	No	No	No	No
MI-3	Low, desirable species	Yes	Yes	No	No	No	No
MI-4		Yes	Yes	Yes	No	No	No
MI-5		Yes	Yes	Yes	Yes	No	No
MI-6		Yes	Yes	Yes	Yes	Yes	No
MI-7		Yes	Yes	Yes	Yes	Yes	Yes

[1]For example, landscape management.
[2]For example, hardwoods.

entered at the beginning of the projection is a target distribution of management intensities for the future. For example, the target might be 10 percent of the acres in MI-3, 30 percent in MI-4, and 60 percent in MI-6. **Third.** As the projection proceeds, acres are moved into the target distribution as they become eligible, usually when cut over. For example, if 20 of the original 100 acres were cut during 1975-1985 and, if all 20 acres are assumed to be regenerated, they would be allocated: 10 percent, or 2 acres, to MI-3; 30 percent, or 6 acres, to MI-4; and, 60 percent, or 12 acres, to MI-6. **Fourth.** Thereafter, the yields for those acres would correspond to the management intensities to which they were assigned. **Fifth.** If no new target is introduced later in the projection span, all 100 acres would tend toward the target distribution among management intensities in the long run. That is, eventually the 100 acres would be distributed with 10 percent, or 10 acres, in MI-3; 30 percent, or 30 acres, in MI-4; and, 60 percent, or 60 acres, in MI-6.

Management-Intensity Target Distributions

Two target distributions are identified for each administrative unit: Target A and Target B (Figure 2). Target A is used as the basic estimate of management intensification in the future. Target B represents a greater proportion of acres in the higher management intensities, on the average, for all owner classes within a timbershed. It is used as a reasonably possible upper bound for our projections.

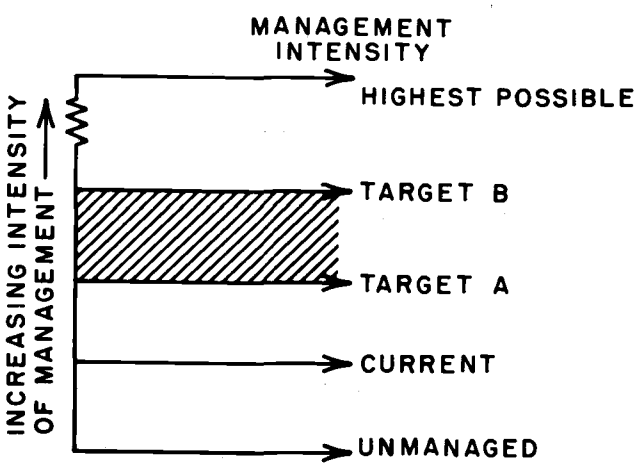


Figure 2. A perspective of timber management intensification for an administrative unit.

In western Oregon, Target A represents likely changes in the distribution of acres by management intensity over the next 30 years as determined by interviews with public and private forest managers. Target A distributions were estimated for the Other Private owner class at somewhat above current levels, but below any of the other owner classes.

Target B is based on interviews with forest industry land managers that posed the question: "What distribution of acres among management intensities would prevail if all lands in your jurisdiction were brought to their desired level of management, assuming enough time and money to do so?" Forest industry interviews were used because these managers are more engaged in intensive management than are public forest managers. In general, forest industry managers were more optimistic about intensification than were public forest managers, so their estimates seemed most appropriate as a reasonably possible upper bound for our projections.

The question was answered for specific locations, site classes, and species types. The results were aggregated by timbershed, weighting the acres by site class and species type. The resulting distribution was used for all owner classes within a timbershed, except Other Private. Again, the Other Private target was estimated at a level below the other owner classes. The complete profile of Current, Target A, and Target B distribution of acres among management intensities for each administrative unit, in each timbershed, that were used in our western Oregon projections is shown in the Appendix (Table A 5). But, to provide a general understanding of the difference between the current, Target A, and Target B distributions, a weighted average summary by owner class is shown here (Table 5). Note that both Target A and Target B are adjusted in the year 2005 to provide the capability for more acres to go to higher management intensities after that time. The shift in 2005 mainly provides for more acres to be regenerated with genetically improved stock, particularly under Target B.

Also included with Target B for the National Forest and BLM owner classes in western Oregon is the assumption that mortality salvage will take place. This is not part of the management intensity targets, but is included as a separate assumption. No

Table 5. Percentage Distributions of Standard[1] Land Class Acres by Management Intensity: Current, Target A, and Target B, for Each Owner Class, Western Oregon.

Distribution	Period applicable	Management intensities[2] (MI)					
		2	3	4	5	6	7
		%	%	%	%	%	%
NATIONAL FOREST							
Current distribution	1975	3	97	--	--	--	--
Target A	1975-2005	1	10	55	34	--	--
Target A	2005+	1	10	55	34	--	--
Target B	1975-2005	--	13	16	23	43	5
Target B	2005+	--	13	16	23	29	19
BLM							
Current distribution	1975	7	90	1	2	--	--
Target A	1975-2005	3	15	45	37	--	--
Target A	2005+	3	15	45	37	--	--
Target B	1975-2005	--	14	22	21	38	5
Target B	2005+	--	14	22	21	31	12
STATE AND OTHER PUBLIC							
Current distribution	1975	10	83	3	4	--	--
Target A	1975-2005	4	73	8	15	--	--
Target A	2005+	4	73	8	15	--	--
Target B	1975-2005	--	14	11	17	53	5
Target B	2005+	--	14	11	17	32	26
FOREST INDUSTRY							
Current distribution	1975	16	43	19	16	6	--
Target A	1975-2005	3	29	39	20	9	--
Target A	2005+	1	25	38	20	11	5
Target B	1975-2005	--	14	16	21	44	5
Target B	2005+	--	14	16	21	31	18
OTHER PRIVATE							
Current distribution	1975	35	62	3	--	--	--
Target A	1975-2005	8	70	22	--	--	--
Target A	2005+	4	63	25	8	--	--
Target B	1975-2005	3	34	37	16	10	--
Target B	2005+	1	30	35	18	11	5

[1]Special acres are all assumed to be managed at MI-3. They are not included in the percentages shown in this table.
[2]See Table 4 for regime implied by MI designations.

mortality salvage is assumed for other owner classes under Target B, nor is any at all assumed under Target A.

There was little reliable information to be found on management intensification in eastern Oregon. The decision made was to recognize only

two management intensities, low and high, where low corresponds to MI-3 in Table 4. For the high management intensity, diameter growth rates were raised by 30 percent. No specific management practices are attributed to this increase, except that some preliminary research results have shown that such increases are possible with species selection and fertilization. This work is not documentable in 1975. Thus, although the eastern Oregon projections are presented as reasonable possibilities, they can rightly be viewed with caution by those less optimistic about the potential for management intensification in eastern Oregon.

There is a Target A and a Target B for eastern Oregon, with Target B having a higher proportion of the acres in the high management intensity than Target A. The complete profile of the Current, Target A, and Target B distribution of acres among management intensities for each administrative unit in each timbershed that were used in our eastern Oregon projection is shown in the Appendix (Table A 6). As for western Oregon, a summary is shown here by owner class (Table 6).

To summarize, the intent of our Target A and Target B was to approximate a reasonably possible range of management intensification. Graphically, we view the range as crosshatched in Figure 2.

Table 6. Percentage Distribution of Standard[1] Land Class Acres by Management Intensity: Current, Target A, and Target B, for each owner class in Eastern Oregon.

Distribution	Period applies	Management intensities[2]	
		Low	High
	%	%	%
ALL PUBLIC OWNERS			
Current	1975	100	--
Target A	1975-2005	100	--
Target A	2005+	80	20
Target B	1975-2005	25	75
Target B	2005+	25	75
FOREST INDUSTRY			
Current	1975	100	--
Target A	1975-2005	50	50
Target A	2005+	50	50
Target B	1975-2005	25	75
Target B	2005+	25	75
OTHER PRIVATE			
Current	1975	100	--
Target A	1975-2005	100	--
Target A	2005+	90	10
Target B	1975-2005	100	--
Target B	2005+	50	50

[1]Special acres are all assumed to be managed at MI-3. They are not included in this table.
[2]Low MI reflects the empirical growth rates (Appendix, Table A4). High MI assumes a 30-percent increase in the empirical growth rates.

Harvest Control

In our projections, harvest is controlled in several ways. One possibility is to specify a harvest volume to be taken from one or more administrative units. For example, if we want to see whether an administrative unit can be expected to maintain its current annual harvest over the next 30 years, we can specify that the current volume be cut for 30 years. Then, as long as enough inventory is present in the administrative unit, the same amount will be harvested. If the merchantable inventory drops below the volume specified for harvest, then all the merchantable timber available would be harvested. Thus, by specifying the harvest we can contol the harvest but not the condition of the forest.

Another type of control provides for the calculation of a harvest volume such that certain conditions for the forest are met. For example, it might be specified that the harvest during 1985-1995 be maximized, subject to a sustained yield test that insures the amount cut during 1985-1995 can be maintained for X decades after 1985. The term "X" implies the rotation length to be achieved in the long run. Thus, if the long-run goal was a 70-year rotation, X would equal seven. Therefore, the harvest calculated in the specified decade is guaranteed to be maintainable for seven decades hence. At the end of the seven decades the forest is approaching sustained yield on a 70-year rotation, although not necessarily fully regulated at that time.

It is also possible to mix the two types of harvest control in a single projection. As will be seen, for some of our projections we specify the harvest for three decades and then switch to a calculated harvest in the fourth and subsequent decades.[2]

Harvest Control Specifications

Because our projections are designed to answer specific questions, the questions will be repeated in describing the harvest controls.

Harvest control specification 1. This specification is designed to answer two questions:

Question 1. Can the present harvest (based on the annual average for 1968-1973) be maintained to the year 2000 if the public owners maintain their current allowable cuts and the private owners continue to try to fill the gap between the public harvest and the total?

Question 2. What is the capability for timber harvest after the year 2000 if the policies and actions among owner classes in question 1 are continued to the year 2000?

This harvest control for each western Oregon timbershed is set up in two stages as follows:

For 1975-2005, specify the harvest from each **public** administrative unit at the current allowable cut for the administrative unit. Then, specify the harvest for the **private** administrative units to fill the gap between the total timbershed harvest (based on the average for 1968-1973) and the public allowable cuts.

For 2005-2075, maximize the harvest for each administrative unit (public and private) in each decade (decade by decade), such that the calculated harvest can be maintained for X decades from the beginning of the decade in question. Additional conditions are set for the solution to this problem such that at the end of X decades, the forest will be approaching sustained yield at a rotation of X decades. For public administrative units with no yield restrictions (standard land class), X = 7 decades; for public administrative units with environmental restrictions on yields (special land class), X = 18 decades; for all private lands, X = 5 decades.

[2] Our computer model has other options for harvest control. Only the ones used in this analysis are discussed here.

Thus, the 1975-2005 control provides the answer to question 1; the 2005-2075 control answers question 2. Note that the conditions specified for 2005-2075 imply a 70-year rotation for public standard class lands, a 180-year rotation for public special class lands, and a 50-year rotation for all private lands. This is not a forecast of an abrupt shift in public policy after 2005. These were chosen as reasonable rotation lengths for a test of the capability to harvest timber after 2005, that is, after current policies and actions among owner classes had been continued during 1975-2005.

It may help to discuss further how the projection for 2005-2075 proceeds. Consider the public standard class lands for which X = seven decades, that is, 70 years. First, we seek to maximize the harvest during 2005-2015 such that the harvest chosen can be maintained for 70 years, that is, to 2085. The test for the condition of the forest as of 2085 is that the harvest for 2075-2085 must come from trees of ages greater than or equal to 70 years. Thus, as of 2085 we have a forest approaching regulation, with no trees above 70 years of age. The harvest solution has accounted for all the interaction between starting inventory, land use shifts, cultural activities, growth, mortality, and harvest over the 70-year period and assures we can harvest a certain amount for 70 years and still meet the conditions set for the forest at the end of 70 years.

Next, the focus is the decade 2015-2025. The projection proceeds as for the previous decade, except that now it looks ahead to 2095 to test the harvest and conditions of the forest.

The projection proceeds decade by decade, calculating a harvest for each decade always looking ahead 70 years. In the last decade (2065-2075) the projection is looking ahead to the year 2145 to test the solution. During the projection span, the harvest can be increasing or decreasing or staying the same from decade to decade, depending on what is specified by the analyst. (The only restraint we used was that harvests from **public** lands couldn't decrease more than 10 percent from one period to the next.) If the projection was allowed to run long enough and land use shifts, switches between management intensities, etc., ceased after awhile, the forest would eventually become regulated, in this instance with a 70-year rotation. In most

instances, our projections don't run long enough to eliminate the effects of all the shift and switches, so we can only speak of approaching regulation. We also speak of an implied rotation because rotation in the traditional sense is not an issue during the projections. Only if regulation is achieved does a *de facto* rotation result. It would be equal to our implied rotation.

This technique provides a stairstep transition from an unregulated or unstable forest condition to a regulated, stable condition. It is similar in general concept to the SORAC projection program (Chappelle and Sassaman, 1968).

The harvest control for eastern Oregon timbersheds is similar to that for western Oregon except that age classes aren't recognized in eastern Oregon and can't be used to control the solution. Instead, diameter classes are used. That is, instead of using an age class restriction (rotation) that implies no trees above a certain age will be grown, the eastern Oregon harvest goals use a diameter restriction that implies no trees above a certain diameter will be grown. The eastern Oregon harvest control is as follows for the projections dealing with questions 1 and 2:

1975-2005—Same as for western Oregon.

2005-2075—Same as for western Oregon, except that at the end of X decades all trees above diameter Y will have been cut, leaving a distribution of trees with diameters less than or equal to Y. For all standard class lands, X = 8 decades, and Y = 13 inches. For all special class lands, X = 10 decades, and Y = 21 inches.

The conditions for standard class lands specified for 2005-2075 imply that at the end of 80 years the forest will be approaching a regulated condition for an all-age stand with the diameters of the trees in the stand less than or equal to 13 inches. The choice of 80 years for the time horizon is an arbitrary estimate that implies how long would be taken to selectively cut the standard lands so that there would be no trees greater than 13 inches in diameter. Eighty years also corresponds to a rough estimate of the time required to grow 13-inch trees on average site lands under low-intensity management.

The forest on special class lands is implied to approach all-age regulation in 100 years with trees less than or equal to 21 inches in diameter.

Harvest control specification 2. This specification is designed to answer **Question 4**: Assuming the various owner classes are willing to change some of their policies and actions, what is the capability for timber harvest over the next 100 years?

The control for western Oregon timbersheds is the same as for the years 2005-2075 in harvest control specification 1, except that in this instance it applies to the years 1975-2075. The harvest is to be maximized each decade (decade by decade) subject to the specified conditions that lead to sustained yield in the long run. As in harvest control 1, the implied rotations are 70 years for public standard class lands, 180 years for the public special class lands, and 50 years for all private lands.

Harvest control specification 2 for eastern Oregon timbersheds also is the same as that for the years 2005-2075 in harvest control specification 1, including the same specifications for time horizon and diameter limits on standard and special lands. That is, a time horizon of 80 years and a maximum diameter of 13 inches on standard class lands and a time horizon of 100 years and a maximum diameter of 21 inches on special class lands.

The only question not accounted for by the harvest control specifications is **Question 3**: How would increases in intensity of timber management change the results of the projections? This is the question that management intensity Target B is designed to answer. Thus, with two management-intensity targets and two harvest-control specifications, we have what is needed to answer all the questions. Now we need a shorthand way to designate the projections.

A Shorthand Guide to the Projections

To the analysts, a projection is a computer run. Thus, we will use the short word "RUN" to designate a projection. Each RUN is made up of a management intensity target, Target A or Target B, and a harvest control specification, Harvest Control Specification 1 or Harvest Control Specification 2. Thus, we can use the notation RUN A-1 to indicate a projection with management intensity Target A and Harvest Control Specification 1. Based on the previous discussion, we know that RUN A-1 is designed to answer questions 1 and 2, assuming

management intensity Target A for each administrative unit. A summary of all projections appears in Table 7.

A Survey of Other Key Assumptions

This section is to discuss, in general, other key assumptions that were made for the projections. The intent is to acquaint the reader with the range of assumptions that were made explicitly in this analysis. Specific numbers relating to the assumptions and an in-depth discussion of the reasoning behind them is available in a supplemental report available upon request from the School of Forestry, Oregon State University.

Land-use Shifts

For public lands, an attempt was made to get the most up-to-date allocation of forest land to various land classes. (See the Appendix, Tables A 1 and A 3, for the allocation of acres to various land classes and the definitions of the land classes.) The assumption was made that no further losses of commercial forest land would occur on public lands because the current allocations, by and large, include projections for nontimber uses of commercial forest land. These are included in the other objectives land class and are excluded from timber-growing considerations in our projections.

On the other hand, the assumption was that land would be added to timber-growing capacity out of the marginal land class, which consists of commercial forest land currently excluded from a timber-growing administrative unit because of economic or technical limitations. This land class was identified only for the National Forest owner class. It amounts to about 15 percent of the total National Forest commercial forest land in both western and eastern Oregon. The marginal land was assumed to enter timber-growing administrative units at the rate of 30 percent per decade over the next three decades. Thus, the National Forests were assumed to have overcome by 2005 the economic or technical limitations of their marginal lands such that 90 percent of it would be restored to the timber-growing capacity attributable to the site class and location of the land.

The only other explicit land-use shift assumed was a loss of commercial forest land from the Other Private owner class in western Oregon timbersheds at the rate of 0.85 percent per decade (based on extrapolation of data by Bolsinger, 1974). Some of

Table 7. An Explanation of the Notation for the Projections.

Management intensity targets	Harvest control specifications	
	1	2
	Current harvest 1975-2005 Capability to harvest 2005+	Capability to harvest 1975-2075
A Likely future management intensities for each administrative unit--the lower bound of our assumed range	RUN A-1 Projection for Questions 1 and 2 with the low end of the assumed range for management intensification	RUN A-2 Projection for Question 4 with the low end of the assumed range for management intensification
B Plausible future management intensities for each administrative unit--the upper bound for our assumed range	RUN B-1 Projection for Questions 1, 2, and 3 with the high end of the assumed range for management intensification	RUN B-2 Projection for Questions 4 and 3 with the high end of the assumed range for management intensification

this will likely be lost from timber growing, and some will be added to other owner classes for timber growing. For example, no losses of commercial timberland are assumed for Forest Industry, because any losses from that owner class probably will be offset by additions from Other Private.

Regeneration Assumptions

There are several explicit assumptions related to regeneration. These vary by administrative unit, so only a range of assumptions is shown.

First, recall that two regeneration assumptions are included in the management intensity targets: **the proportion of cutover acres reverting to hardwoods (MI-2)** and **the proportion of acres restocked with genetically improved stock (MI-7)** (See the Appendix, Tables A 5 and A 6).

Regeneration lag is assumed to range in western Oregon by administrative unit and management intensity from 2 years to 10 years, except for lands managed by the shelterwood method. For shelterwood management, a head start of 3 years before the final removal cut is assumed. In eastern Oregon, a regeneration lag assumption is not used. The addition of young trees into a stand is controlled by an assumption that ingrowth into the lowest diameter class just equals the trees leaving that class each period, that is, the lowest diameter class maintains a constant tree count.

Another consideration is **the proportion of cutover acres not regenerated each decade**. This ranges by administrative unit and management intensity from zero to 9 percent per decade. Related to this is **the proportion of the backlog of unstocked acres that are restocked each period**. This includes the backlog at the beginning of the projection, as well as that added to it over time. Depending on administrative unit, from 16 to 33 percent of the unstocked backlog is assumed to be restocked each decade. This suggests that, in the absence of large additions to the unstocked backlog in the future, some regeneration backlog could be close to elimination in three to four decades; for other administrative units it could take six or more decades.

Related to regeneration success is **the distribution of restocked acres by stocking level**. Restocked acres are allocated among three stocking levels: high, medium, and low representing 85, 55, and 25 percent stocked compared to the basic yield function for the management intensity in question. This allocation occurs at minimum harvestable age—25 years for our projections. It varies by administrative unit and management intensity. Weighted average stocking levels for restocked acres range from 54 percent to 87 percent in western Oregon. Stocking level was not an explicit variable for eastern Oregon.

Species Conversion Assumptions

Each administrative unit is made up of one or more resource units for which a primary species type is designated. The designated species type for the resource unit remains unchanged throughout the projection span, unless a species conversion is called for. This option was used only to convert some hardwoods and mixed species types to Douglas-fir species type. Conversion can occur as the species to be converted is routinely cut, or the rate of conversion can be accelerated by an explicit assumption. We used accelerated conversion based on interviews with forest managers. The proportion of acres in hardwood or mixed species to be converted ranged from 9 percent per decade over 6 decades to 25 percent per decade over 4 decades. The rate and time varied by administrative unit. Thus, the percentage of acres in hardwood or mixed species that could be converted over the projection span ranged from 54 percent to 100 percent, depending on administrative unit in western Oregon. Species conversion was not used for the eastern Oregon projections.

Harvest Assumptions

These assumptions relate to the type of harvest, where it comes from, and where it goes.

The **minimum age for commercial harvest** in western Oregon is assumed to be 25 years; the **minimum diameter for commercial harvest** in eastern Oregon is assumed to be 5 inches dbh.

The **age priority for regeneration harvest** in each western Oregon administrative unit is assumed to be "oldest age class first." The **diameter priority for regeneration harvest** in eastern Oregon is assumed to be a weighted distribution over all diameter classes eligible for harvest within an

administrative unit, such that proportionately more of the harvest comes from the larger diameter classes.

Commercial thinning is assumed to occur between ages 25 and 105, inclusive, in western Oregon for the management intensities that include commercial thinning (MI-4 through MI-7 in western Oregon). This varies by site class and management intensity, with commercial thinning beginning at age 25 or 35 on high and medium site lands and age 35 or 45 on low site lands, depending on management intensity. Only acres that are 70 percent stocked compared to the MI-3 yield function are eligible for commercial thinning. The volume to be removed is determined such that the stand after thinning is 60 percent stocked compared to the MI-3 yield function, **or** such that the stand after thinning has 67 percent of the before-thinning volume per acre, using whichever leaves the greatest volume per acre in the stand after thinning. If the thinning volume calculated as above is less than 800 cubic feet (about 4,000 board feet) per acre, no thinning occurs.

The age for precommercial thinning (stocking control) was assumed to be 15 for high and medium site lands and 25 for low site lands. This assumption is important as a criterion for the eligibility of acres to move into MI-5 and above. If a stand is older than the specified age, it is not eligible to move into MI-5 and above until it is regeneration harvested. If the stand is below the specified age, some acres can move to the higher management intensities at any time, provided the management intensity target allows them to. Commercial and precommercial thinning are not explicitly taken into account in eastern Oregon.

Shelterwood management is assumed for several administrative units in the Roseburg and South Coast timbersheds, and for all administrative units in the Medford timbershed except for those in the Other Private owner class and those that are totally hardwood species type. A two-stage shelterwood is assumed, with the final harvest coming 10 years after the first-stage harvest.

Mortality salvage is assumed for all western Oregon National Forest and BLM standard land class administrative units for projections made using management intensity Target B. At least 200 cubic feet (about 1,000 board feet) per acre of mortality salvage volume is required before mortality salvage can occur.

Mortality salvage was not explicitly assumed for eastern Oregon.

Where unit boundaries overlap timbershed boundaries, for example, a national forest that lies in two or more timbersheds, the **allocation of unit harvest among timbersheds** is assumed to be proportionate to the unit acres within each timbershed (Appendix, Table A 7).

Utilization Standards

The starting utilization standard for the projections was assumed to be cubic feet for trees 7 inches in dbh and larger to a 5-inch top. Over time, the utilization standard is allowed to move toward total cubic feet at the rate of 19 percent of the difference between the original utilization standard and total cubic feet each decade. The movement occurs over five decades; therefore, in the fifth decade the utilization standard is about 95 percent of total cubic feet. It remains at that standard for the rest of the projection span.

The board foot measure is used for reporting purposes only—the standard used is the Scribner log rule in trees 8 inches in dbh and larger to a 6-inch top.

Growth Assumptions

For western Oregon, a set of net yield functions was used. These vary by species type, site class, and management intensity. Accompanying each net yield function is a mortality function, so gross growth can be determined when needed.

Growth in the absence of thinning is the net growth from the appropriate yield function adjusted for differences in stocking percent. Stands with less than the yield function stocking for a particular age tend to exhibit more than the growth rate based on the net yield function. Stands with substantially more than the yield function stocking tend to exhibit a lower growth rate. The growth adjustment varies depending on the stand age and location of the administrative unit.

For MI-4, growth after commercial thinning is set at 90 percent of gross growth (net growth plus mortality). In the absence of commercial thinning, MI-4 growth is calculated as for MI-3. Growth for

MI-5, MI-6, and MI-7 is calculated the same as it is for MI-4, except each of these management intensities has its own net yield and mortality function. For this analysis, MI-6 and MI-7 are assumed to have identical yield functions. The advantage for MI-7 comes from more optimistic regeneration assumptions, which eventually translate into more growth because more acres are better utilized.

An example of medium site yields for Douglas-fir under different stocking assumptions and management intensities is shown in Figure 3. The Appendix contains more detail for the example in a tabular display (Table A 8).

For eastern Oregon, empirical diameter growth rates from the Forest Survey of the Pacific Northwest Forest and Range Experiment Station were used (Appendix, Table A 4). The growth was calibrated with the basal area at the time the growth was recorded. A function is included in the growth projection that modifies the diameter growth rates depending on the basal area at the time growth is calculated. If the basal area is less than the calibration basal area, growth tends to be accelerated; if it is greater, growth tends to be decelerated. No growth was assumed to occur if the basal area exceeded 200 square feet per acre.

There are other assumptions related to the computer simulation, or to things that are for reporting purposes only and do not affect the harvest flow solutions. These will not be discussed here, but will be described in the supplement referred to earlier.

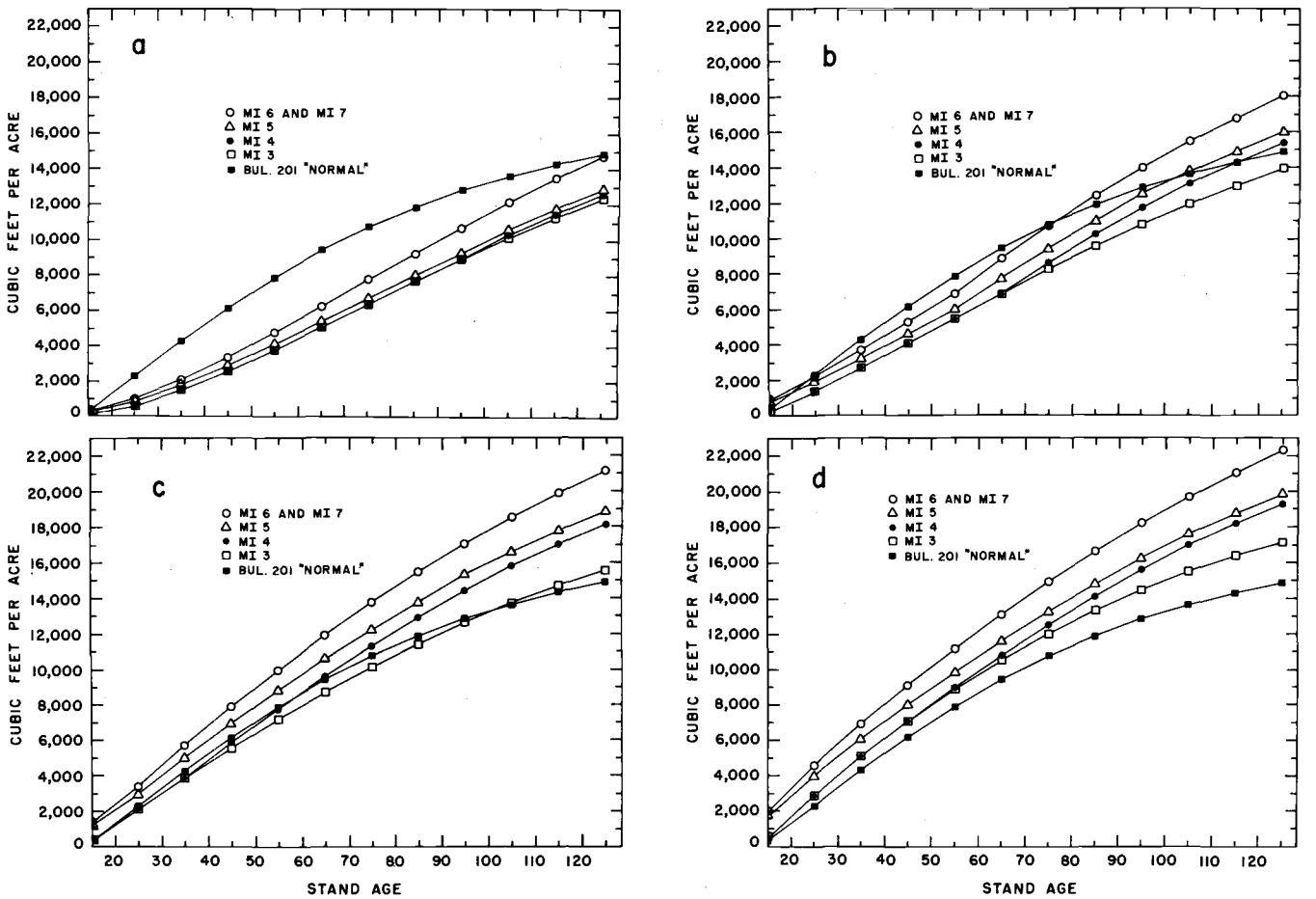


Figure 3. Douglas-fir yields on a medium site with different management intensities. Comparison is with normal yield as defined for site index 140 in Table 2 of Bulletin 201 (McArdle 1961). Four densities of stocking at age 25 are shown: 25 percent (a); 55 percent (b); 85 percent (c); and 115 percent (d).

TIMBER AVAILABILITY, NOW AND IN THE FUTURE–WESTERN OREGON

Here, let us review the four questions to be answered by the projections and the notation for the projections before discussing the results:

1. Can the present annual harvest (based on the annual average for 1968-1973) be maintained to the year 2000 if public owners maintain their current allowable cuts and private owners continue trying to fill the gap between public harvest and total harvest?

2. What is the capability for timber harvest after the year 2000 if policies and actions among owner classes in question one are continued until the year 2000?

3. How would increases in intensity of timber management change the results of the projections?

4. If we assume that the various owner classes are willing to change some of their policies and actions, what is the capability for timber harvest during the next 100 years?

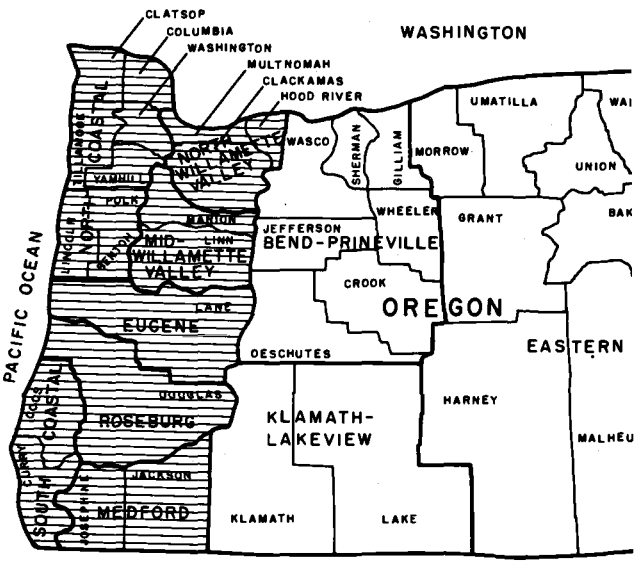
The notation for the projections is (from Table 7):

RUN A-1 is the projection for questions 1 and 2, with the low end of the assumed range for management intensification (Target A).

RUN B-1 is the projection for questions 1, 2, and 3 with the high end of the assumed range for management intensification (Target B).

RUN A-2 is the projection for question 4 with the low end of the assumed range for management intensification (Target A).

RUN B-2 is the projection for questions 4 and 3 with the high end of the assumed range for management intensification (Target B).



The Situation for Western Oregon

Questions 1 and 2. The current annual harvest for western Oregon based on the average experience for 1968-1973 is 1.4 billion cubic feet, or 7.15 billion board feet (Table A 9, Appendix). The sum of the western Oregon timbershed results for RUN A-1 tests whether that level of cut can be maintained for the next 30 years with the public agencies continuing to harvest their current annual allowable cuts (Table A 10, Appendix) and the private owner classes continuing to cut at about their current rates. Under these conditions, the current harvest cannot be maintained over the next 30 years (Figure 4-a, RUN A-1). The harvest can be maintained through about 1985, after which the inventories of merchantable growing stock for some administrative units will fall below the level of harvest being requested for western Oregon in each of the first three decades. Only 1.3 and 1.1 billion cubic feet can be cut annually in the second and third decades, under the assumptions of this projection. This amounts to a reduction of 7 percent and 22 percent in the second and third decades, compared to the requested 1.4 billion cubic feet.

Results of RUN A-1 after the year 2005 show the capability for harvest for the remainder of the projection span, with the assumption that some policies and actions among owner classes are modified as of 2005. Remember that after 2005, RUN A-1 enters a maximization phase that sets the

harvest for each administrative unit, in each decade, at the highest volume that will still allow satisfaction of the specified sustained-yield condition for the administrative unit. Thus, the harvest is seen to rise for some owner classes and fall for others in the fourth decade, depending on the condition of the timber inventory for the owner class at that time.

All owner classes except Forest Industry are shown to have the capability of raising their harvests in the fourth decade after harvests were held at current levels for three decades (Figure 4-a, RUN A-1). The result for western Oregon as a whole shows a capability to harvest in the fourth decade only 3 percent below the current harvest, and except for a slight dip in the fifth decade it rises gradually thereafter.

Question 3. Would a higher management intensity made a difference? Yes, but not much (Figure 4-a, RUN B-1). Only slightly more timber could be cut during the first three decades with higher management intensities. The big payoff for management intensification comes after the year 2005.

This conclusion must be qualified, however. Because public harvests were restricted to their current allowable cuts during the next 30 years, we really are testing whether higher management intensities on Forest Industry lands would help offset the declines for that owner class that occurred during 1975-2005 in RUN A-1. Thus, the conclusion, in the context of question 1, is that management intensification on Forest Industry lands is unlikely to make much difference in the total harvest in western Oregon during the next 30 years.

By comparing RUN B-1 with RUN A-1 for the period from 2005 to 2075, an increasing benefit from management intensification by all owner classes can be seen. The capability for harvest in western Oregon under RUN B-1 starts out 10 percent higher than under RUN A-1 during 2005-2015 and is 15 percent higher by 2065. The possibility of moving some of that benefit back to the period 1975-2005 will be seen when we compare RUN A-2 and RUN B-2.

Discussion of RUNS A-1 and B-1

The results of these runs must be viewed with caution—they are not forecasts of what will happen,

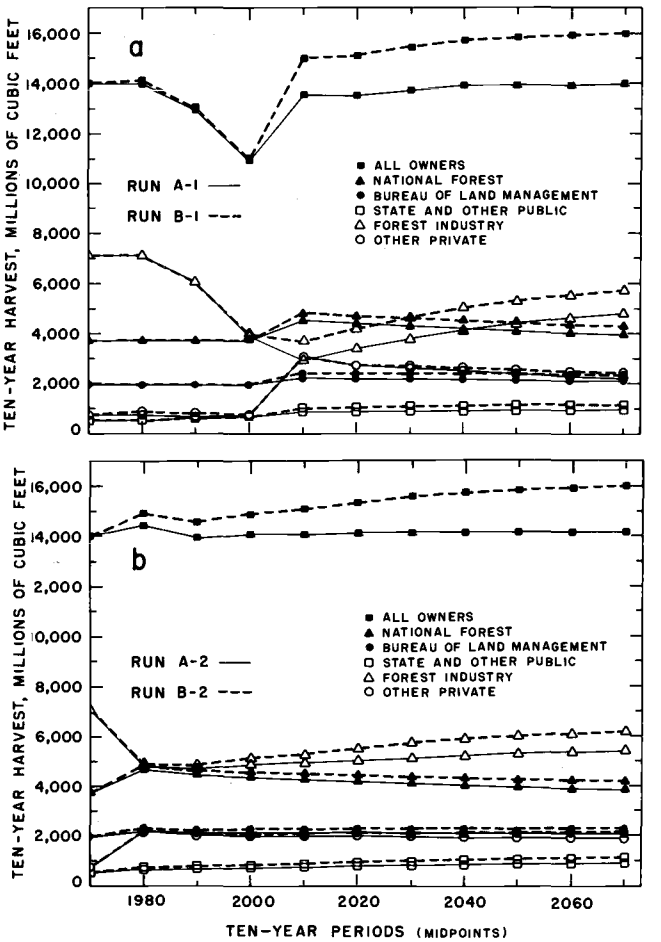


Figure 4. Harvest projections in western Oregon by owner class and management intensity target.

but rather forecasts of what could happen if present policies and actions are adhered to while trying to maintain the specified level of harvest in western Oregon. There is nothing sacred about 1.4 billion cubic feet of harvest in western Oregon, except that we're used to it. Presumably, the economy of the State will suffer to some degree if at least that level of harvest can't be maintained, all other things being equal.

The obvious message in Figure 4-a is that the Forest Industry owner class for western Oregon as a whole cannot continue to harvest the volume necessary to fill the gap between public allowable cuts and the current total harvest in western Oregon. A more subtle message is the ease with which the other owner classes can continue to meet their share of the current total harvest, and, in fact, are able to increase their harvests in the fourth decade when the

harvest maximization phase of the projection begins. Both of these occurrences were predictable based on previously published material (Gedney *et al.* 1975) and the assumptions about management intensification contained in these projections.

One question that might arise from studying the figure is: Why does the harvest for the Other Private owner class take such a huge jump in the fourth decade? This occurrence was also predictable based on previously published material. The Other Private owner class in western Oregon has been cutting less than one percent of its inventory, although its growth rate has been about three percent (adapted from Bassett and Choate, 1974). RUNS A-1 and B-1 provided for a continuation of this trend for 30 years, which results in a big increase of Other Private inventory. When the maximization phase of a projection begins in the fourth decade, it's like lifting the lid of a jack-in-the box.

Interpreting the meaning of the Other Private projections is difficult at best. This owner class is comprised of a large number of individuals with diverse objectives. Whether all of the timber shown in the projections will be available is conjectural, but it can't be ignored as part of the potential. On the other hand, a potential to increase harvest evidently exists, and some might argue that if timber prices rise more timber will be cut. The capability for more harvest will be seen in the analysis of RUNS A-2 and B-2. Note that this analysis starts out with about two-thirds of the Other Private acres shown in the latest published U.S. Forest Service statistics (Bassett and Choate, 1974). This reduction is based on our analysis of this owner class, which resulted in a transfer of some acres to Forest Industry and others out of the commercial forest land category. In addition, we assumed that 0.85 percent of the Other Private acres are going to other objectives each decade.

Another question based on Figure 4-a might be: Why does the harvest for the public owner classes go up in the fourth decade and decline gradually thereafter? This occurs primarily because of a backlog of old-growth timber that still exists in 2005 after the public harvest has been limited to current allowable cuts for 30 years. When the harvest maximization phase of the projection begins after 2005, the available old-growth timber will allow harvest to be increased without violating the sustained yield conditions of the problem. That is, the highest harvest level that can be sustained for seven decades is chosen in the fourth decade. At the end of seven decades the public administrative units are approaching sustained yield at about 70-year rotation. In the fifth and subsequent decades, as the old growth is cut, the harvest levels reflect an approach to long-run sustained yield at a 70-year rotation, thus the gradual decline. The possibility of these increases occurring earlier than 2005 will be seen in RUNS A-2 and B-2.

To some extent, RUNS A-1 and B-1 represent an artificial situation—merely a test of whether business as usual will support a continuation of current harvest levels for the next 30 years. The situation is artificial in that changes likely would occur in policies and actions over 30 years that will change these results. A place to start to look for possible changes is in the apparent ability of the various owner classes to produce timber. In RUNS A-1 and B-1, an attempt was made to get each owner class to cut at a specified level for the first three decades. What would happen if, instead, we specified a sustained yield objective for each owner class and made a projection to see how much they **can** cut and still meet the sustained yield criteria? That is, what is the answer to question four?

Question 4. RUNS A-2 and B-2 are projections used to chart the harvest trajectory under reasonable sustained-yield assumptions for each owner class. As was pointed out earlier, the procedure was to maximize the harvest, decade by decade, for each administrative unit starting in 1975, such that the harvest chosen could be maintained for a specified number of decades from the one in question. The specified number of decades implies a rotation length to be associated with the long-run sustainable harvest. For public lands, it's seven decades; for private lands, five decades.

The results for RUNS A-2 and B-2 are a significant change in harvest trajectory compared to RUNS A-1 and B-1 (Figure 4-b and Table 8). All public owner classes and the Other Private owner class could cut significantly more during the first three decades. Forest Industry cut is significantly less during the first two decades, but would be significantly more by the third decade. This occurs

because in RUNS A-1 and B-1 Forest Industry depleted its inventory in the first and second decades and had to reduce its cut in the second and third decades. In RUNS A-2 and B-2, the reductions occur in the first and second decade, so inventory increases, which allows more to be cut in the third and subsequent decades. In the long run, all comparable projections for an owner class tend toward the same sustained-yield harvest level, as indicated by the ratios approaching 1.00 in the tenth decade (Table 8).

Although the current harvest of 1.4 billion cubic feet in western Oregon could not be maintained through the first three decades in RUNS A-1 and B-1, it can be in both RUNS A-2 and B-2 (Table 9). Even with management intensity Target A, the harvests over the entire projection span never are significantly below the current harvest level, although there would be a slight decline in some decades compared to the harvest calculated for the first decade.[3] RUN A-2 shows a fairly constant harvest over time compared to the current harvest in western Oregon. RUN B-2 shows a gradually increasing harvest compared to the current harvest, which reflects the higher management intensities

[3]The reader is reminded that the projection span with regard to harvests actually extends beyond the ten decades discussed. The harvest volumes determined for the tenth decade include an assurance that those volumes can be harvested for the number of decades beyond the beginning of the tenth that are specified in setting up the maximization problem. For public owner classes, that is seven additional decades; for private owner classes, five additional decades. Thus, the effective projection span can be considered as 15 to 17 decades, depending on owner class.

Table 8. Comparison of Harvest Trajectories Between Alternative Projections for Western Oregon, by Ratios as Indicated by Column 1.

Comparison	Fixed harvest phase of RUN A-1 and RUN B-1			Harvest maximization phase of RUN A-1 and RUN B-1						
	1	2	3	4	5	6	7	8	9	10
				NATIONAL FOREST						
RUN A-2/RUN A-1	1.25	1.19	1.17	0.94	0.96	0.96	0.96	0.97	0.97	0.98
RUN B-2/RUN B-1	1.30	1.25	1.23	0.93	0.95	0.95	0.96	0.96	0.97	0.98
				BUREAU OF LAND MANAGEMENT						
RUN A-2/RUN A-1	1.13	1.10	1.11	0.96	0.97	0.97	0.97	0.98	0.98	0.98
RUN B-2/RUN B-1	1.19	1.17	1.18	0.94	0.96	0.96	0.97	0.97	0.97	0.98
				STATE AND OTHER PUBLIC						
RUN A-2/RUN A-1	1.34	1.20	1.09	0.89	0.92	0.93	0.95	0.95	0.96	0.97
RUN B-2/RUN B-1	1.48	1.34	1.24	0.86	0.90	0.92	0.93	0.93	0.95	0.96
				FOREST INDUSTRY						
RUN A-2/RUN A-1	0.67	0.78	1.26	1.68	1.49	1.37	1.27	1.21	1.16	1.13
RUN B-2/RUN B-1	0.68	0.81	1.30	1.44	1.31	1.23	1.17	1.13	1.10	1.08
				OTHER PRIVATE						
RUN A-2/RUN A-1	2.98	3.27	2.82	0.66	0.74	0.76	0.77	0.81	0.85	0.88
RUN B-2/RUN B-1	2.50	2.60	2.75	0.69	0.77	0.79	0.81	0.84	0.87	0.90
				ALL OWNER CLASSES, WESTERN OREGON						
RUN A-2/RUN A-1	1.03	0.08	1.29	1.04	1.05	1.03	1.02	1.02	1.02	1.01
RUN B-2/RUN B-1	1.06	1.12	1.35	1.00	1.02	1.01	1.00	1.00	1.00	1.00

assumed for that projection. The higher management intensities result in an ability to harvest 4 percent more timber in western Oregon during 1975-1995, compared to RUN A-2. After 1995, the difference is 6 percent, and it increases to 13 percent by 2065.

Can we now conclude that there are no problems with timber availability in western Oregon for the next 30 years? Not necessarily. There are important considerations beyond the simple comparison of total harvest figures.

First, RUNS A-2 and B-2 reflect changes in allowable-cut policies of public agencies for the next 30 years that may be unacceptable to the public—such things as shorter rotations and harvests that decline from one decade to the next.

Second, no mention has been made so far of what is happening in local areas—at the timbershed level—during the projections.

If we assume, for the purpose of discussion, that public agencies would change their policies (specifically, the nondeclining, even-flow policies) as assumed in RUNS A-2 and B-2, we have seen that current harvest for western Oregon as a whole could be maintained indefinitely, despite a likely drop in harvest by Forest Industry (Table 9).

This, however, is not meaningful without knowing the situation at the timbershed level. Even though western Oregon as a whole appears to be able to sustain the current harvest over time, that sustainability could be comprised of a deficit in some timbersheds, offset by a surplus in others, compared to the current harvest for those timbersheds.

The view from the timbersheds. Before presenting the results for the individual timbersheds, we should put the timbersheds into perspective with regard to our discussion of western Oregon. The results for western Oregon as a whole represent the sum of the results for the individual timbersheds in western Oregon. Thus, if we look at RUNS A-2 and B-2, for the individual timbersheds, we can see which timbersheds are likely to have declines relative to current harvest, and which are likely to have increases (Table 10).

The entries for western Oregon as a whole in Table 10 confirm what we've already noted: the current harvest of western Oregon can be maintained over the next 30 years (disregarding a negligible deficit during 1985-1995 under management intensity Target A). The negative numbers in the body of the table, however, indicate timbersheds in which harvest is likely to decline, even though all owner classes are harvesting at the full capability indicated by RUN A-2 or RUN B-2. A pattern is evident in the table, with the largest negative numbers occurring during 1985-1995, and centering around the Eugene timbershed. The decline for the Eugene timbershed compared to current harvest would be around 16 percent during 1985-1995 under management intensity Target A and around 14 percent under Target B. On the other hand, increases of as much as 33 percent above current harvest are evident in the North Coast timbershed. This, along with lesser increases for some other timbersheds, offsets the declines shown for Eugene and elsewhere.

How should this be interpreted?

In general, the negative numbers in Table 10 indicate potential trouble spots; the positive numbers, potential areas of opportunity. The timbersheds chosen for the analysis are not independent, closed systems. Although we have based our analysis on where the forest land lies, that doesn't legislate where the timber might be used.[4] Thus, changes from our assumptions could well occur. Timber marketing patterns could develop such that some of the pluses could cancel some of the minuses in Table 10. Alternatively, wood processing capacity could migrate from deficit areas to surplus areas. And, of course, more timber or less timber could be harvested from either private or public forest lands, but not without changing the trajectories in Figure 4b. There are many possibilities, but the scope of this analysis is limited to the range of reasonably possible occurrences discussed here. It may be desirable to look at other possibilities in future analyses aimed at developing forestry policies and programs for Oregon.

[4] Marketing patterns are subject to change over time because of many factors. As this analysis deals with long-run projections, it was decided that distribution of harvest proportional to location is more defensible than projecting on the basis of current marketing patterns that might be inherently unstable.

Table 9. The Relationship of Harvest Projections to Current Harvest.

Projection being compared with current harvest	Ratio by decade									
	Fixed harvest phase for RUN A-1 and RUN B-1[1]			Harvest maximization phase for RUN A-1 and RUN B-1						
	1	2	3	4	5	6	7	8	9	10
				NATIONAL FOREST						
RUN A-1	1.00	1.00	1.00	1.22	1.18	1.15	1.13	1.10	1.08	1.06
RUN B-1	1.00	1.00	1.00	1.30	1.26	1.24	1.22	1.19	1.17	1.16
RUN A-2	1.25	1.19	1.17	1.15	1.13	1.10	1.08	1.06	1.05	1.04
RUN B-2	1.30	1.25	1.23	1.21	1.19	1.18	1.16	1.15	1.14	1.13
				BUREAU OF LAND MANAGEMENT						
RUN A-1	1.00	1.00	1.00	1.15	1.14	1.14	1.13	1.11	1.10	1.09
RUN B-1	1.00	1.00	1.00	1.26	1.26	1.26	1.26	1.24	1.24	1.23
RUN A-2	1.13	1.10	1.11	1.10	1.11	1.10	1.10	1.09	1.08	1.08
RUN B-2	1.19	1.16	1.18	1.19	1.20	1.21	1.21	1.21	1.21	1.21
				STATE AND OTHER PUBLIC[2]						
RUN A-1	1.00	1.00	1.00	1.72	1.76	1.80	1.85	1.88	1.91	1.92
RUN B-1	1.00	1.00	1.00	2.09	2.15	2.24	2.31	2.36	2.39	2.41
RUN A-2	1.34	1.39	1.46	1.53	1.61	1.68	1.75	1.78	1.82	1.86
RUN B-2	1.48	1.56	1.67	1.80	1.93	2.06	2.14	2.21	2.27	2.32
				FOREST INDUSTRY						
RUN A-1	1.00	0.86	0.56	0.41	0.47	0.53	0.58	0.62	0.65	0.68
RUN B-1	1.00	0.85	0.57	0.52	0.59	0.65	0.71	0.75	0.78	0.81
RUN A-2	0.67	0.66	0.69	0.69	0.71	0.72	0.74	0.75	0.75	0.76
RUN B-2	0.68	0.68	0.72	0.75	0.78	0.81	0.83	0.85	0.86	0.87
				OTHER PRIVATE						
RUN A-1	1.00	1.00	1.00	4.20	3.75	3.60	3.47	3.31	3.16	3.04
RUN B-1	1.00	1.00	1.00	4.24	3.84	3.74	3.65	3.54	3.44	3.34
RUN A-2	3.00	2.80	2.79	2.79	2.77	2.74	2.69	2.67	2.67	2.66
RUN B-2	3.04	2.89	2.89	2.94	2.96	2.97	2.96	2.99	2.99	3.00
				ALL OWNER CLASSES, WESTERN OREGON						
RUN A-1	1.00	0.93	0.78	0.97	0.97	0.98	0.99	1.00	1.00	1.00
RUN B-1	1.00	0.93	0.79	1.07	1.08	1.11	1.13	1.14	1.14	1.15
RUN A-2	1.03	1.00	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
RUN B-2	1.07	1.04	1.07	1.08	1.08	1.11	1.13	1.14	1.14	1.14

[1]A specific harvest is requested from each owner class in each of the first three decades for RUN A-1 and RUN B-1. For National Forests, BLM, and State and Other Public, it is the sum of the western Oregon allowable cuts for each owner class. For the private owner classes, it is the amount necessary to fill the gap between the current harvest for western Oregon and the sum of the allowable cuts from the three public owner classes.

[2]The allowable cuts for the Oregon State Forestry Department vary for the first three decades. Therefore, the ratios shown for those decades for RUN A-1 and RUN B-1 are the projection harvest volume divided by the actual allowable cut in each of the first three decades. For RUN A-2 and RUN B-2, the ration for all decades is the projection harvest volume divided by the allowable cut for the first decade.

Table 10. Surpluses and Deficits in Millions of Cubic Feet between the Ability to Harvest and the Current Harvest, by Timbershed for Three Decades for RUN A-2 and RUN B-2.

Timbershed	Current harvest[1]	Surpluses and deficits[2]					
		1975-1985		1985-1995		1995-2005	
		A-2	B-2	A-2	B-2	A-2	B-2
North Coast	301.1	59.3	74.0	58.5	79.7	71.2	100.6
North Willamette Valley	98.7	26.4	32.4	18.8	26.2	17.0	25.5
Mid-Willamette Valley	145.5	-3.4	0.9	-10.7	-5.3	-12.5	-5.6
Eugene	286.1	-40.8	-34.3	-47.4	-39.1	-46.2	-35.8
Roseburg	292.2	-10.5	-1.7	-24.0	-12.7	-24.2	-10.0
South Coast	154.2	2.6	6.0	-0.9	3.7	2.0	8.3
Medford	118.6	13.7	17.3	3.9	7.9	4.3	10.2
Western Oregon	1,396.4	47.3	94.6	-1.8	60.4	11.6	93.2

[1]Average annual harvest, based on 1968-1973.
[2]Negative values show deficits.

All that can be concluded here is that, even though it may be physically possible to continue the current harvest in western Oregon during the next three decades and beyond, there is no guarantee that all timbersheds will fare well during that period. Some timbersheds likely will suffer deficits relative to their current harvest levels, even while others show surpluses.

The Situation by Timbershed

This section will rely primarily on a series of 10 graphs to tell the story for each timbershed. Graph **a** represents RUNS A-1 and B-1 for each owner class, and Graph **b** represents RUNS A-2 and B-2 for each owner class within the timbershed. These graphs can be used to infer the answers to questions 1-4 for the timbershed, just as they were used to answer these questions for western Oregon as a whole.

Graphs **c** and **d** show the distribution of the harvest, over time, in each of five diameter classes, for all owner classes combined, in all projections.

For simplicity, the rest of the graphs pertain only to RUNS A-2 and B-2.

Graph **e** shows the distribution of the harvest, over time, for all owner classes combined, among types of harvest: clearcut, shelterwood, thinnings, and other.

Graph **f** shows the distribution of the harvest, over time, for all owner classes combined, between softwood and hardwood.

Graphs **g** through **j** show the number of acres, over time, for each owner class, that will be subject to conversion from hardwood to softwood growing stock (**g**); stocking control (precommercial thinning) (**h**); fertilization (**i**); and planting of genetically improved stock (**j**).

The harvest graphs (**a** through **f**) show the characteristics of the harvest over time for the specified projections. The cultural activity graphs (**g** through **j**) reflect some specific assumptions that must be fulfilled to get the harvests shown. The projections can be evaluated, to some degree, by the faith one has that such things as hardwood conversion, stocking control, fertilization, and genetic improvement will occur to the extent shown.

Interpretation of the graphs on cultural activity will be left to the reader. Only a short summary of key points regarding harvest projections will accompany each set of timbershed graphs.

To avoid repetition, there are some characteristics most timbersheds exhibit that are the same as those noted for western Oregon: 1, all public administrative units and the Other Private owner class in each timbershed can maintain their share of

the current harvest for three decades in RUNS A-1 and B-1; 2, almost all public administrative units and the Other Private owner class in each timbershed exhibit an increase in harvest in the fourth decade of RUNS A-1 and B-1 when the maximization phase begins—correspondingly, these same units exhibit higher first decade harvests for RUNS A-2 and B-2 than the fixed amount called for in the first decade of RUNS A-1 and B-1; 3, there is no timbershed in which the Forest Industry owner class can maintain the harvest needed to fill the gap between the fixed public harvests and the current harvest for the next 30 years in RUNS A-1 and B-1—correspondingly, the Forest Industry harvest was lower in the first decade for RUNS A-2 and B-2 than the amount called for to fill the gap; 4, all timbersheds will be harvesting smaller diameter trees in the future, although the transition times differ, as will be noted.

North Coast. The current situation at a glance is as tabulated below (pertains only to lands currently in the standard and special land classes).

This timbershed apparently will have no trouble maintaining its current harvest, and apparently could harvest up to 20 percent more timber within the next decade. The only decline over the next three decades occurs for Forest Industry in RUNS A-1 and B-1—in both runs a gradual decline occurs during the first three decades. In RUN A-1, it continues into the fourth decade with recovery thereafter; in RUN B-1, the higher management intensity spurs recovery in the fourth decade (Figure 5a).

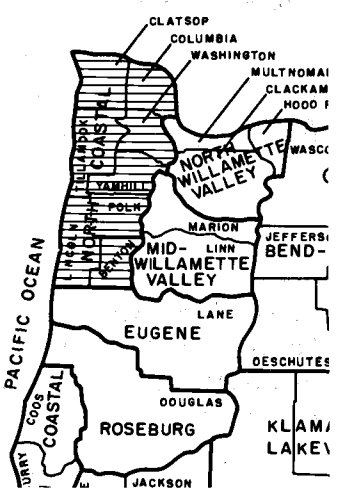
RUN A-2 shows capability for a rise of up to 20 percent in total harvest during 1975-1985, and a gradual increase thereafter (Figure 5b). This is a somewhat speculative capability, because it presumes changes in policies by public owners and changes in behavior by private owners. A sizeable segment of the current inventory is held by the unpredictable Other Private owner class. If this owner class could not be counted upon to increase harvest above current levels, the potential increase during 1975-1985 for the timbershed drops from 20 percent to about 4 percent. Under management intensity Target B, the results are similar, with slightly higher increases.

Several qualifications regarding the harvest projections should be noted. Based on RUNS A-2 and B-2, the size of harvested trees will decline significantly after 1985 (Figure 5d) and there will be a sizeable hardwood component in the timbershed harvest over the next 30 years (Figure 5f). Volume to be harvested from trees greater than 21 inches dbh will decline from more than 50 percent of total harvest during 1975-1985 to about 18 percent of total harvest during 1985-1995 and decline steadily thereafter. The bulk of the harvest will come from trees between 9 and 21 inches dbh after 1985.

Hardwoods will account for 16 to 18 percent of the harvest volume during the next 30 years, primarily because extensive conversion of hardwoods is assumed during that period (Figure 5g). If the hardwood conversion doesn't occur, the near-term hardwood component will decline, but hardwood harvests then would be greater at some future time, assuming the hardwood is to be harvested eventually.

Owner class	Commercial timber area	Standing growing stock volume	Standing sawtimber volume[1]	Current harvest[1]
	%	%	%	%
National Forest	9.8	16.6	21.0	12.4
BLM	7.4	11.2	12.1	7.6
State & Other Public	19.8	8.6	6.9	7.2
Forest Industry	43.7	41.8	37.9	65.2
Other Private	19.3	21.8	22.1	7.6
All classes	100.0	100.0	100.0	100.0

[1]Trees 8 inches or more in dbh.



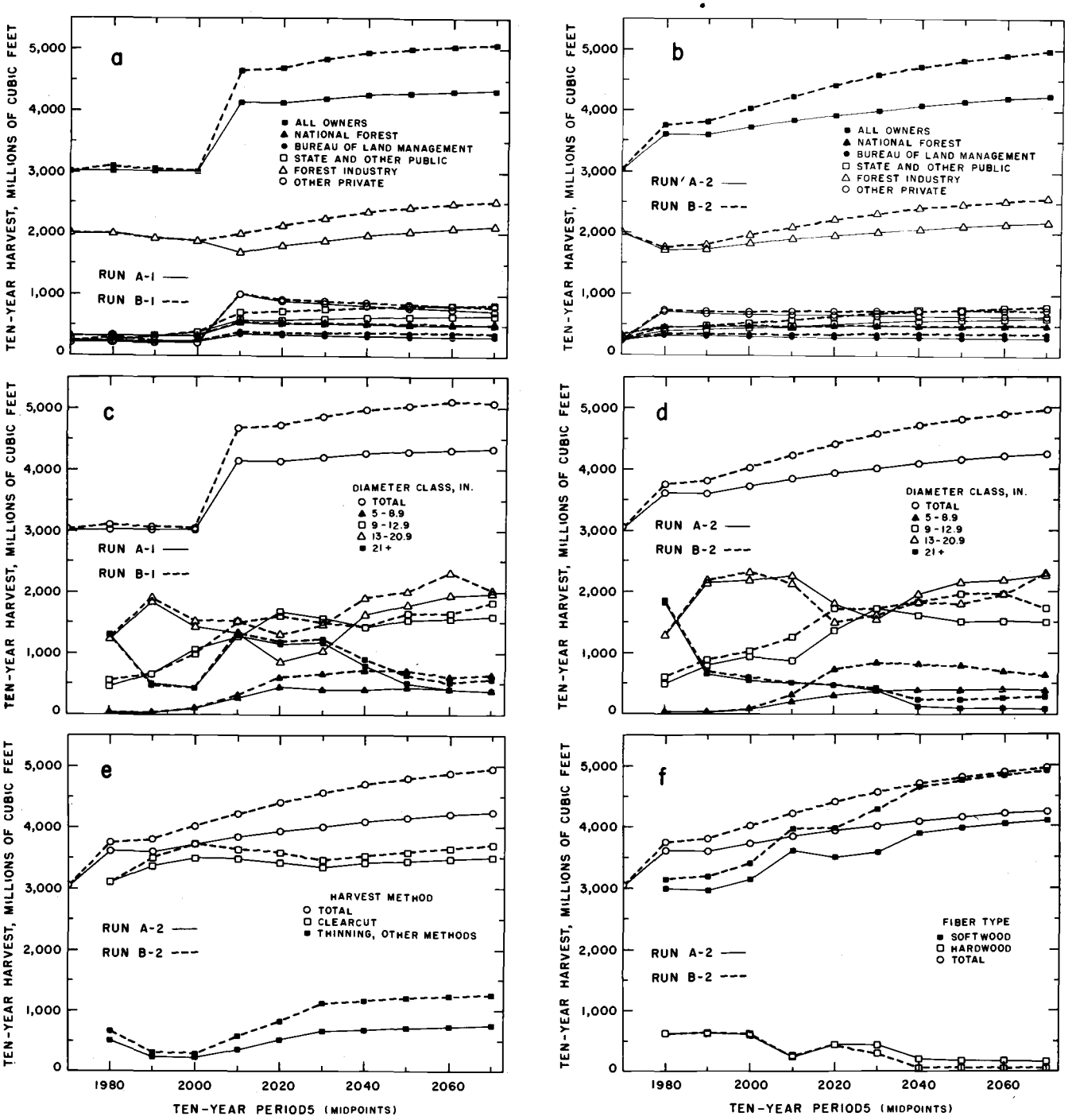
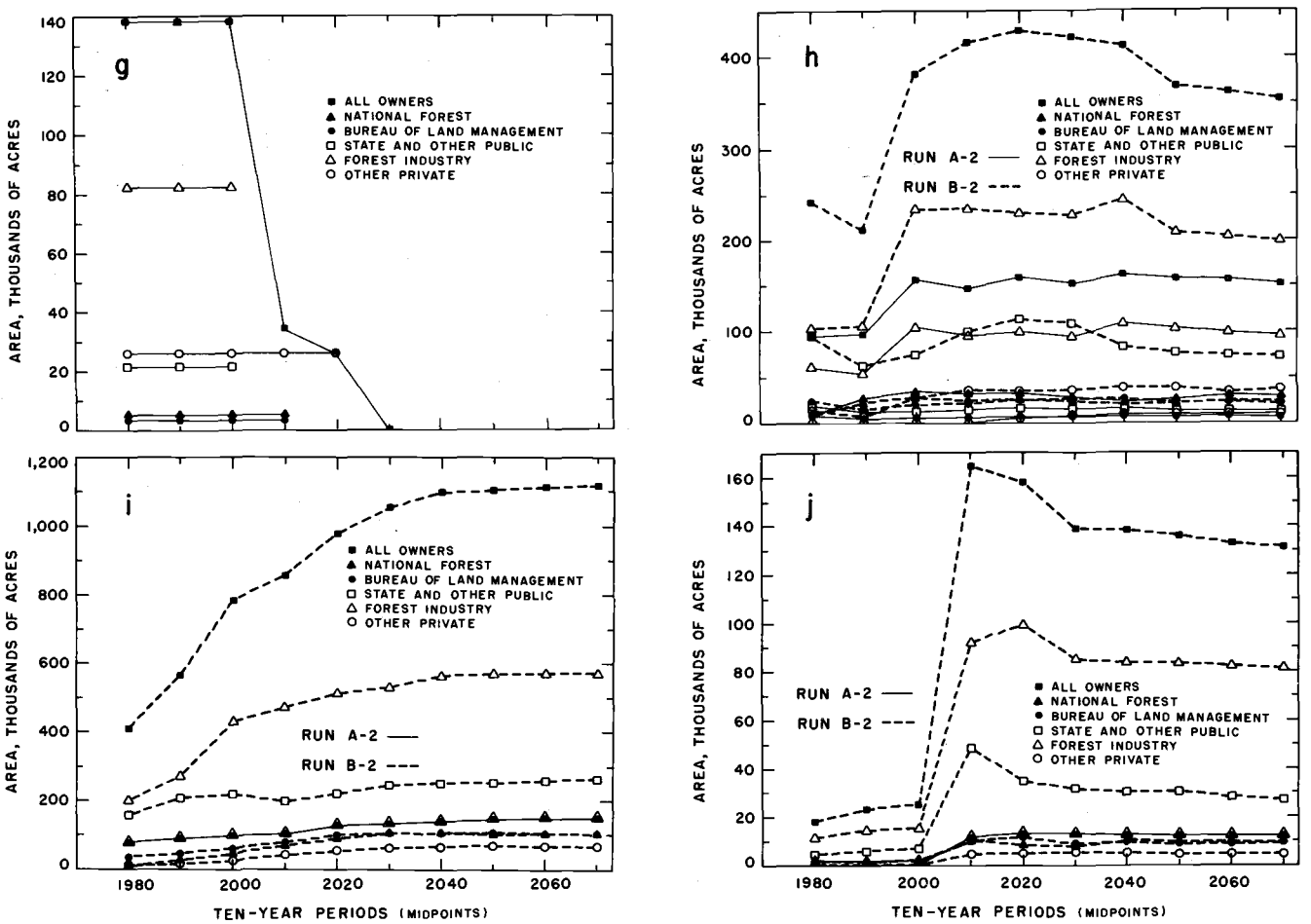


Figure 5. Harvest projections for the North Coast timbershed: By owner class and management intensity target (a, b); by diameter class (c, d); by harvest method (e); and by fiber type (f). Projected acres subjected to accelerated conversion of hardwoods (g); to stocking control (h); to fertilization (i); and to genetic planting (j).

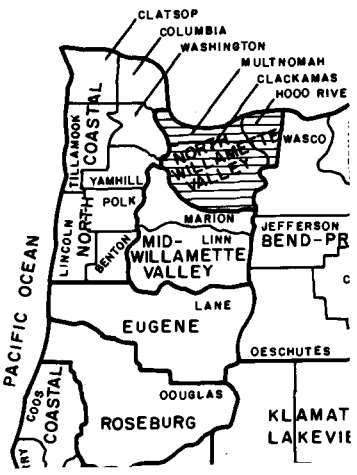


North Willamette Valley. The current situation at a glance is as tabulated below (pertains only to lands currently in the standard and special land classes).

This timbershed is characterized by an extremely heavy Forest Industry harvest relative to the inventory for that owner class. As a consequence, Forest Industry cannot maintain its current

Owner class	Commercial timber area	Standing growing stock volume	Standing sawtimber volume[1]	Current harvest[1]
	%	%	%	%
National Forest	58.0	71.0	73.0	50.0
BLM	5.2	6.8	7.2	6.5
State & Other Public	5.4	2.6	1.9	5.5
Forest Industry	15.2	7.1	6.3	33.2
Other Private	16.2	12.5	11.6	4.8
All classes	100.0	100.0	100.0	100.0

[1]Trees 8 inches or more in dbh.



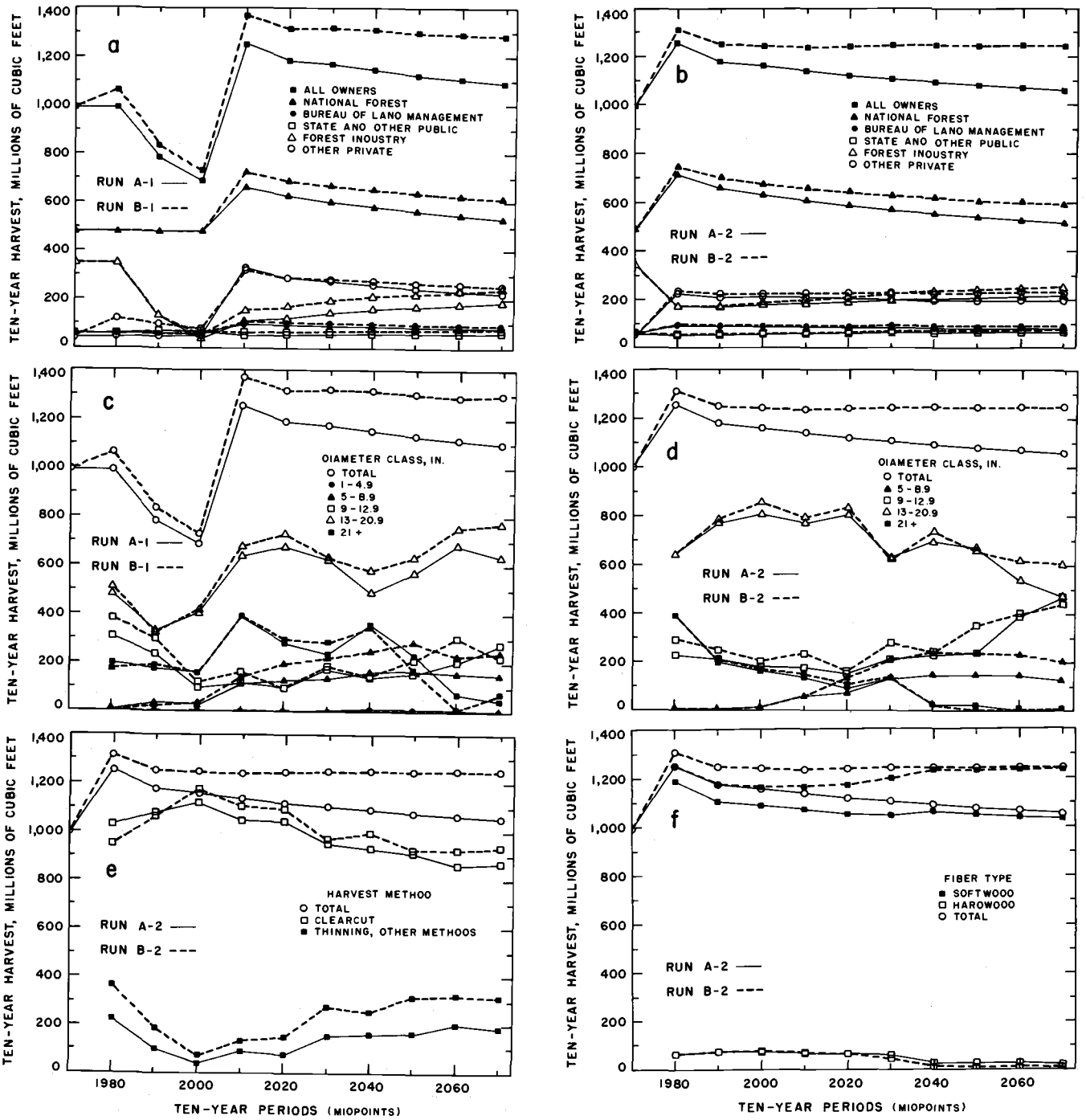
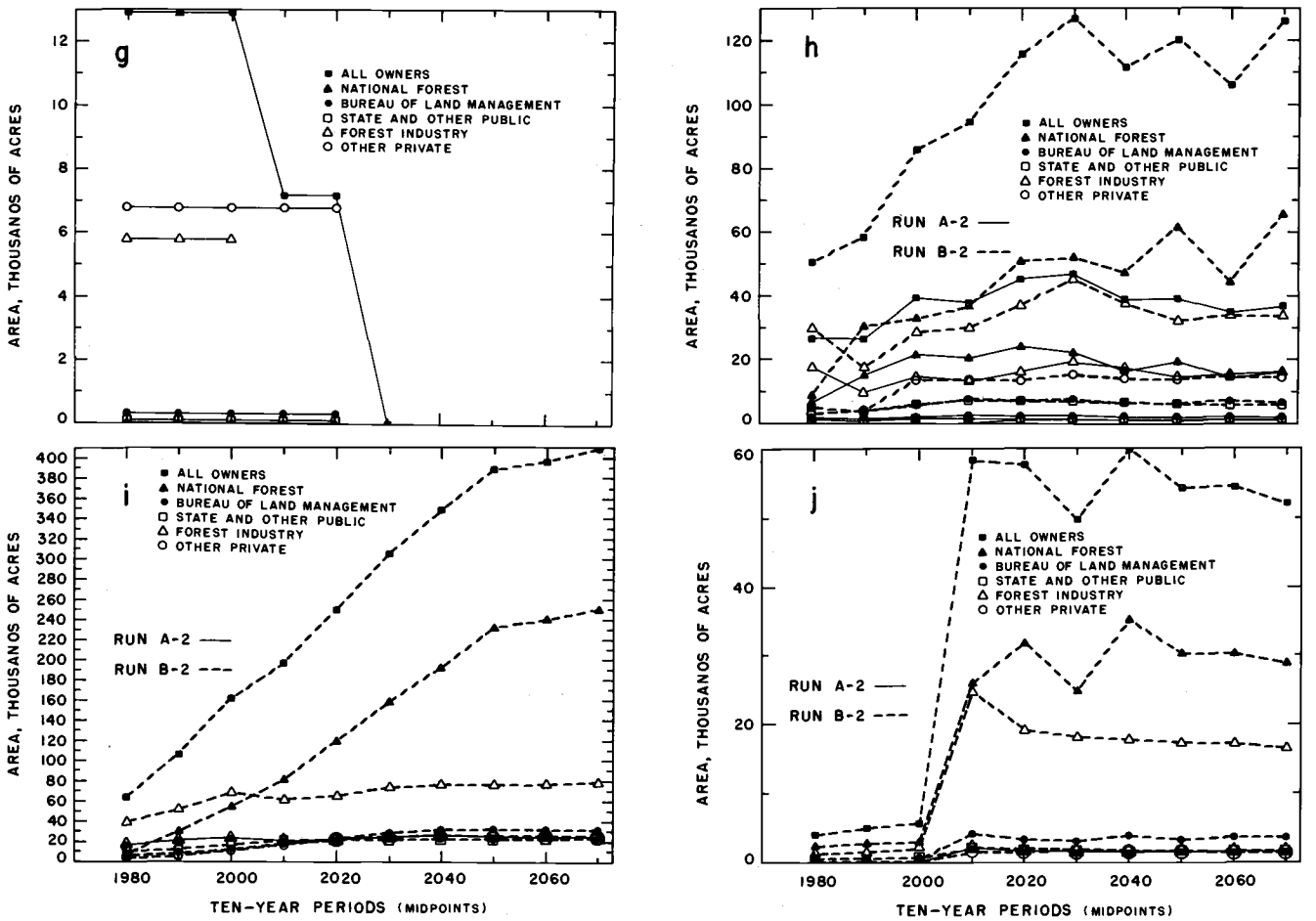


Figure 6. Harvest projections for the North Willamette Valley timbershed: By owner class and management intensity target (a, b); by diameter class (c, d); by harvest method (e); and by fiber type (f). Projected acres subjected to accelerated conversion of hardwoods (g); to stocking control (h); to fertilization (i); and to genetic planting (j).



harvest beyond the first decade with either management intensity Target A or Target B (Figure 6a). The result under current policies and actions would be a decline of 30 percent in the timbershed harvest by the third decade.

RUN A-2 shows an apparent ability for National Forest, BLM, and Other Private to harvest more timber at present. This could offset the Forest Industry decline such that the timbershed harvest during 1975-1985 could be as much as 27 percent higher than the current harvest (Figure 6b). The Other Private owner class is a significant component of this capability—it has more commercial forest acreage and inventory volume than Forest Industry. If Other Private could not be counted upon to increase harvest above current levels, the potential for 1975-1985 for the total timbershed harvest is only 8 percent above the current harvest.

Based on RUNS A-2 and B-2, the volume of trees 21 inches and larger in dbh to be harvested in the timbershed will decline from over 30 percent of total harvest during 1975-1985 to about 17 percent during 1985-1995, and decline steadily thereafter (Figure 6d).

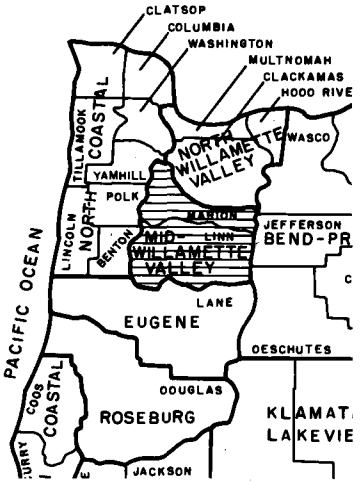
Hardwoods are not a major factor in the future harvest, never amounting to more than 6 percent of the total (Figure 6f).

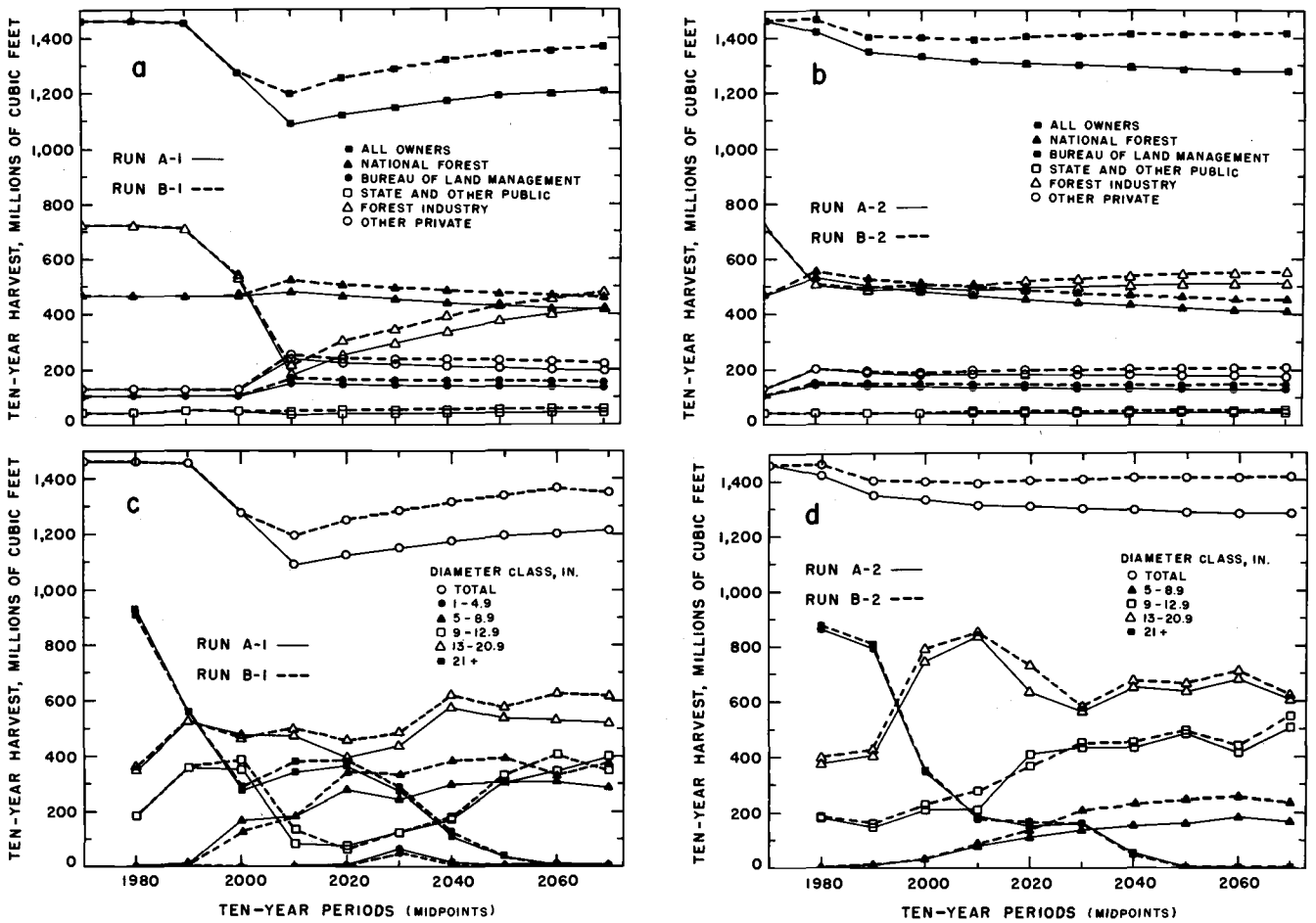
Mid-Willamette Valley. The current situation at a glance is as tabulated below (pertains only to lands currently in the standard and special land classes).

Under current policies and actions, this timbershed could maintain its current total harvest through 1995 with a decline in the two decades thereafter, the low point being about 25 percent below the current harvest (Figure 7a). With the higher management intensity of Target B, the low point would be only 19 percent below current harvest (Figure 7a). A

Owner class	Commercial timber area	Standing growing stock volume	Standing sawtimber volume[1]	Current harvest[1]
	%	%	%	%
National Forest	40.6	53.4	53.6	29.7
BLM	8.6	10.0	10.5	7.2
State & Other Public	3.7	1.9	1.3	2.3
Forest Industry	32.4	24.8	25.0	51.9
Other Private	14.7	9.9	9.6	8.9
All classes	100.0	100.0	100.0	100.0

[1]Trees 8 inches and larger in dbh.





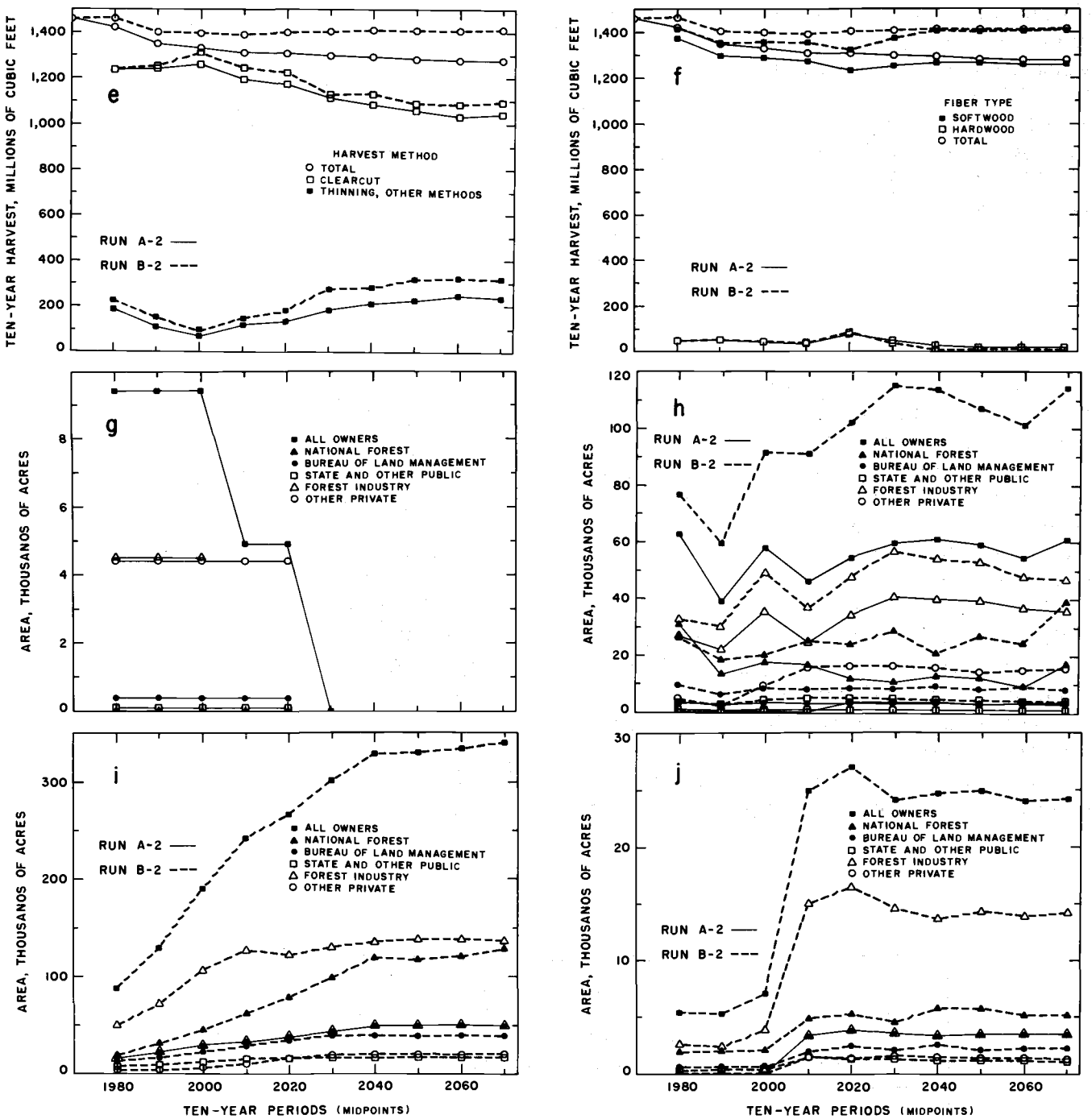


Figure 7. Harvest projections for the Mid-Willamette Valley timbershed: By owner class and management intensity target (a, b); by diameter class (c, d); by harvest method (e); and by fiber type (f). Projected acres subjected to accelerated conversion of hardwoods (g); to stocking control (h); to fertilization (i); and to genetic planting (j).

decline is forecast for Forest Industry with either management intensity Target A or Target B, but it would not be significant until after 1995.

Changes in policies and actions as depicted in RUN A-2 also would result in a decline in total harvest during the next 30 years: 9 percent by 1995

(Figure 7b). After 2005, the decline would be more gradual, but steady, until 2065 when total harvest would be about 8 percent of current harvest. In RUN B-2, the higher management intensities reverse a declining trend from 1975 to 1995; after 1995, there is a gradual increase in total harvest, which stabilizes after 2035 at about 97 percent of current harvest (Figure 7b).

Based on RUNS A-2 and B-2, about 60 percent of the harvest will come from trees 21 inches in dbh and larger until 1995. During 1995-2005, this will drop to about 26 percent and decline steadily thereafter (Figure 7d).

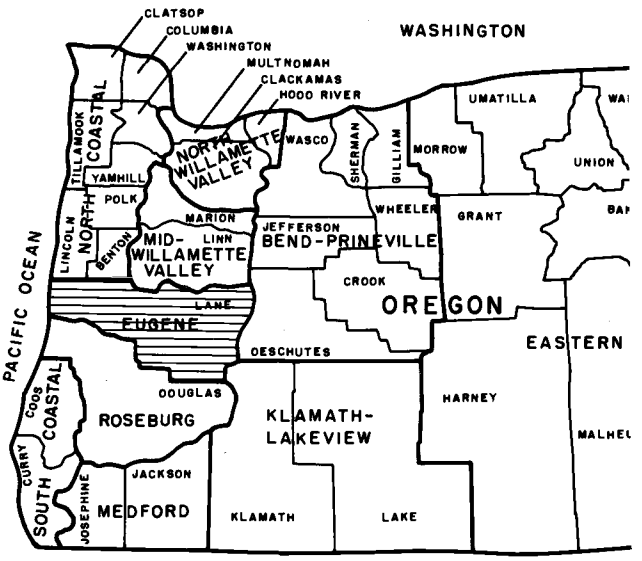
Hardwoods are a minor component of the harvest, never amounting to more than 4 percent (Figure 7f).

Eugene. The current situation at a glance is as tabulated below (pertains to lands currently in the standard and special land classes).

Regardless of which projection is considered, the current timbershed harvest cannot be maintained in this timbershed. For RUNS A-1 and B-1, the decrease between 1975 and 2005 is about 40 percent (Figure 8a).

The potential for timbershed harvest in 1975-1985 based on RUN A-2 is 86 percent of the current harvest; based on RUN B-2, it is 88 percent of the current harvest (Figure 8b).

Forest Industry currently is harvesting at a very high rate relative to the inventory for that owner class, and cannot maintain its current level of harvest beyond 1985. If the current harvest was maintained



Owner class	Commercial timber area	Standing growing stock volume	Standing sawtimber volume[1]	Current harvest[1]
	%	%	%	%
National Forest	50.1	67.6	68.7	38.1
BLM	12.3	10.3	10.3	11.6
State & Other Public	1.0	0.6	0.5	0.7
Forest Industry	26.7	16.4	15.9	45.6
Other Private	9.9	5.1	4.6	4.0
All classes	100.0	100.0	100.0	100.0

[1]Trees 8 inches and larger in dbh.

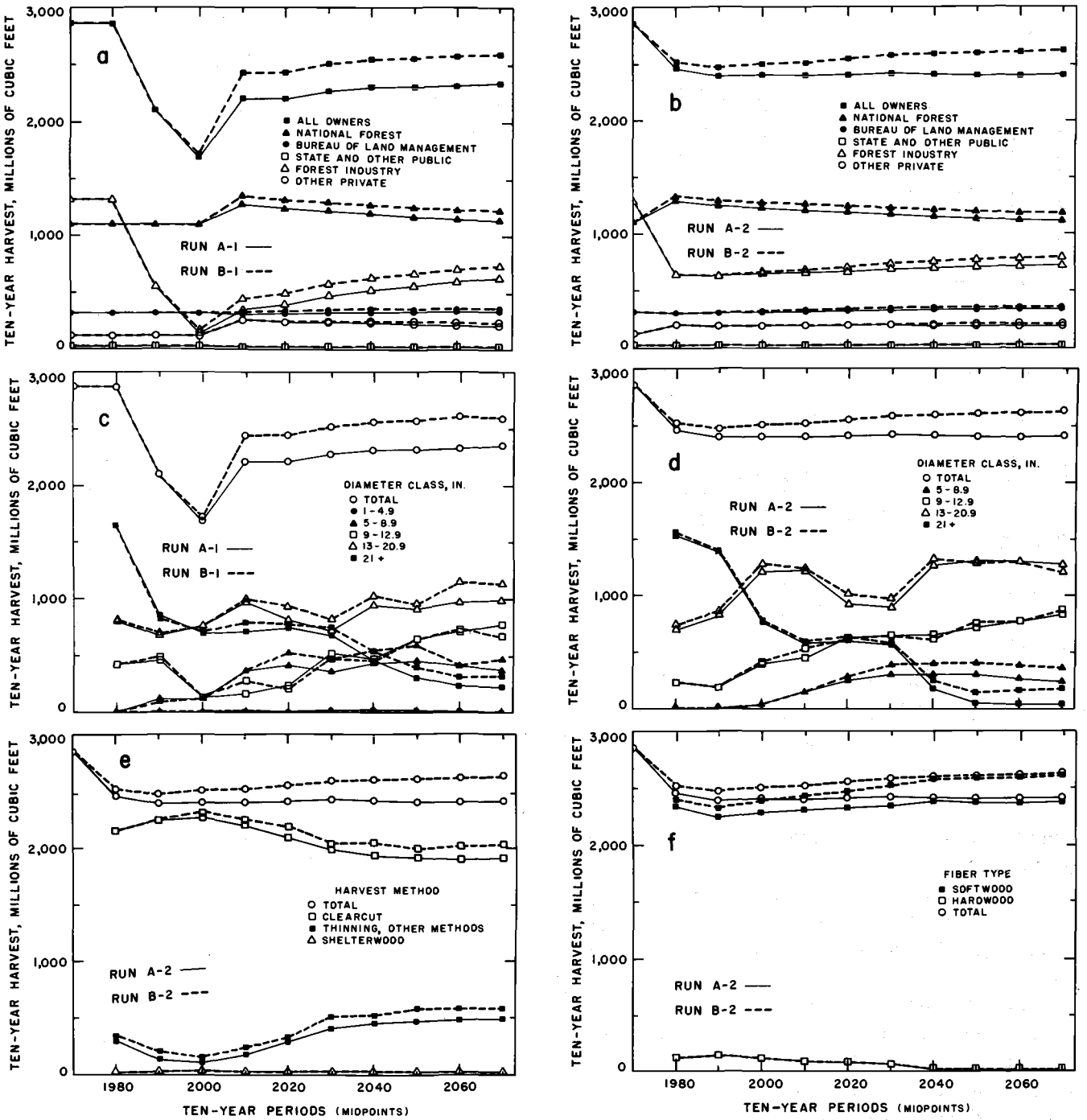
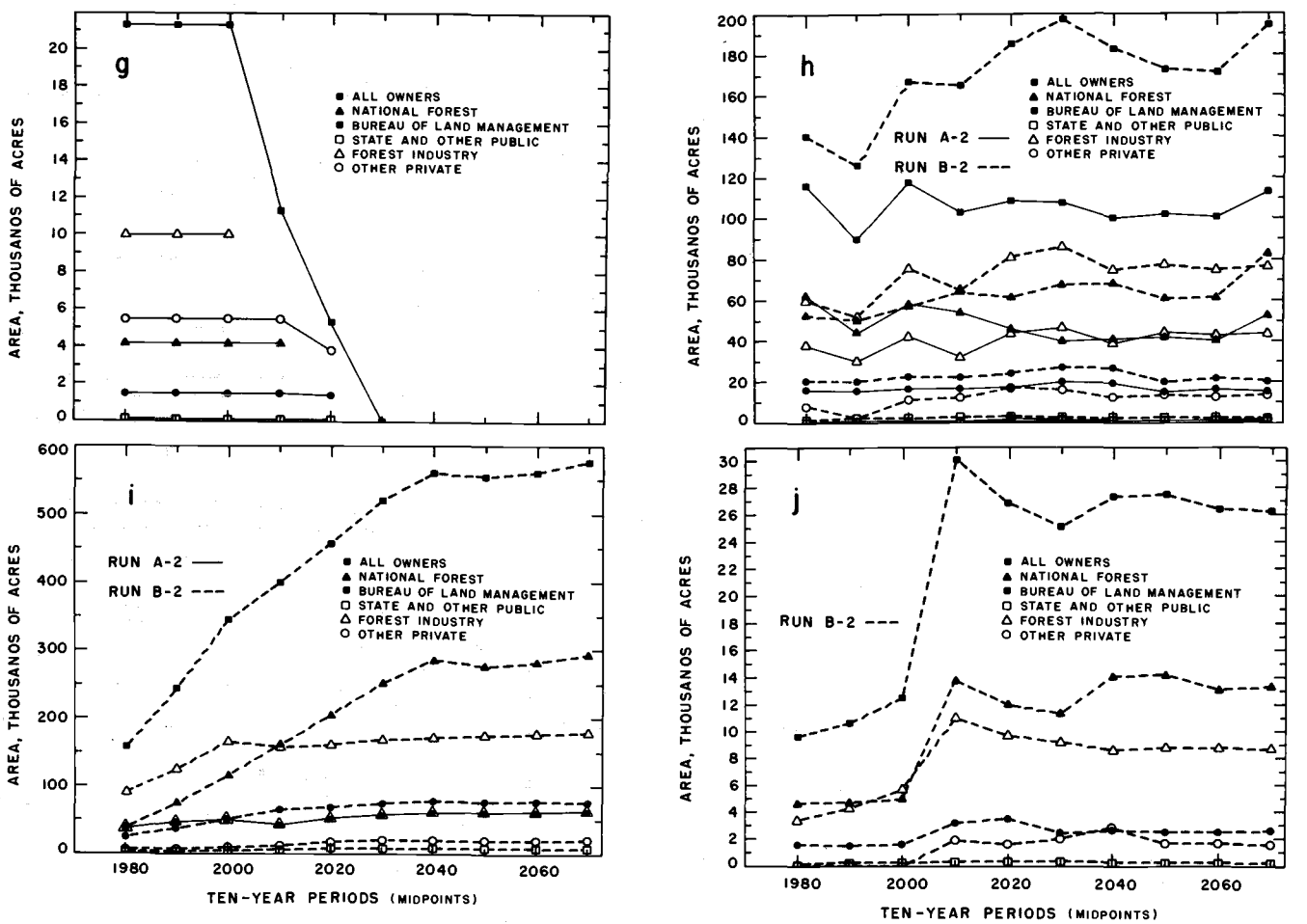


Figure 8. Harvest projections for the Eugene timbershed: By owner class and management intensity target (a, b); by diameter class (c, d); by harvest method (e); and by fiber type (f). Projected acres subjected to accelerated conversion of hardwoods (g); to stocking control (h); to fertilization (i); and to genetic planting (j).

to 1985, a decrease of almost 60 percent would occur during 1985-1995 because of a severe depletion of inventory (Figure 8a).

Thus, even with changes in policy on public lands such that the harvests in RUN A-2 or RUN B-2 would be obtained, the harvest in this timbershed



can be expected to decrease at least 12 percent in the near future.

Once Forest Industry harvests are lowered and the effects of the regeneration and management intensity assumptions come to bear, a rapid recovery can occur after 2005 as the regenerated stands become merchantable. From then on, a rising timbershed harvest is possible for all projections (Figures 8a and 8b). Keep in mind that the projection is then in the maximization phase beyond 2005 for RUNS A-1 and B-1.

Interestingly, the percentage of the harvest in trees 21 inches and larger in dbh stays relatively high in this timbershed, not going below 25 percent until about 2015 (Figure 8c). This is because, as the Forest Industry harvest drops, a greater proportion of the harvest comes from National Forest and BLM, wherein lies the remaining old-growth timber.

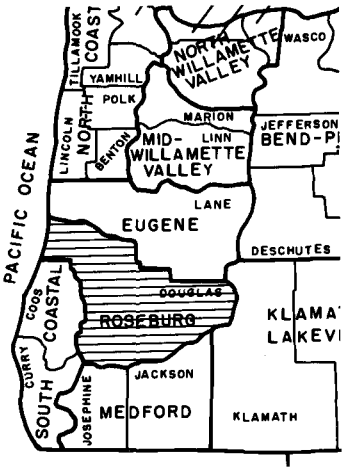
Hardwoods are not a major component of the harvest in this timbershed, never amounting to more than 6 percent of the total harvest (Figure 8f). If it were possible to break out the coastal area of the timbershed, however, the hardwoods, which likely are concentrated there, might represent as much as 15 to 20 percent of the harvest in that area in the next 30 years, based on what was found in the North and South Coast timbersheds.

Roseburg. The current situation at a glance is as tabulated below (pertains only to lands currently in the standard and special land classes).

This timbershed is characterized by a large proportion of the standing volume in trees over 180 years old. On the Umpqua National Forest, 76

Owner class	Commercial timber area	Standing growing stock volume	Standing saw-timber volume[1]	Current harvest[1]
	%	%	%	%
National Forest	33.3	40.7	39.9	24.8
BLM	22.2	23.6	22.9	17.1
State & Other Public	2.0	1.8	1.7	1.3
Forest Industry	28.8	28.1	30.1	54.7
Other Private	13.7	5.8	5.4	2.1
All classes	100.0	100.0	100.0	100.0

[1]Trees 8 inches and larger in dbh.



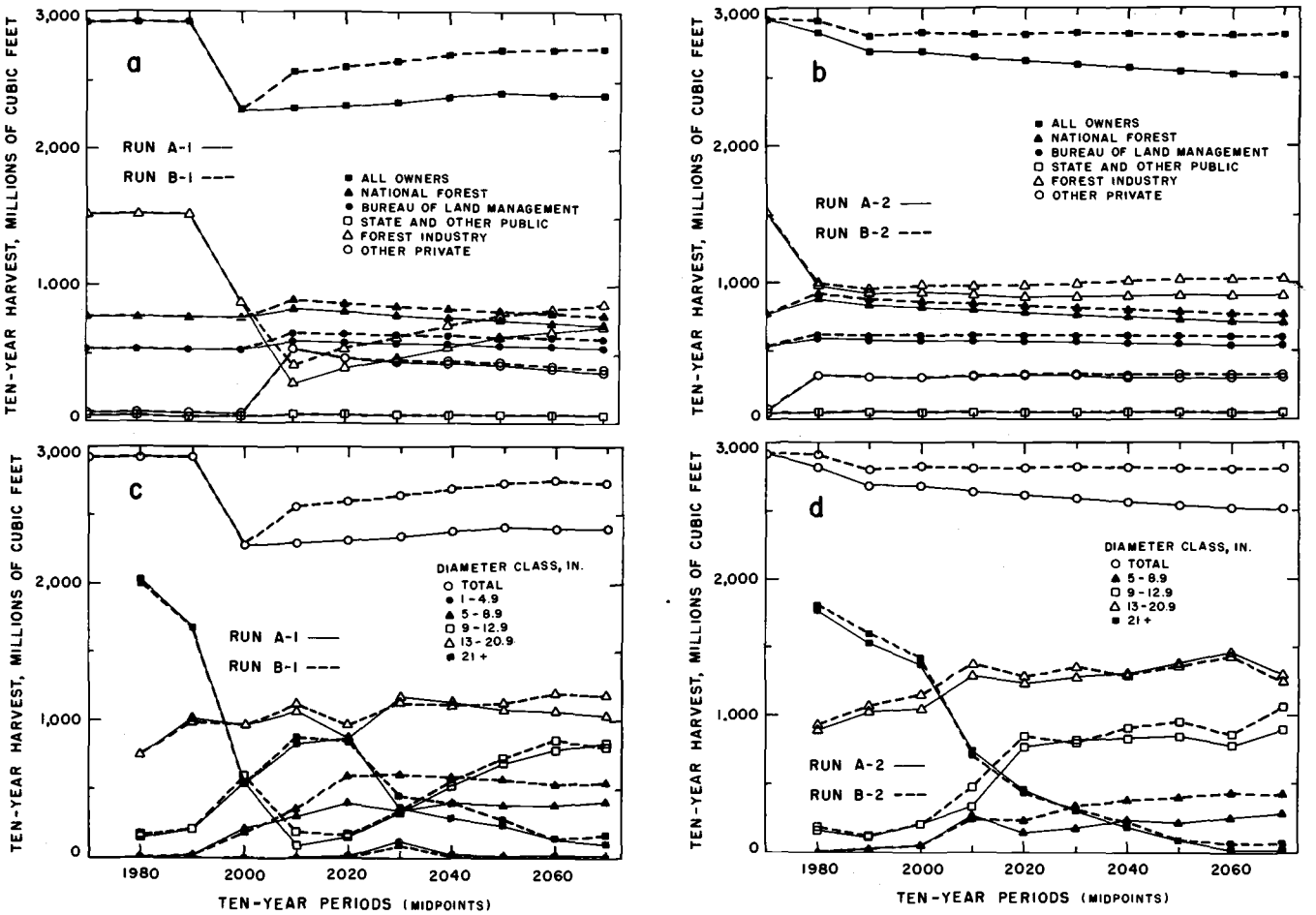
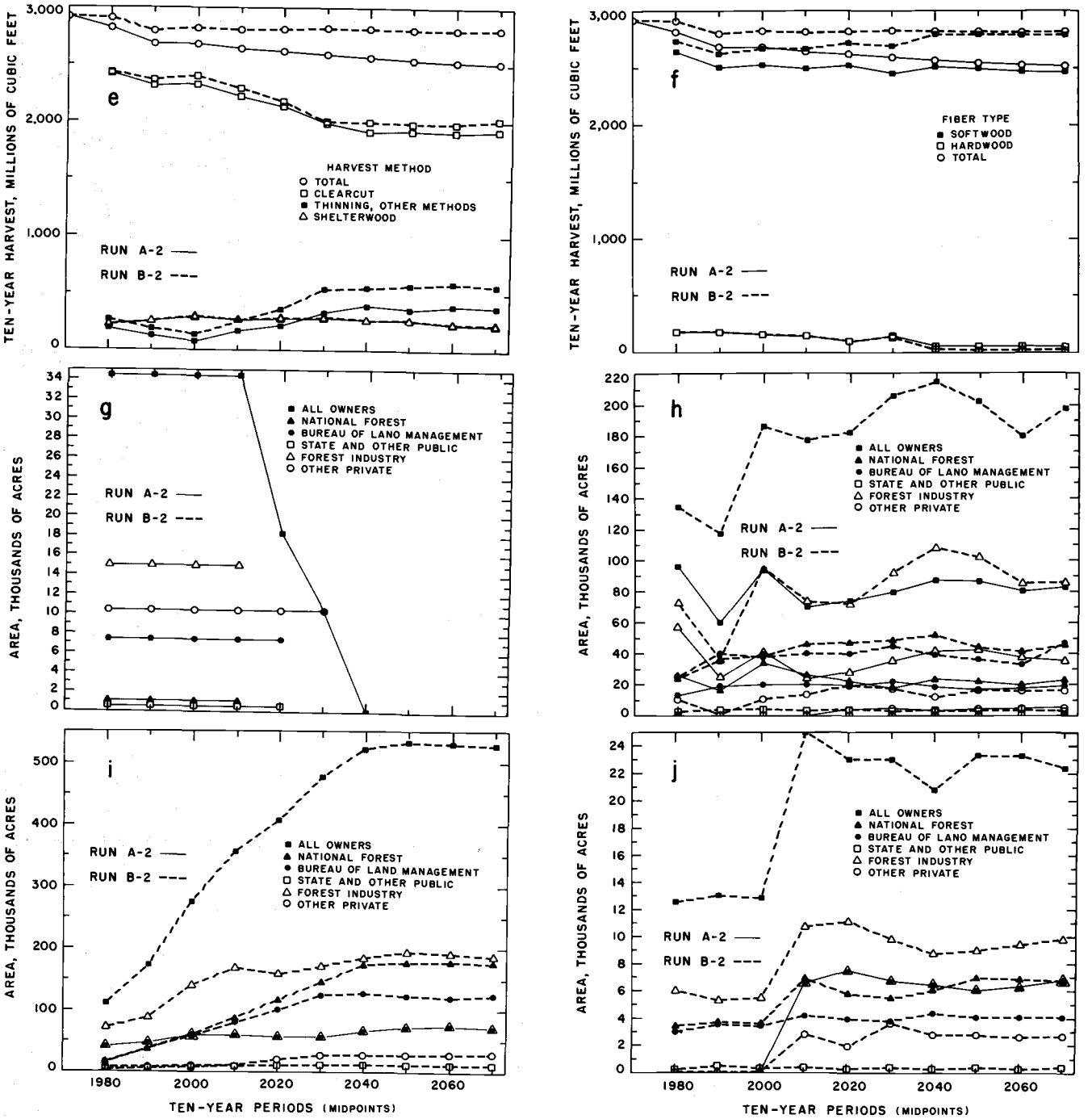


Figure 9. Harvest projections for the Roseburg timbershed: By owner class and management intensity target (a, b); by diameter class (c, d); by harvest method (e); and by fiber type (f). Projected acres subjected to accelerated conversion of hardwoods (g); to stocking control (h); to fertilization (i); and to genetic planting (j).



percent of the volume is in trees over 180 years old; on BLM lands, it's 58 percent; and on Forest Industry lands, 73 percent (Table A 2). As a result, there is considerable capacity for harvest, but little capacity for growth at present.

The current total timbershed harvest can be maintained through 1995, after which a decline of around 20 percent would occur if current policies and actions are pursued (Figure 9a). An attempt to cut at the current level for the next three decades would result in large areas of old growth being cut on public and private lands within a short time. As a result, there would be a lag in the availability of merchantable timber when the old growth is gone.

This can be seen in RUNS A-1 and B-1 for Forest Industry (Figure 9a). The end of the old growth for this owner class would occur in the third decade, at which time the Forest Industry harvest would drop by over 40 percent. Unlike the Forest Industry in some of the other timbersheds, we don't see a rapid recovery in the fourth decade; in fact, the Forest Industry harvest continues to drop into the fourth decade. At that time, the owner class is in an hiatus between the end of the old-growth timber and the maturing of the stands that replace the old growth. In other timbersheds there was more of an age-class balance in the owner class, such that mature young timber would be available before current stocks were depleted.

RUNS A-2 and B-2 show that the timbershed has the capability of maintaining the harvest at about 8 percent below the current harvest over the next 30 years, with little adjustment thereafter (Figure 9b). With management intensity Target B, the harvest in 1975-1985 could be no lower than 96 percent of current harvest, and stay at that level or slightly above thereafter. This capability presumes increases in public and Other Private harvests and a decrease in Forest Industry harvest during 1975-1985 (Figure 9b).

The harvest volume in trees 21 inches and more in dbh will decline from about 60 percent of the total timbershed volume during 1975-1985 to about 50 percent during 1995-2005. After 2005, it will decline to around 30 percent of total harvest volume and continue downward thereafter, as older timber becomes scarce (Figure 9d).

Hardwoods do not account for more than 6 percent of the harvest at any time. As in the Eugene timbershed, however, they probably are concentrated in the coastal portion of the timbershed and may account for 15 to 20 percent of the harvest in that area over the next 30 years (Figure 9f).

One other characteristic of note in this timbershed is the assumption that certain National Forest and BLM administrative units will be managed by the shelterwood method. This results in about 9 percent of timbershed harvest in the first 30 years coming from first-stage or final-stage shelterwood cuts (Figure 9e).

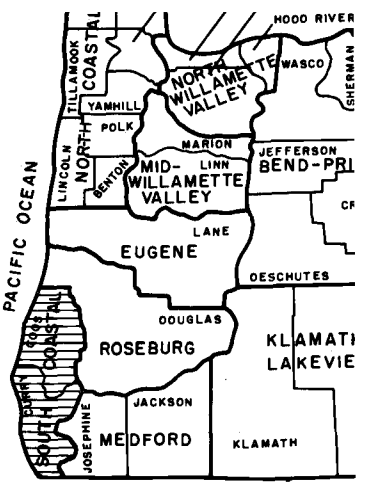
South Coast. The current situation at a glance is as tabulated below (pertains only to lands currently in the standard and special land classes).

This timbershed is an amalgamation of the various characteristics seen in other timbersheds: old growth, young timber, shelterwood, and hardwoods.

The total timbershed harvest can be maintained until 1995 under present policies and actions, but could fall as much as 35 percent after 1995 because of a decline in Forest Industry harvest (Figure 10a). The Forest Industry harvest would continue to decline into the fourth decade, but the timbershed harvest could turn around during the fourth decade if public owner classes began to cut more, as shown possible in the projection.

Owner class	Commercial timber area	Standing growing stock volume	Standing saw-timber volume[1]	Current harvest[1]
	%	%	%	%
National Forest	29.8	28.7	28.4	14.5
BLM	11.9	20.6	22.3	14.7
State & Other Public	4.3	6.1	5.9	3.9
Forest Industry	36.2	29.6	29.9	60.8
Other Private	17.8	15.0	13.5	6.1
All classes	100.0	100.0	100.0	100.0

[1]Trees 8 inches or more in dbh.



Based on RUNS A-2 and B-2, the current timbershed harvest could be maintained with only minor variations (Figure 10b). Under management intensity Target B, it could be maintained at from 5 to 10 percent above the current harvest after 1995. Again, these projections reflect a near-term decrease in Forest Industry harvests and an increase in harvests from public and Other Private lands.

The Other Private owner class is a significant portion of the timber-producing base of this timbershed. If it could not be counted upon to raise harvests above current levels, the timbershed capability would fall to from 86 to 94 percent of the current harvest for the next three decades.

Based on RUNS A-2 and B-2, the percentage of the timbershed harvest coming from trees over 21 inches in dbh is likely to decline slightly from more than 60 percent of the total during 1975-1985 to about 56 percent of the total during 1995-2005. After 2005 it will drop to less than 30 percent and decline steadily thereafter as the older timber is cut (Figure 10d).

As in the North Coast timbershed, hardwoods are a significant component of the timber base in this timbershed. The results of the projections should be qualified by the observation that about 16 percent of the harvest volume over the next 30 years is expected to be hardwoods (Figure 10f). This is

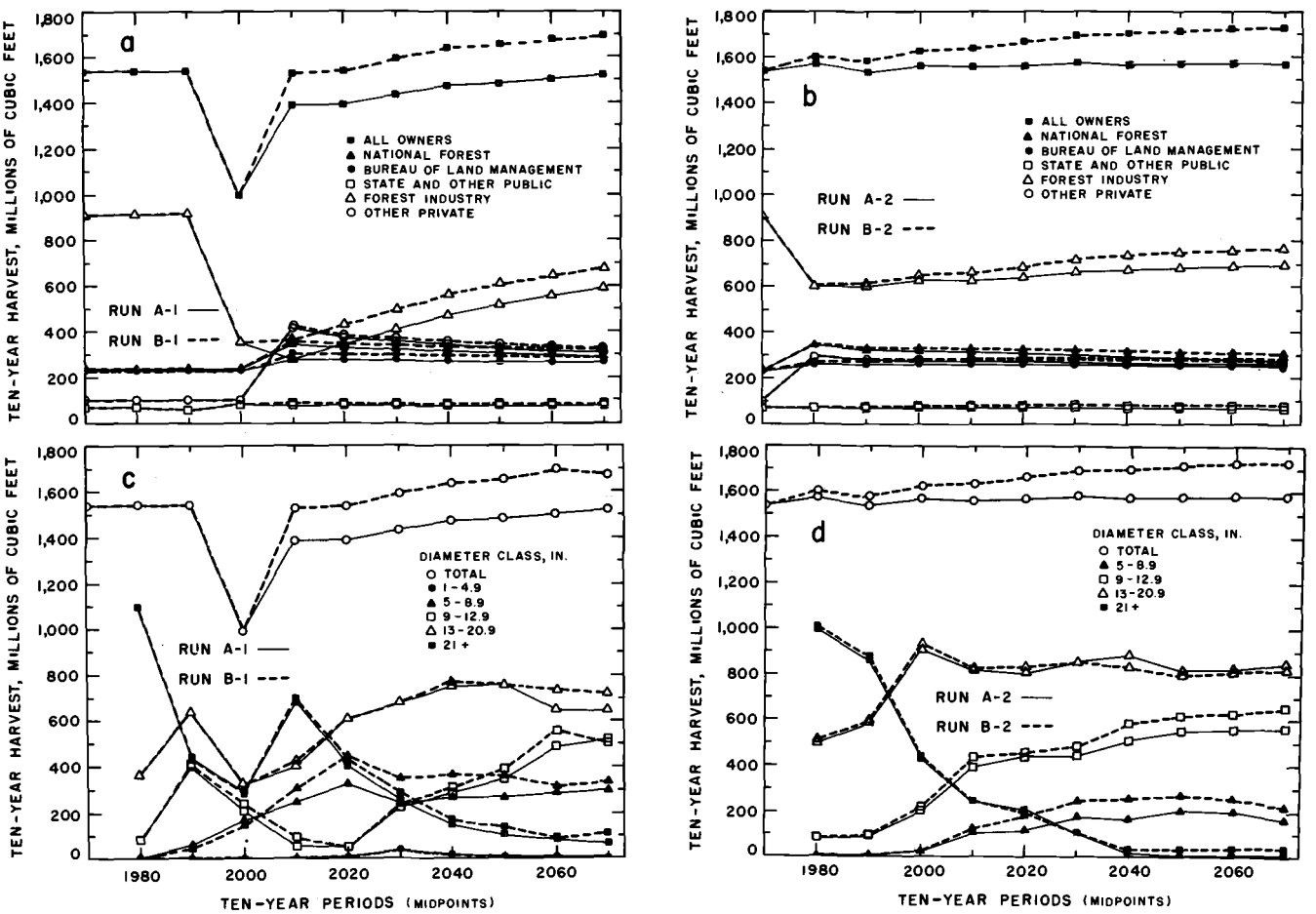
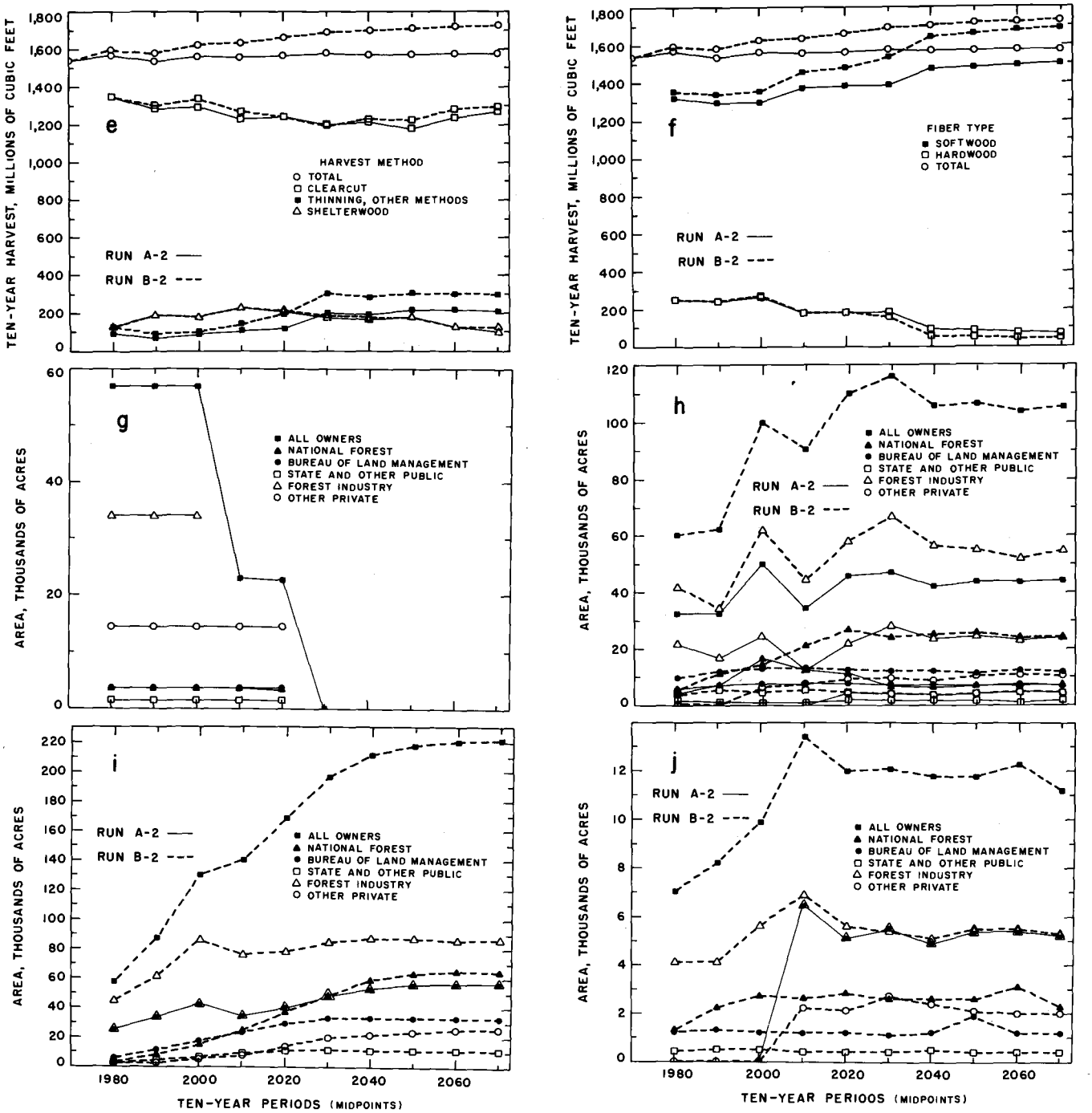


Figure 10. Harvest projections for the South Coast timbershed: By owner class and management intensity target (a, b): by diameter class (c, d); by harvest method (e); and by fiber type (f). Projected acres subjected to accelerated conversion of hardwoods (g); to stocking control (h); to fertilization (i); and to genetic planting (j).



because of the extensive hardwood conversion assumed during that period (Figure 10g).

Shelterwood management is assumed for some National Forest and BLM administrative units. As a result, about 11 to 15 percent of the timbershed harvest is expected to come from first- or final-stage shelterwood cuts (Figure 10e).

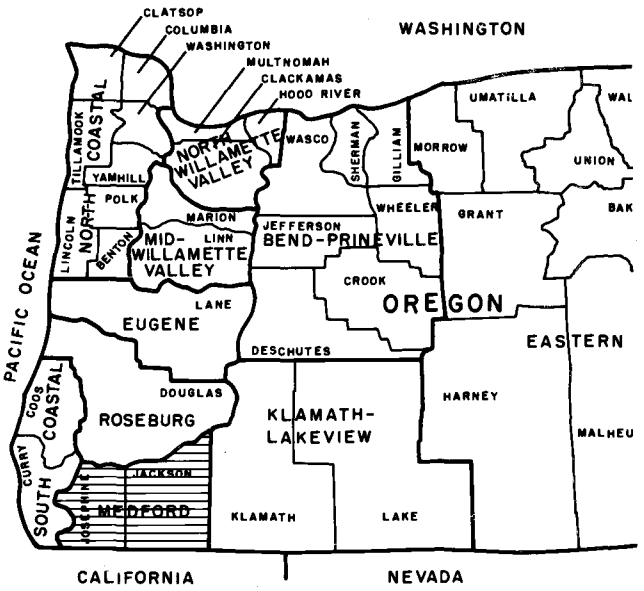
Medford. The current situation at a glance is as tabulated below (pertains only to land currently in the standard and special land classes).

If the current policies and actions were pursued in this timbershed, the timbershed harvest could be expected to decline by about 18 percent after 1995 because of a decline in Forest Industry harvest (Figure 11a). As seen in other timbersheds, a turnaround in the decline is possible soon thereafter.

Based on RUNS A-2 and B-2, the timbershed has the capability for maintaining at least the present level of harvest. Under management intensity Target A, the timbershed harvest during 1975-1985 could be as much as 10 percent above the current harvest, after which it would decrease gradually to about the current level (Figure 11b). About the same possibility exists under management intensity Target B, except that future harvests could be maintained at about 5 percent above current harvests. Again, such events would depend on the assumed changes in policies and actions actually occurring.

These capabilities need a special qualification because of the high proportion of Other Public owner class lands in this timbershed—more than 20 percent of the available commercial forest lands. If this owner class were to harvest no more than its current harvest, then the total timbershed harvest during 1975-1985 would be slightly less than the current harvest, based on RUN A-2, and about one percent more than the current harvest, based on RUN B-2.

A notable assumption of the projections in this timbershed is that the primary harvest technique will be the shelterwood method for all owner classes, except Other Private. Thus, about 70 to 80 percent of the harvest is expected to come from first- or final-stage shelterwood cuts (Figure 11e). The net effect of this assumption can vary, depending on the regeneration gains expected by use of the shelterwood method. We assumed that stands harvested by shelterwood would be regenerated three years before the final-stage cut. A test was made comparing this assumption to clearcutting with a 5-year regeneration lag for the Medford timbershed using RUN A-2. The finding was that the shelterwood method would give slightly lower harvests (less than



Owner class	Commercial timber area	Standing growing stock volume	Standing saw-timber volume[1]	Current harvest[1]
	%	%	%	%
National Forest	31.8	36.7	38.2	30.7
BLM	31.3	39.2	40.3	39.4
State & Other Private	1.2	1.2	1.3	1.4
Forest Industry	14.4	9.6	8.8	23.5
Other Private	21.3	13.3	11.4	5.0
All classes	100.0	100.0	100.0	100.0

[1]Trees 8 inches and larger in dbh.

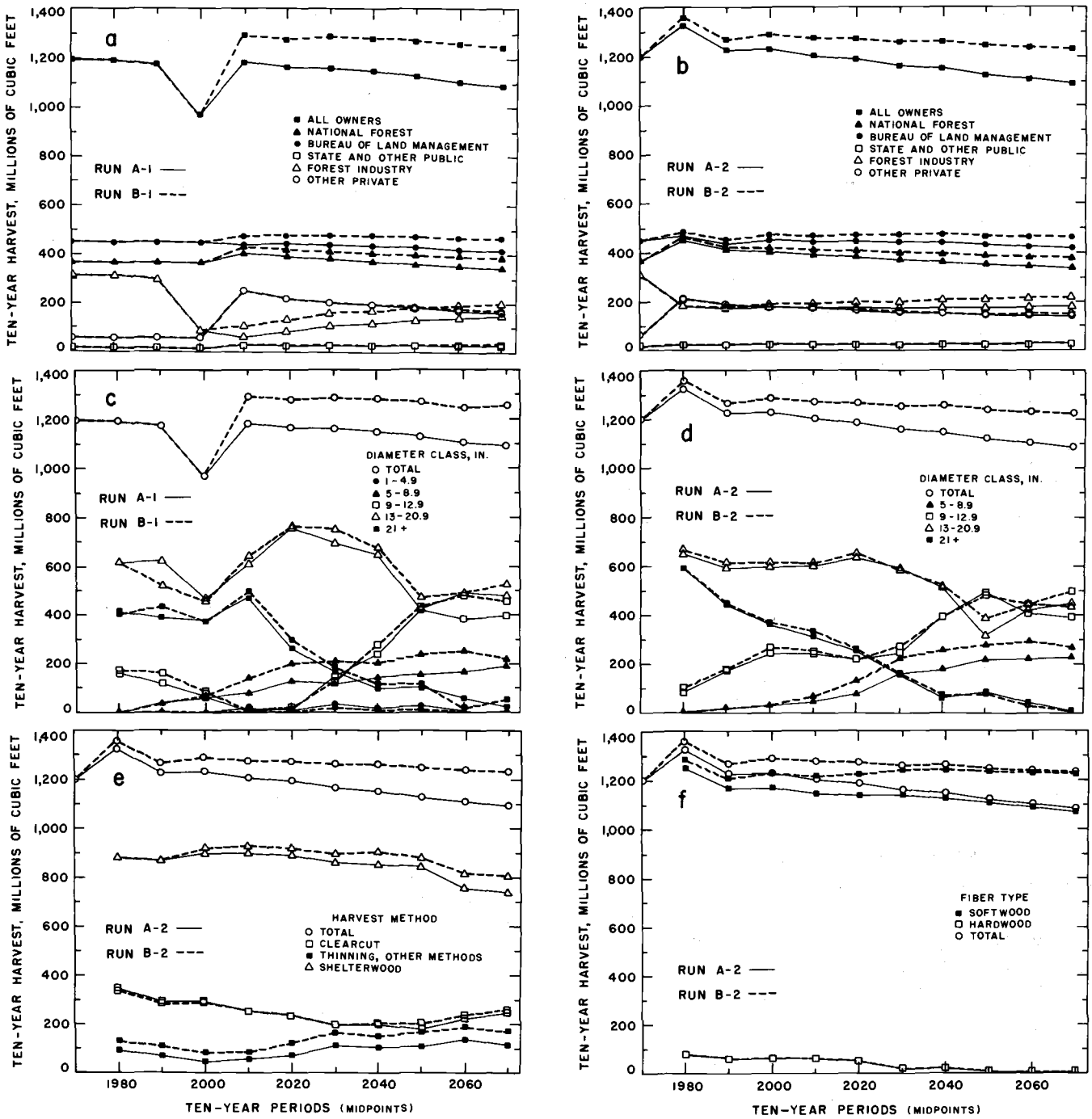
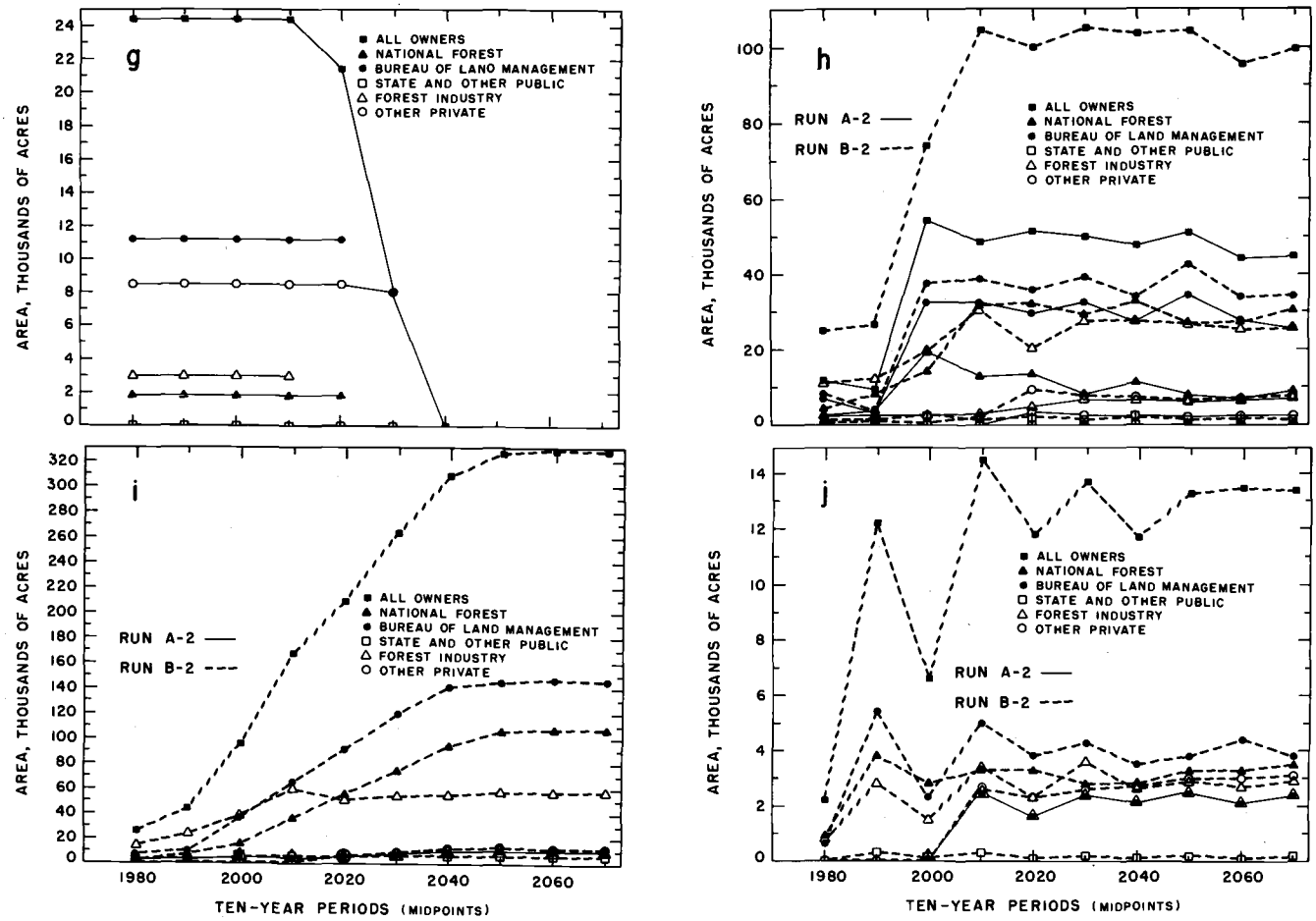


Figure 11. Harvest projections for the Medford timbershed: By owner class and management intensity target (a, b); by diameter class (c, d); by harvest method (e); and by fiber type (f). Projected acres subjected to accelerated conversion of hardwoods (g); to stocking control (h); to fertilization (i); and to genetic planting (j).



2 percent) in the first decade, but would allow for harvests at least as high as clearcutting in the future. In fact, the shelterwood method provided harvests 3 percent above the clearcutting method, on the average, for the 90 years after the first decade. This is caused primarily by reducing the time necessary for regeneration to occur.

The percentage of the timbershed harvest coming from trees larger than 21 inches in dbh decreases gradually from over 40 percent of the total harvest during 1975- 1985 to about 20 percent of the total harvest during 2015-2025, after which it drops more rapidly (Figure 11d). Apparently, the assumed shelterwood method plays a role in stretching out the harvest of larger trees in this timbershed compared to other timbersheds.

Hardwoods are not a significant component of the harvest, never amounting to more than 5 percent of the total (Figure 11e).

Western Oregon Summary

The situation for western Oregon as a whole and for each timbershed has been discussed based on the projections that were made. These projections were intended to represent reasonably possible occurrences, from "business as usual" to an estimate of capability of harvest over time based on modifications of policies and actions of the various owner classes.

If one chooses to believe that current policies and actions will persist, then declines in harvests are forecast within the next 30 years for western Oregon as a whole, and for all timbersheds in western Oregon except the North Coast timbershed. Management intensification will do little to ameliorate the declines, although it will provide for greater availability of timber after the year 2000.

Not all is lost, however, if one believes there is room for change in policies and actions. Projections made using assumed sustained-yield objectives for public and private owner classes show that there is a capability within most timbersheds to hold harvest near or at current levels, and some could even be above current levels. Included in this capability is the consideration of significant proportions of public commercial forest land being committed to other uses, subject to reduced yields, or held out of the timber production for some period of time while technical or economic problems are overcome. Thus, this was an attempt to simulate a working capability, not an unrealistic optimum based on all lands producing timber at full potential.

None of the projections herein was meant to be a prescription. The gap between the current situation and reasonably possible capability is merely an area for policy consideration and negotiation. Evidently there is a considerable amount of leeway.

As a point of reference regarding the western Oregon projections, a profile of the projected growth rates for three selected decades over the projection span is presented in the Appendix (Tables A 11 and A 12). Growth rates are presented in terms of cubic feet per acre and as a percentage of total inventory for each projection, by unit within owner class.

TIMBER AVAILABILITY, NOW AND IN THE FUTURE–EASTERN OREGON

The analysis for eastern Oregon is not nearly so intensive as that for western Oregon. Part of the reason for this difference is uncertainty about how to handle the projections for eastern Oregon and the difficulty of getting some kinds of inventory data and management information.

There is uncertainty about whether it is best to simulate eastern Oregon timber management using an assumption of multi-age stands being selectively harvested, or even-age stands being harvested in one or more stages. Both types of management are used and advocated in eastern Oregon. The time limitation for this analysis precluded a thorough investigation of the alternatives.

An expeditious way out of the dilemma was to use appropriately updated data that had been developed already by the Forest Survey Project of the Pacific Northwest Forest and Range Experiment Station for the latest national timber supply study (U.S. Forest Service, 1973; U.S. Forest Service, 1975). These data represent each owner class in terms of a distribution of trees by diameter class on a representative (average) acre. Empirical diameter growth rates and mortality estimates were also available for each distribution of trees (Appendix, Table A 4).

Forest Survey data were used intact, except for the Klamath-Lakeview timbershed where it was supplemented by additional data for Forest Industry lands and for the Klamath Indian Trust (now part of the Winema National Forest).

A stand table projection is inherently more difficult to control over a long period than a projection based on a distribution of even-age stands. Such things as ingrowth into the smallest diameter class, modulation of growth relative to stand density, and number of trees moving between various diameter classes each projection period have been studied and debated for a long time, but still are applied without a great deal of confidence. Generally, analysts key on the shape of the distribution of trees by diameter class, the basal area per acre, and, perhaps, the number of trees per acre as indicants of the behavior of a projection. That is, if observed wild and managed stands fall within certain ranges of these parameters, it would be difficult to accept projections far outside these ranges.

This analysis of eastern Oregon is no different in that regard. That is, confidence in results rests mainly on observations of stand distributions, basal area, and numbers of trees per acre being within tolerable ranges over the projection span. The tolerable ranges, however, are based on past experience, which doesn't offer much with regard to the transition from stands with trees ranging from one to two hundred-plus years of age, to stands with trees ranging from one to 50 or 60 years of age.

Thus, these projections might be viewed as reasonable based on our rather limited knowledge at this time, but the foundation for them could have defects. They should be regarded as preliminary estimates, subject to possible change as we learn more about the dynamics of forest growth in eastern Oregon and the management goals of those who control the forests of that region.

A reminder before going on to the results of the projections–management intensification for the eastern Oregon projections is represented by an assumption that it is possible to increase diameter growth rates by 30 percent. Some intensification is included with management intensity Target A; a greater amount with Target B (Appendix, Table A 6).

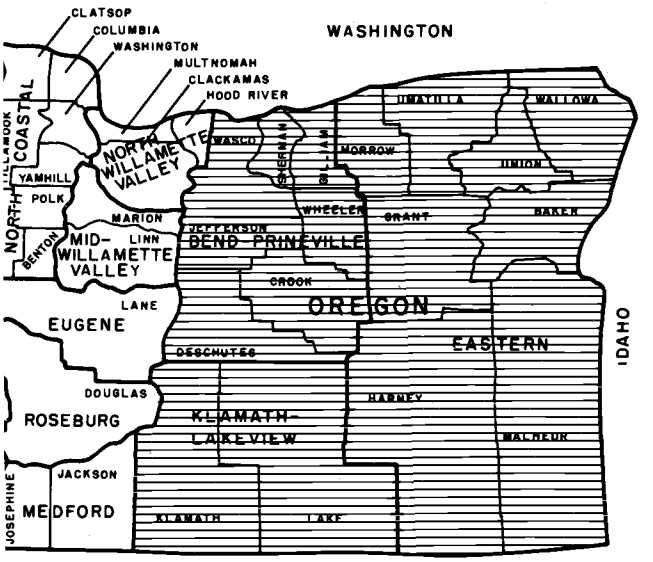
The Situation for Eastern Oregon

Questions 1, 2, and 3. The current annual harvest for eastern Oregon based on average experience for 1968-1973 is 390 million cubic feet, or 2.0 billion board feet (Appendix, Table A-9). There was no projection for which this amount could not be maintained indefinitely. In fact, based on the projections, more than the current volume likely could be harvested in the future.

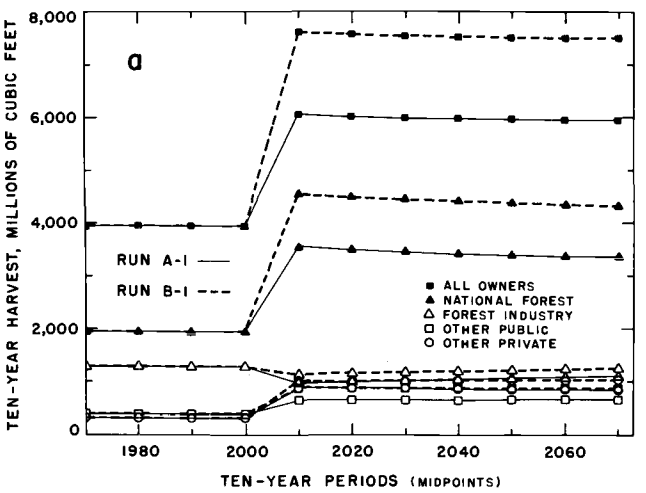
RUNS A-1 and B-1 show that the current harvest in eastern Oregon can be maintained for the next 30 years, and at the end of that time, when the harvest-maximization phase of the projection begins, the harvest could be increased by as

much as 53 and 93 percent for the two projections (Figure 12a). The abrupt increases, which occur after 2005 for all owner classes except Forest Industry, indicate that the current harvest to which these owner classes were limited from 1975 through 2005 was lower than the sustainable harvest for those owner classes. That harvests could be increased earlier than 2005 will be seen in the discussion of question 4.

Question 4. RUNS A-2 and B-2 are projections used to chart a harvest trajectory under an assumption of sustained yield for each owner class. The procedure was to maximize the harvest, decade by decade, for each administrative unit starting in 1975, such that the harvest chosen could be maintained for a specified number of decades from the one in question. For all standard-class lands the sustained-yield test was to be applied for eight decades hence; for all special-class lands the test was applied over ten decades. The test refers to a maximum diameter, breast high, for stands of the future. For standard class lands it was assumed to be 13 inches; for special class lands it was assumed to be 21 inches. Thus, the harvest chosen in each period is assured to be sustainable for the number of decades specified, and at the end of that time the stand will be approaching an equilibrium with most trees less than or equal to the diameter specified. As in western Oregon, these projections represent an ability to produce based on the specifications noted above.



RUN A-1 demonstrated that the current harvest for eastern Oregon as a whole can be maintained with the current public allowable cuts (Figure 12a), even at the lowest assumed management-intensity target. As the harvest trajectory for RUN A-2 is uniformly higher, the same is also true for that projection (Figure 12b). Note that, as in western Oregon, the projection depicted by RUN A-1 and that depicted by RUN A-2 tend toward the same harvest in the long run. The same is true for RUNS B-1 and B-2. Again, this is a reminder that projections with comparable management assumptions tend toward the same long-run equilibrium; the difference is in how we get there.



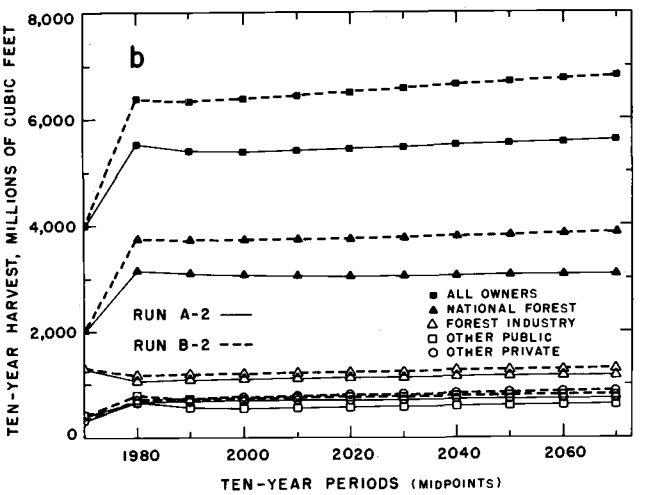


Figure 12. Harvest projections for eastern Oregon by owner class and management intensity.

Table 11. Surpluses and Deficits in Millions of Cubic Feet between the Ability to Harvest and the Current Harvest, by Timbershed for Three Decades in Eastern Oregon for RUN A-2 and RUN B-2.

Timbershed	Current harvest[1]	Surpluses and deficits[2]					
		1975-1985		1985-1995		1995-2005	
		A-2	B-2	A-2	B-2	A-2	B-2
Klamath-Lakeview	163.8	15.2	40.9	15.6	42.5	16.8	45.4
Bend-Prineville	90.0	52.8	73.3	42.3	67.2	41.9	69.0
Eastern	136.1	94.5	133.9	91.9	133.7	90.4	134.7
Eastern Oregon	389.9	162.5	248.1	149.8	243.4	149.1	249.1

[1]Current harvest, based on average for 1968-1973.
[2]There were no deficits from current harvest.

The Situation by Timbersheds

Unlike western Oregon, there were no timbersheds in eastern Oregon in which the current harvest could not be maintained for the next 30 years (Table 10). In fact, increases above the current harvest are possible during 1975-1985 with the changes in policies and actions assumed in RUNS A-2 and B-2. These range from an increase of 9 percent in the Klamath-Lakeview timbershed under management intensity Target A to an increase of 98 percent in the Eastern timbershed under Target B.

As hardwoods are not a major factor and specific cultural activities were not explicitly specified for the higher management intensities in eastern Oregon, there is less information available from the projections. Only four graphs will be presented for each timbershed and these are the same as the first four graphs for each western Oregon timbershed: Figure 13a represents RUNS A-1 and B-1; 13b represents RUNS A-2 and B-2; 13c and 13d show the distribution of the harvest over time in each of five diameter classes, for all owner classes combined, for the projections in 13a and 13b.

Klamath-Lakeview. The current situation at a glance is as tabulated below (pertains only to lands currently in the standard and special land classes).

All owner classes in this timbershed can continue to harvest at their current levels for the next 30 years. Forest Industry is the only one showing a possible decline at the end of that time—up to 25 percent (Figure 13a). But the capability of the other owner classes to increase their harvests after 2005 more than cancels the possible

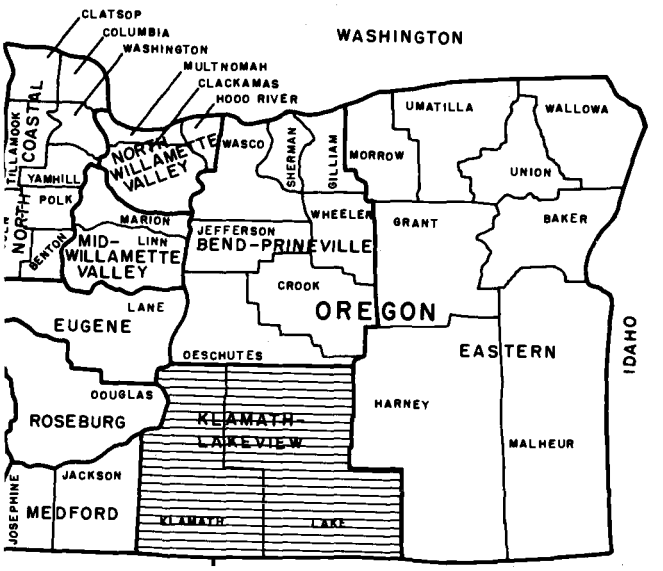
Owner class	Commercial timber area	Standing growing stock volume	Standing sawtimber volume[1]	Current harvest[1]
	%	%	%	%
National Forest	59.7	62.1	63.5	38.7
Other Public	3.6	6.3	6.4	6.6
Forest Industry	28.7	26.8	25.9	50.6
Other Private	8.0	4.8	4.2	4.1
All classes	100.0	100.0	100.0	100.0

[1]Trees 8 inches and larger in dbh.

decline of harvest from Forest Industry lands. Thus, the timbershed harvest need never fall below the current level.

RUNS A-2 and B-2 show a capability for an increase in the timbershed harvest for 1975-1985 of 7 and 22 percent. This projection entails an increase of harvest from the public and Other Private administrative units and a decrease from Forest Industry lands (Figure 13b). For both management intensity Target A and Target B, future timbershed harvests would increase gradually from 1975 to 1985, with the Target B harvests averaging about 17 percent higher than the Target A harvests (Figure 13b).

A notable consequence of the projection assumptions is a rather sharp decrease in size of material harvested (Figures 13c and 13d). For example, for RUN A-2, the percentage of volume



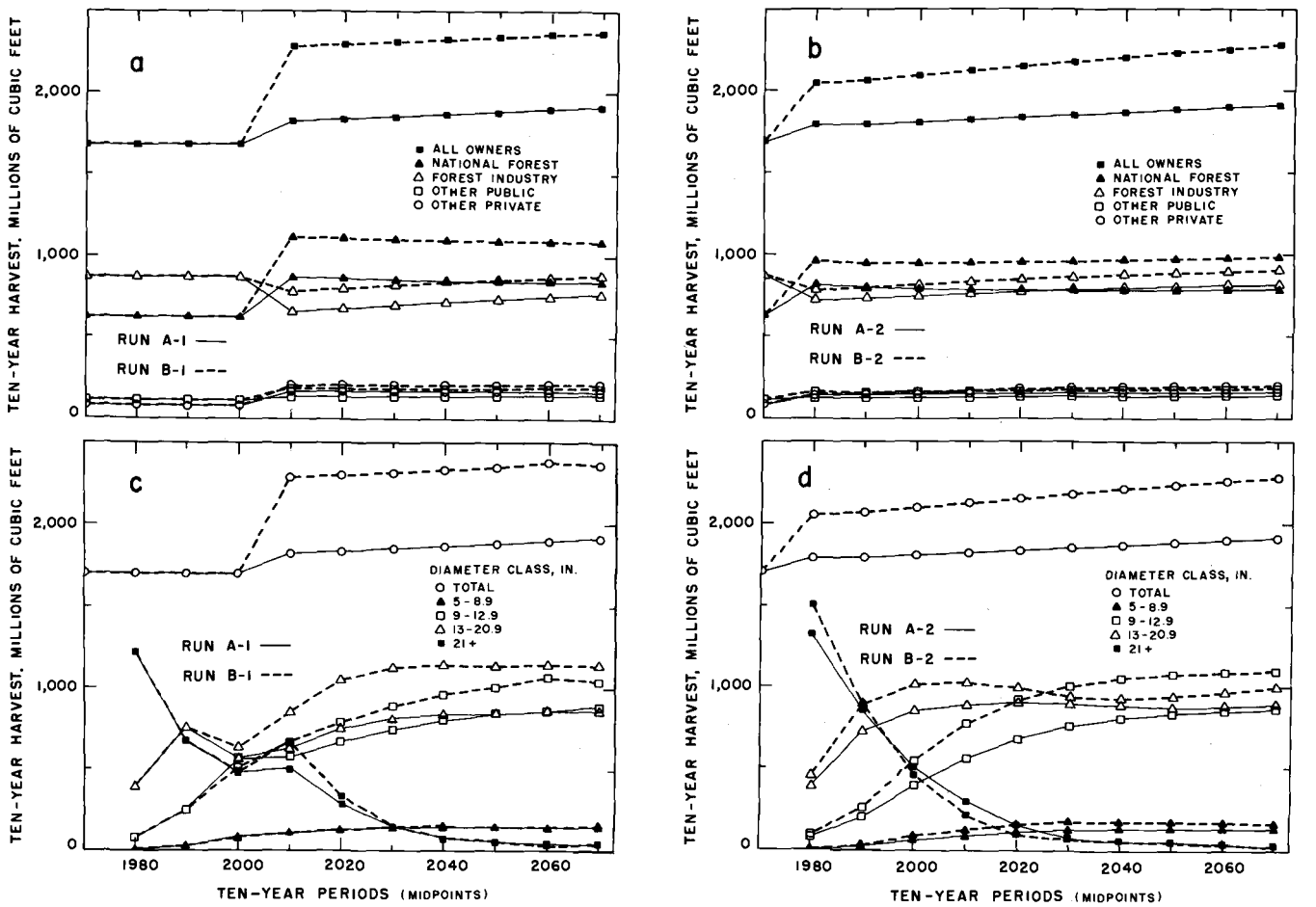


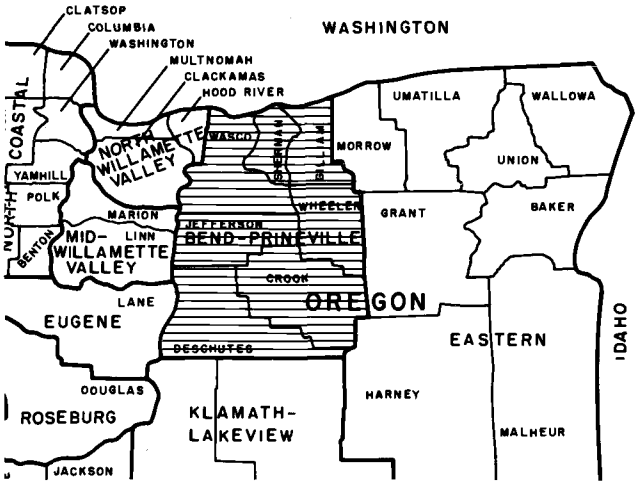
Figure 13. Harvest projections for the Klamath-Lakeview timbershed: By owner class and management intensity target (a, b) and by diameter class (c, d).

coming from trees over 21 inches in dbh declines from about 74 percent during 1975-1985 to about 30 percent during 1995-2005. The distribution of volume by diameter class stabilizes in about 60 to 70 years with about 1 to 2 percent from trees 21 inches and larger; 45 percent each from diameter classes 9-13 inches in dbh and 13-21 inches in dbh; and the remainder from trees less than 9 inches in dbh.

Bend-Prineville. The situation at a glance is as tabulated below (pertains only to lands currently in the standard and special land classes).

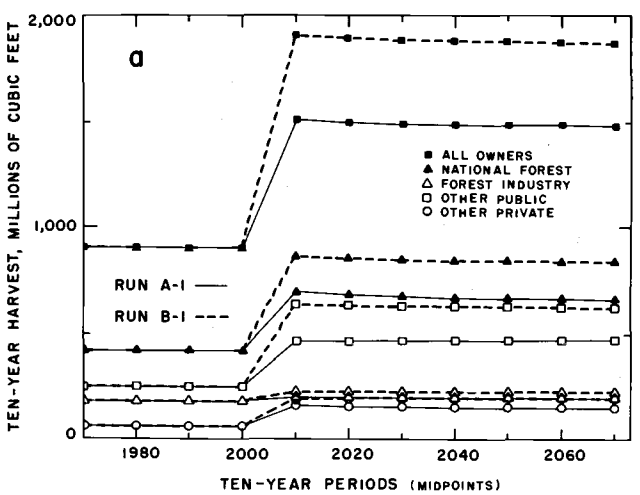
RUNS A-1 and B-1 show that the current timbershed harvest can be maintained for the next 30 years (Figure 14a). When the maximization phase of the projection commences after 2005, the timbershed harvest could be raised by as much as 67 percent for management intensity Target A; it could be more than doubled for Target B. No owner class shows a harvest decline.

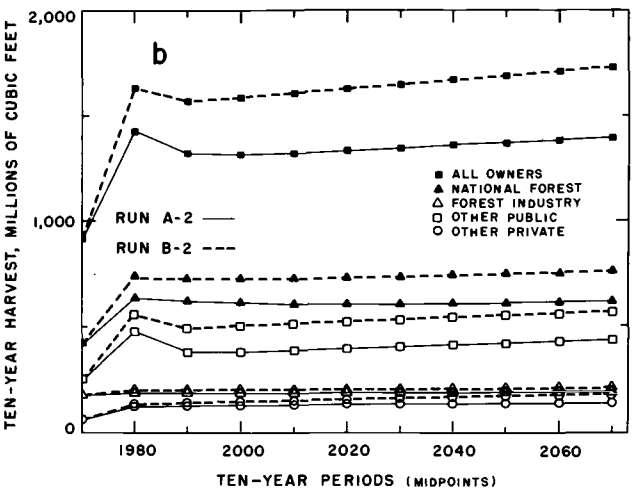
When period-to-period maximization is begun in 1975-1985, as in RUNS A-2 and B-2, the timbershed harvest for 1975-1985 could be raised as



Owner class	Commercial timber area	Standing growing stock volume	Standing sawtimber volume[1]	Current harvest[1]
	%	%	%	%
National Forest	61.8	60.9	61.9	47.0
Other Public	16.0	24.5	25.0	28.7
Forest Industry	12.0	9.3	8.4	18.2
Other Private	10.2	5.3	4.7	6.1
All classes	100.0	100.0	100.0	100.0

[1]Trees 8 inches and larger in dbh.





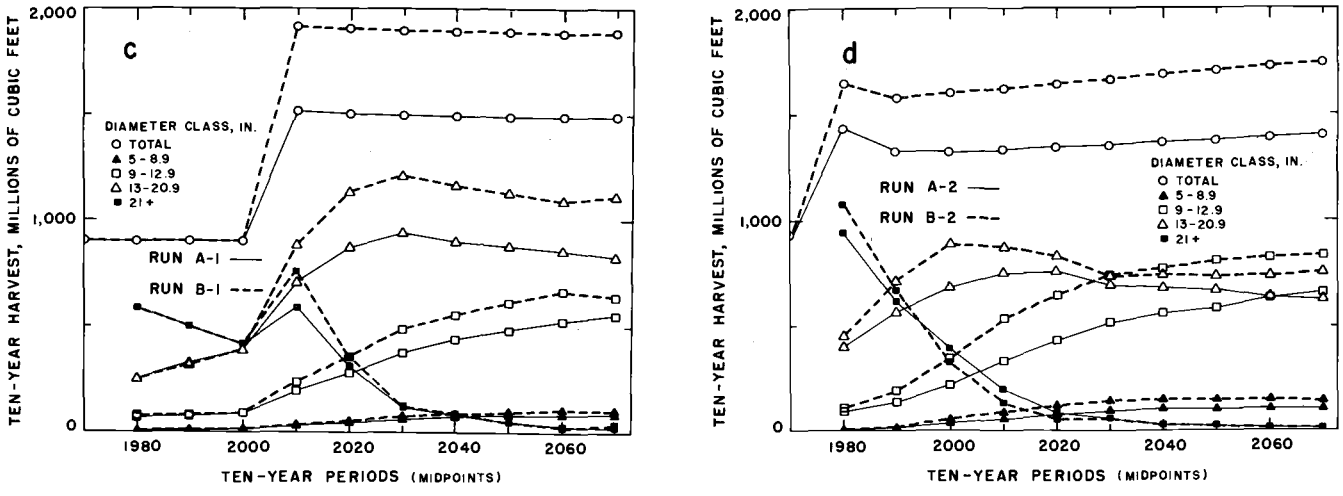


Figure 14. Harvest projections for the Bend-Prineville timbershed: By owner class and management intensity target (a, b) and by diameter class (c, d).

much as 59 percent above the current harvest for management intensity Target A; for Target B it could be raised by as much as 80 percent (Figure 14b). In both instances there would be a gradual decline in harvest to 2005, after which the harvest would increase gradually to the long-run sustainable level.

As in the Klamath-Lakeview timbershed, the size of harvested material decreases rapidly, stabilizing in about 70 years with only about 1 to 2 percent of the trees harvested being 21 inches in dbh and larger (Figures 14c and 14d). Ninety percent of the harvest at that time will come from trees between 9 and 21 inches in dbh.

Eastern. The current situation at a glance is as tabulated below (pertains only to lands currently in the standard and special land classes).

If the Other Private owner class in this timbershed is discounted as being an uncertain component of future timber harvest, then this could be called a National Forest timbershed. And because the current National Forest harvest is quite low relative to apparent capability, the outlook for the timbershed is a possibility for much increased harvests in the future.

Based on RUNS A-1 and B-1, the current timbershed harvest could be maintained for 30 years, after which it would be possible to increase harvests significantly (Figure 15a). For management intensity Target A, the harvest could be doubled in

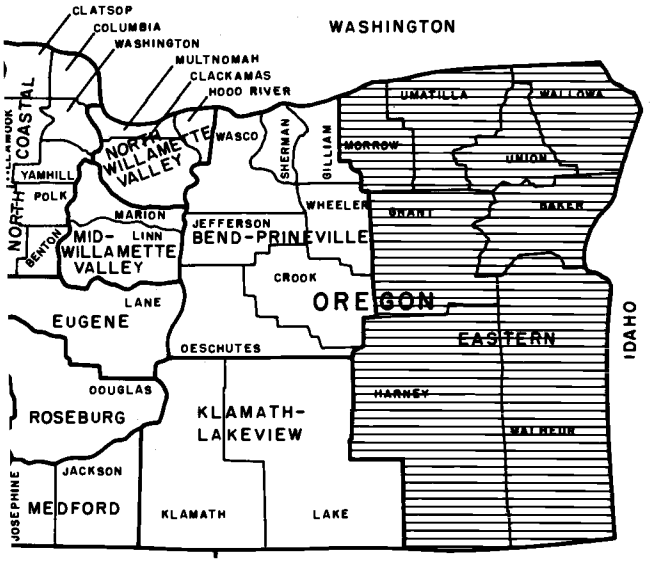
Owner class	Commercial timber area	Standing growing stock volume	Standing sawtimber volume[1]	Current harvest[1]
	%	%	%	%
National Forest	73.3	80.7	82.6	69.0
Other Public	1.9	1.6	1.6	1.7
Forest Industry	8.5	6.1	5.6	16.7
Other Private	16.3	11.6	10.2	12.6
All classes	100.0	100.0	100.0	100.0

[1]Trees 8 inches and larger in dbh.

the fourth decade; for Target B it would be as much as 2.5 times higher.

RUNS A-2 and B-2 show the capability for substantially increased timbershed harvests during 1975-1985 without any significant declines thereafter (Figure 15b). For management intensity Target A, the harvest for 1975-1985 could be increased by as much as 69 percent; for Target B, as much as 98 percent. If the Other Private owner class could not be depended upon to harvest more than the current level, the potential increases for 1975-1985 are reduced to 54 percent and 86 percent for Target A and Target B.

The size of harvested material follows the same pattern as for other eastern Oregon timbersheds (Figure 15c and 15d).



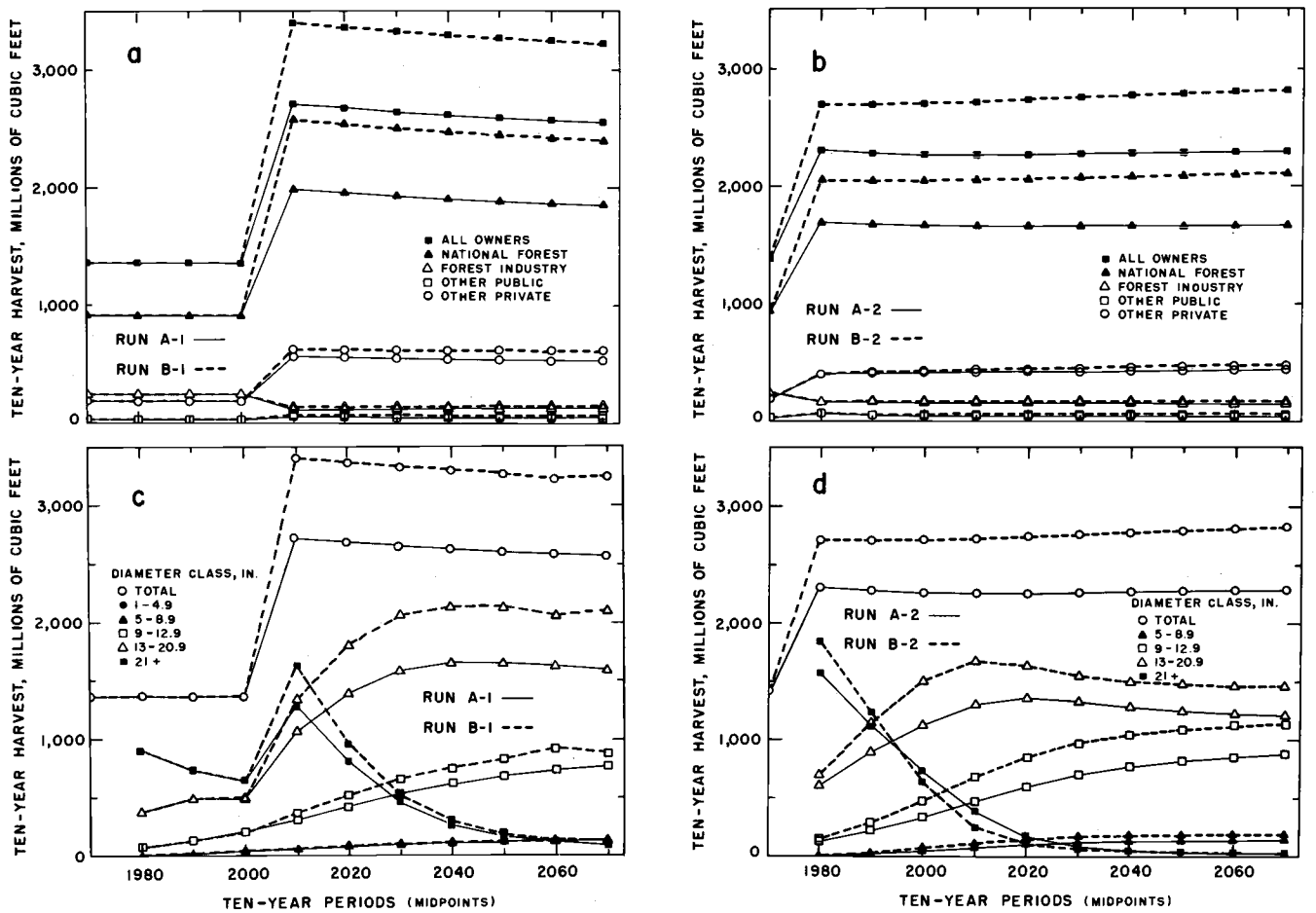


Figure 15. Harvest projections for the Eastern timbershed: By owner class and management intensity target (a, b) and by diameter class (c, d).

Eastern Oregon Summary

The situation for eastern Oregon as a whole and for each timbershed has been discussed based on the projections that were made. Under current policies and actions, the chances appear very good that the current harvest can be maintained over the next 30 years in each timbershed and for eastern Oregon as a whole. In fact, as the capability for increased harvests exists in each timbershed, it would be surprising if harvests did not increase over that period in the face of forecast increases in demand for wood products.

As a point of reference regarding the eastern Oregon projections, a profile of the projected growth rates over the next 30 years is presented in the Appendix (Tables A 14 and A 15). Growth rates are presented in terms of cubic feet per acre and as a percentage of total inventory for each projection, by unit within owner class.

ECONOMIC IMPLICATIONS OF THE PROJECTIONS

The projections of timber harvest show a range of reasonably possible occurrences regarding future harvest flows. For Oregon and the timbersheds of Oregon, timber is largely a means to an end. The end product to Oregonians consists of jobs, net income from places outside Oregon (the export base), a viable tax base to support community services, and the quality of life that goes along with economic well-being in idyllic surroundings. What do the projections mean with regard to these issues?

A major concern among Oregonians these days is environmental protection. Although this analysis does not directly address the impacts of timber production on the environment, they are implied in the data and in many of the assumptions. The special, marginal, and other objectives categories for the commercial forest land of some owner classes represent environmental constraints on timber growing, or the use of forest land for purposes other than timber growing. For these lands timber yields are deferred, reduced, or cancelled in keeping with the intent of the classification. Because the entire practice of forest management comes under state and federal laws and regulations designed to protect the environment, even lands classed as standard in this analysis are subject to environmental constraints. The management practices and resulting timber yields assumed for this analysis are compatible with current environmental constraints. Changes could occur in the future, however, ranging from restrictions on fertilizing to a ban on clearcutting on national forests that could significantly affect the results of this analysis. That remains to be seen.

If we assume that the projections represent timber flows compatible with other environmental concerns, then we can address economic issues. Here, we also must begin with an assumption.

The projections represent a considerable range of investment in timber production among the various owner classes and between the assumed management intensities. Stocking control, thinning, fertilization, genetically improved planting stock, mortality salvage, species conversion, reforesting the backlog of nonstocked acres, and other regeneration assumptions all require investments above those generally made in the past. Whether these increased investments are warranted has not, and will not, be addressed explicitly by this study. The assumptions regarding all these practices were developed by interviewing forest managers about their intentions for managing their lands in the future. Presumably, these intentions represent a rational assessment of technical and economic possibilities. Thus, we are assuming that the management practices of the projections are economically viable and will, in fact, be carried out.

The economic issues that will be discussed in the remainder of this section have to do with the flow of direct economic benefits from timber production to the people of Oregon. Specifically, we will discuss employment and tax payments (including in-lieu payments from public lands). The time period for the discussion is the next 30 years.

Timber-Dependent Employment

Our analysis of timber-dependent employment includes two major components: logging and end-product processing, which includes foreign exports but excludes pulp and paper and log hauling, which are not included in statistics for the logging sector. To include timber management (timber growing) employment would have been desirable, but reliable published information on this type of employment is lacking. This is an important omission, because timber management could represent an important source of new jobs as cultural practices (such as stocking control) and regeneration-related activities are intensified.

Another important omission is the consideration of secondary (indirect) employment resulting from timber-related activities. Reliable multipliers are not generally available, although estimates of the relation between basic employment, such as timber-dependent employment, and total employment can be found. Gustafson found ratios of total employment to basic employment in 1970 and 1972 ranging from 2.15 to 2.98 for local economic areas in Oregon, excluding Portland. For the Portland area and the state as a whole, he found multipliers of more than 4.00 (Gustafson, 1975). He questions the stability of such ratios, however, and raises doubts about their validity for forecast-

ing secondary employment into the future. Also, changes in timber-dependent employment may not affect total income, especially when the changes are caused by changes in productivity. And income may be a more important predictor of indirect employment than is timber-related employment.

Timber Harvest, Exports, Imports, and Consumption

The projections discussed earlier include only timber production within timbersheds. They can be used to forecast logging employment, but information on exports, imports, and net consumption are needed to forecast end-product processing employment. An analysis was made using published log-flow information (Schuldt and Howard 1974; Austin 1966; Bergvall and Ormrod 1974; Howard 1974; and Manock *et al.* undated) and log export information (USDA, Forest Service, Quarterly Reports) to estimate these items for each timbershed. Based on this analysis, forecasts were made on the assumption that the following relations would remain stable over the next 30 years for each timbershed: Foreign exports related to

Foreign exports related to harvest by owner class.

Domestic exports related to total harvest (exports to other timbersheds and other states).

Imports from other states and foreign sources would be the same as found currently (note, however, that imports from other timbersheds depend on harvest in those timbersheds, from the second assumption).

Thus, timber consumption by timbershed is estimated as follows: timber consumption = timber harvest - exports + imports. Admittedly, this is a crude estimate of future consumption, but it should suffice for an estimate of broad trends in employment. It does reflect current marketing patterns, but little can be said about the likelihood that these will continue in the face of current economic conditions, particularly with regard to fuel costs.

Employment Trends

The following relations were used to make employment projections in each timbershed[5]:

Logging employment depends on timber harvest

Foreign export employment depends on timber harvest.

End-product processing employment depends on log consumption.

In addition, a time trend was assumed for each of the three types of employment (primarily based on an extrapolation of trends in Wall and Oswald, 1975). The assumption was that from 1985 to 2005, logging employment per unit of timber production would decrease at the rate of 9 percent per decade; foreign export employment per unit of log export would decrease at the rate of 10 percent per decade; and end-product processing would decrease at the rate of 7 percent per decade.

The results of the analysis differ, based on the timber projection used. Based on RUN A-1, which reflects a continuation of current policies and actions over the next 30 years, western Oregon timber harvest can be expected to decline by about 22 percent, compared to current harvest, by the year 2005. A corresponding reduction in direct timber-dependent employment of about 27 percent would accompany such a reduction (Table 12). If policies and actions were changed so that RUN A-2 or RUN B-2 were appropriate projections, however, one can see that, even though timber harvest would be maintained at or above current harvest, timber-dependent employment still can be expected to decline by from 10 to 14 percent by 2005 in western Oregon.

For Oregon as a whole, a decline in timber-dependent employment of 25 percent by 2005 would accompany RUN A-1; corresponding declines of 11 and 7 percent would accompany RUNS A-2 and B-2 (Table 12). In general, one can say that timber-dependent employment in Oregon could decline between 3 and 25 percent by 2005 depending on the harvest projection that prevails.

[5]The regression models and coefficients used appear in a supplement to this report that is available on request from the School of Forestry, Oregon State University.

Another interesting aspect of the analysis is the possibility to actually increase timber-dependent employment during 1975-1985 over current levels. For Oregon as a whole, RUN A-2 shows an increase in the timber harvest for 1975-1985 of 11 percent, which would be accompanied by an increase of 8 percent in timber-dependent employment during the same period. With management intensity Target B, RUN B-2 shows a possible increase of 14 percent in employment for 1975-1985 (Table 12). In both instances, employment could be expected to decline from 1985 to 2005, as mentioned above.

The results in Table 12 are not definitive, but they should be representative of the range of possibilities. Table A 16 in the Appendix shows the results by timbershed.

Private Timber Taxes and Public In-Lieu Payments

Another major area of concern directly related to timber inventory and harvest is revenue to local governments in Oregon. Property taxes or other types of taxes on privately owned timber and timberlands, and payments made in-lieu of taxes from public forests are important sources of government revenue in all timbersheds.

Private taxes. There are several types of timber-related taxes currently used in Oregon: the western Oregon ad valorem timber tax; the western Oregon small tract option tax; the forest fee and yield tax (an option for both western and eastern Oregon); the eastern Oregon severance tax; and the forest products harvest tax. For a given tract (tax lot) the first four are mutually exclusive; the fifth

Table 12. Timber Harvest and Employment Trends for Three Oregon Timber-Flow Projections, 1975-2005, as Ratios with the Current Decade.[1]

	Timber harvest[2]			Timber-dependent employment[2]		
Decade	RUN A-1	RUN A-2	RUN B-2	RUN A-1	RUN A-2	RUN B-2
WESTERN OREGON						
1975-1985	Current	1.03	1.07	Current	1.02	1.05
1985-1995	0.93	1.00	1.04	0.88	0.92	0.95
1995-2005	0.78	1.01	1.07	0.73	0.86	0.90
EASTERN OREGON						
1975-1985	Current	1.40	1.61	Current	1.36	1.55
1985-1995	1.00	1.37	1.60	0.93	1.23	1.43
1995-2005	1.00	1.36	1.62	0.86	1.14	1.33
ALL OF OREGON						
1975-1985	Current	1.11	1.19	Current	1.08	1.14
1985-1995	0.94	1.08	1.17	0.89	0.98	1.04
1995-2005	0.83	1.09	1.19	0.75	0.91	0.97

[1]Each group of values in the table stands by itself. The harvest of 1975-1985 for RUN A-1 is the current harvest defined as experience in 1968-1973 earlier. The employment of 1975-1985 associated with RUN A-1 thus represents current employment. The ratios in each cell are with relation to the current harvest or employment for the location specified.

[2]Ratio of value for decade in question to value for current decade.

applies to all timber harvested in the state (with minor exclusions). The distribution of the use of the first four tax options varies considerably by timbershed (Table 13), thereby complicating an analysis of tax revenues.

Public in-lieu payments. Different schedules apply to different public agencies for payments to local government in-lieu of taxes. The national forests pay a flat 25 percent of net receipts from the sale of timber and other fees to counties in which a particular national forest lies. The allocation to counties is proportional to the acres of the forest in each county.

The Bureau of Land Management has different payment schedules based on the type of land. The Oregon and California Railroad Grant Lands (O & C lands), including the so-called controverted lands administered by the Forest Service, return about 50 percent of net receipts to the counties, with the allocation by county fixed by law in 1937; the Public Domain lands return 5 percent of net receipts to the state; and the Coos Bay Wagon Road Lands are assessed and taxed under the provisions of the western Oregon ad valorem tax by the counties in which the lands lie.

Lands owned by the State of Oregon and administered by the Oregon Department of Forestry return various proportions of net receipts to counties, depending on specific ownership classes for the state lands and bonding liens. For our timbersheds, the returns range from zero to 63 percent of net receipts.

Calculating the taxes and in-lieu payments. The purpose for calculating tax and in-lieu payments for this analysis is to show the relative changes in these payments over time, as timber harvests vary. Certain assumptions were needed to specify the relative use of the private tax options over time. A key assumption was that the distribution of acres for each owner class among tax types would stay the same as at present (Table 13). This assumption was used to distribute the values of standing timber and harvest for the private owner classes into each tax type for use in calculating tax payments.

Other assumptions were made about stumpage prices, land values, and tax rates. Real stumpage prices and land values were assumed to increase at the rate of 34 percent per decade, beginning in 1985.[6] Tax rates were assumed to stay the same as at present (on the assumption that assessed valuations and other revenues to county government would keep up with real price increases).

All in-lieu payment rates on public lands were assumed to remain as at present. The same stumpage price increases as on private lands also were assumed for public lands.

Each type of tax or in-lieu payment is dependent upon one or more of the following: standing timber value; forest land value; harvest value; or harvest volume. The projections of harvest volumes, coupled with the assumptions noted above, allowed for projections of relative increases in tax and in-lieu payments over time.

Trend for in-lieu payments from public lands. As all public administrative units could maintain their current harvest for the next 30 years for RUN A-1, the trend for in-lieu payments depends only on the stumpage price trend and the size of material harvested. The price trend dominates, so in-lieu payments are likely to rise at close to the price trend rate—about 2 percent per year from 1975 to 2005 (Table 14 and Appendix, Table A 17).

The impact of reduced sizes of material can be seen by looking at RUN A-1 for eastern Oregon. If price trend alone was at work, the in-lieu payments during 1995-2002 could be expected to be about 80 percent higher than at present, because harvest is unchanged between now and that decade. In-lieu payments however, are only 70 percent above the present because smaller material will be harvested during 1995-2005, thus decreasing the unit value of timber harvested (Table 14; also see the diameter class graphs for eastern Oregon timbersheds, Figure 13c, 14c, and 15c).

The results for RUNS A-2 and B-2 show even higher in-lieu payments, which reflect the higher public harvests of those projections. Note that the in-lieu payments would increase during 1975-1985 for both of those projections, and still increase

[6] The increase of 34 percent a decade is equivalent to an increase of about 3 percent a year. Douglas-fir stumpage price has risen at about 3.5 percent a year from 1910 to 1970 (USDA, Forest Service 1973. p. 148). Note that because this increase begins in 1985, the average annual increase from 1975 to 2005 is about 2 percent.

Table 13. Distribution in Percentages of Forest Industry and Other Private Forest Acres by Tax Type Within Timbershed, about 1973.[1]

Western Oregon ad valorem tax			Forest fee and yield tax			Eastern Oregon severance tax			Small tract tax			All tax types		
Forest Industry	Other Private	All private	Forest Industry	Other Private	All private	Forest Industry	Other Private	All private	Forest Industry	Other Private	All private	Forest Industry	Other Private	All private
NORTH COAST														
72	82	75	28	8	22	--	--	--	--	10	3	100	100	100
NORTH WILLAMETTE VALLEY														
72	82	77	28	4	16	--	--	--	--	14	7	100	100	100
MID-WILLAMETTE VALLEY														
80	84	81	20	13	18	--	--	--	--	3	1	100	100	100
EUGENE														
76	87	79	24	9	20	--	--	--	--	4	1	100	100	100
ROSEBURG														
98	96	98	2	4	2	--	--	--	--	--	--	100	100	100
SOUTH COAST														
90	90	90	10	10	10	--	--	--	--	--	--	100	100	100
MEDFORD														
96	97	96	4	--	2	--	--	--	--	3	2	100	100	100
KLAMATH-LAKEVIEW														
--	--	--	5	13	7	95	87	93	--	--	--	100	100	100
BEND-PRINEVILLE														
--	--	--	18	10	14	82	90	86	--	--	--	100	100	100
EASTERN														
--	--	--	--	--	--	100	100	100	--	--	--	100	100	100

[1]Adapted from an analysis of records at the Oregon Department of Revenue and various handouts from that department and the Oregon State Forestry Department.

considerably between the current decade and 1995-2005. For example, RUN A-2 for western Oregon shows an increase of 22 percent in the harvest for 1975-1985 and an increase of 24 percent for in-lieu payments over the same items for RUN A-1. For 1995-2005, the harvest would be only 17 percent above the current harvest, but the in-lieu payments would be double the current in-lieu payments.

Similar results were found for each timbershed (Table A 17, Appendix).

Trend for private tax payments. The analysis of the trend for private tax payment is much more complicated than that for in-lieu payments. First, there's the interaction among tax types. Second, for the ad valorem tax, there's the interaction between harvest and inventory as determinants of the tax. Then, there's the interaction between Forest Industry harvests, which tend to decline in all projections, and Other Private harvests, which tend to rise in the projections other than RUN A-1. And finally, changes in the size of trees in the inventory and harvest can significantly change unit timber values, and thus affect tax assessments. All this interaction makes it difficult to predict what will happen to timber taxes just by looking at timber harvests, particularly in western Oregon.

Looking at western Oregon, one can see some interesting things (Table 15). For example, even though private timber inventory would drop 14 percent and private harvest would drop 41 percent by 1995 under RUN A-1, timber taxes would be up

Table 14. Timber Harvest and In-Lieu Payment Trends for Public Lands Based on Three Timber Flow Projections, 1975-2005.[1]

	Timber harvest from public lands[2]			In-lieu payments from public lands[2]		
Decade	RUN A-1	RUN A-4	RUN B-4	RUN A-1	RUN A-2	RUN B-2
WESTERN OREGON						
1954-1985	Current	1.22	1.28	Current	1.24	1.29
1985-1995	1.10	1.18	1.25	1.37	1.55	1.63
1995-2005	1.03	1.17	1.25	1.82	2.06	2.19
EASTERN OREGON						
1975-1985	Current	1.62	1.93	Current	1.57	1.86
1985-1995	1.00	1.56	1.89	1.31	1.97	2.31
1995-2005	1.00	1.54	1.90	1.70	2.42	2.77
ALL OREGON						
1975-1985	Current	1.33	1.46	Current	1.30	1.40
1985-1995	1.01	1.28	1.42	1.36	1.63	1.76
1995-2005	1.02	1.28	1.43	1.80	2.13	2.30

[1]Each group of values in the table stands by itself. The harvest of 1975-1985 for RUN A-1 is the current harvest. The in-lieu payments of 1975-1985 associated with RUN A-1 thus represent current in-lieu payments. The ratios in each group are with relation to the current harvest or employment for the location specified.

[2]Ratio of value for decade in question to value for current decade.

by 14 percent. This is caused by the price trend. Comparing RUN A-2 with RUN A-1 during 1975-1985, one can see that even though harvest would drop by 11 percent for RUN A-2, taxes would not drop. This is because the RUN A-2 inventory would rise relative to the RUN A-1 inventory during that period because of the decrease in harvest, thus preserving some of the inventory tax base.

The results are even more interesting at the timbershed level (Table A 18, Appendix), and, of course, it is at that level that the issue of timber taxes is most relevant. There are many instances of inventories and harvests being below current levels without a resultant decrease in taxes below current levels. The most severe decreases in taxes occur for RUN A-1, which reflects the heavy cutting and inventory depletion on Forest Industry lands that would occur if the attempt were made to maintain current total harvests while the public lands continue to harvest their current allowable cuts.

Interestingly, the shift to the policies and actions reflected by RUNS A-2 and B-2 would result at times in a decrease in tax revenues for some timbersheds compared to current policies and actions of RUN A-1. Remember, however, that these decreases would be more than offset by the higher public in-lieu payments of RUNS A-2 and B-2. In addition, the modulation of private harvests, in keeping with the long-run sustained-yield conditions assumed for the projections, would assure a more stable tax flow for the future beyond the year 2005.

In summary, the private tax analysis shows the trend for taxes under the present mix of tax types in Oregon. In addition to the type of tax, the trend is

Table 15. Timber Inventory, Timber Harvest, and Timber Tax Trends for Private Lands Based on Three Timber Flow Projections, 1975-2005.[1]

	Inventory[2,3]			Harvest[3]			Taxes[3]		
Decade	RUN A-1	RUN A-2	RUN B-2	RUN A-1	RUN A-2	RUN B-2	RUN A-1	RUN A-2	RUN B-2
WESTERN OREGON									
1975-1985	Current	1.03	1.03	Current	0.89	0.90	Current	1.00	1.00
1985-1995	0.89	0.97	0.95	0.86	0.86	0.88	1.00	1.07	1.08
1995-2005	0.86	0.93	0.91	0.59	0.88	0.92	1.14	1.18	1.19
EASTERN OREGON									
1975-1985	--[2]	--	--	Current	1.07	1.15	Current	1.06	1.12
1985-1995	--	--	--	1.00	1.09	1.18	1.15	1.25	1.31
1995-2005	--	--	--	1.00	1.10	1.21	1.34	1.51	1.56
ALL OREGON									
1975-1985	--	--	--	Current	0.92	0.94	Current	1.00	1.01
1985-1995	--	--	--	0.89	0.90	0.93	1.01	1.09	1.10
1995-2005	--	--	--	0.66	0.92	0.97	1.16	1.22	1.23

[1]Each group of values in the table stands by itself. The inventory and harvest of 1975-1985 for RUN A-1 is the current inventory and harvest. The taxes for 1975-1985 associated with RUN A-1 thus represent current taxes. The ratios in each group are relationships to the current inventory, harvest, or taxes for the location specified.

[2]The inventory is a factor for the western Oregon ad valorem tax only. Thus, it is not shown for eastern Oregon and the entire state.

[3]Ratio of value for the decade in question to the value for the current decade.

dependent on a mix of several factors: stumpage prices, harvest, tree sizes, and, for the ad valorem tax, inventory. Changes in any of these factors would have an impact on the results.

This was not meant to be an in-depth analysis of Oregon's timber tax system. The intent was to show the tax trends that would accompany timber trends in the various projections. These trends are valid only for the mix of tax types, tax rates, and price assumptions used in this analysis. A different mix of tax types or different assumptions about tax rates and prices could change the results significantly.

CONCLUSIONS

This analysis was designed to provide projections of possible changes in future timber harvests in Oregon and their contributions to the economies of local areas (timbersheds) within the state. It was found that, under current policies and actions among owner classes, a decline in total harvest below the current level is likely for all western Oregon timbersheds, except the North Coast timbershed. But there are reasonable opportunities for offsetting some of the timbershed declines because of the apparent ability of the public and Other Private owner classes to harvest more timber than they do now. Despite inevitable declines in Forest Industry harvests in most timbersheds, the total harvest for western Oregon could continue at the current level or higher indefinitely. Even so, some timbersheds are likely to experience declines within the next 30 years, regardless of what policies and actions prevail among owner classes.

Intensifying timber management in western Oregon is not likely to result in an increase of more than 4-6 percent in the ability to harvest in western Oregon as a whole over the next 30 years. In the long run, however, the increase could be as much as 13 percent, based on the data and assumptions used in this analysis

All timbersheds in eastern Oregon apparently can maintain their current harvest over the next 30 years, although some decline in Forest Industry harvest is likely in two of the timbersheds. As in western Oregon, the public and Other Private owner classes could be harvesting more than they are now. The total harvest in all eastern Oregon timbersheds apparently could be higher than it is currently, now and in the future. Given the current inventory and the potential capacity for timber growth in Oregon, the forest itself does not appear to be a limiting factor, unless future demands for timber far outstrip our present expectations. Or, unless Oregon's forest land becomes much more valuable for things other than timber growing. This is not to say problems of timber availability won't exist in Oregon. These analyses make evident that some adjustments are inevitable. These adjustments could take several forms: shifts in timber-marketing patterns; shifts in location of timber-processing capacity; shifts in the amount and types of wood processing; shifts in policies and actions in the management of timber. Problems will occur, but feasible solutions appear to be within reach. If anything is limiting with regard to the future of Oregon's forests, it is man himself.

A medium-size conference room would suffice for a meeting of people who develop and revise policies and supervise actions on at least 75 percent of the productive forest land in Oregon. It is not certain whether this is good or bad. Such concentration of power could have merit in providing the impetus for a constructive forestry program for Oregon and for providing the continuing action any such program would require. On the other hand, indifference or dissension among the few could weaken attempts to deal with problems or capture opportunities. An example of the constructive side of the ledger is this study, which had the support and cooperation of the major land-managing agencies and many of the largest private forest landowners in the state. Without this cooperation the study would have been much more difficult, if not impossible.

This brings us to the role of this study in developing a forestry program for Oregon. The study is a beginning—a focal point for discussion of problems and opportunities. It presents some alternatives, but certainly not all possible alternatives. The study has many limitations—everything from the classic problem of some poor data, to our inability to simulate some aspects of forest growth as well as we would like. Some will believe the analysis did not go far enough in testing alternatives for management intensification and other ways to increase the timber harvest potential of the state. Others will think we have been too optimistic in the assumptions we did make. Both views may be warranted. This analysis does not include the full biological potential to grow timber in Oregon, nor does it include the more optimistic aspirations of those interested in converting timberland to other uses. Thus, there is plenty of room for further analysis using different data, different approaches in making projections, different assumptions about management intensification and other things, and different techniques.

As we said, this study is just a beginning.

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APPENDIX

CAN OREGON MAINTAIN HER SHARE OF NATIONAL TIMBER SUPPLY TO THE YEAR 2000?

The analyses discussed in the main body of this report have been from the perspective of Oregon and local areas within the state. As Oregon is a major supplier of the Nation's timber, the timber situation of the state is also of interest from a national perspective.

The National Timber Outlook (U.S. Forest Service, 1973) projected a 47-percent rise in national timber consumption by the year 2000, compared to 1970, if relative prices are above the average prices in 1970 for wood products. If such a rise in consumption were to come about, could Oregon maintain her relative share of the supply needed? That is, can Oregon's timber harvest increase steadily between now and 2000 so that the state's harvest in 2000 will be 1.47 times its current harvest (based on experience in 1968-1973)? What would happen after 2000 if harvests were increased in this manner?

Two projections, RUN A-3 and RUN B-3, were made for each half of the state to answer these questions. They are similar to RUNS A-1 and B-1 for each timbershed in that a harvest is specified for each of the first three decades and a maximization phase begins in the fourth decade. They differ in several important ways, however. First, there is only one administrative unit for western Oregon and one for eastern Oregon, exclusive of the special class administrative units, which are handled as before. Second, the harvests were set to increase linearly over the first three decades such that the harvest during 1995-2005 is about 1.47 times the current harvest for each half of the state. Third, a common sustained-yield objective was chosen for all owner classes for the maximization phase of the projection beginning after 2005.

By designating western Oregon and eastern Oregon as administrative units, we are saying that the projections are to be made without regard to which owner class or timbershed the harvests will come from. When a harvest is called for, as in the first three decades, or calculated, as in the maximization phase, it can come from any owner class or timbershed within the half-state at any time, depending on where timber is available. Despite this proviso, however, the basic assumptions about regeneration, management intensity targets, and types of harvest remain specified at the owner class or unit within owner class as they were for RUNS A-1 and B-1.

As an entire half of the state is considered a single administrative unit, a single sustained-yield assumption is needed for all owner classes. Thus, for the maximization phase beginning after 2005, it was specified that the administrative unit harvest be maximized in each decade (decade by decade) such that the chosen harvest can be sustained for six decades from the beginning of the period in question. Note that the sustainability criterion is a compromise between the five decades used for private lands and the seven decades used for public lands in the previous projections.

Even though the administrative unit is at the half-state level, it was possible to keep track of the timbersheds and owner classes from which the timber was to come each decade.

Western Oregon

Of the projections discussed previously for western Oregon, RUN B-2, which was the most optimistic, showed a projected harvest for 1995-2005 at 7 percent above the current harvest (Figure 4b). Therefore, if we wish to increase harvest over the same period by 47 percent, some disruption in the flow of harvest after 2005 can be expected. In both RUN A-3 and RUN B-3 the requested increase in western Oregon harvest is accomplished, after which the harvest decreases sharply in the fourth decade when the maximization phase of the projection begins (top line in Figure 16a and 16b). With management intensity Target A, the decline is 40 percent; with Target B, it is 33 percent. In both instances, the harvest increases gradually thereafter, which reflects a build-up of growing stock inventory that is needed to satisfy the sustained yield conditions for the projection after 2005.

The impact of considering western Oregon as a single administrative unit can be seen by the large variation in the harvest from some owner classes (Figure 16a) and some timbersheds (Figure 16b) over the next 40 to 50 years. For example, in RUN A-3, National Forest harvest in western Oregon would jump from the current allowable cuts totaling about 375 million cubic feet to harvest of about 1.03 billion cubic feet during 1975-1985. The harvest would drop sharply to 650 million cubic feet during 1985-1995, rise slightly during 1995-2005, and then drop sharply again to 157 million cubic feet during 2005-2015 (Figure 16a). Similar fluctuations can be seen for some timbersheds over time (Figure 16b).

This analysis shows that it is physically possible to increase western Oregon harvest to keep pace with

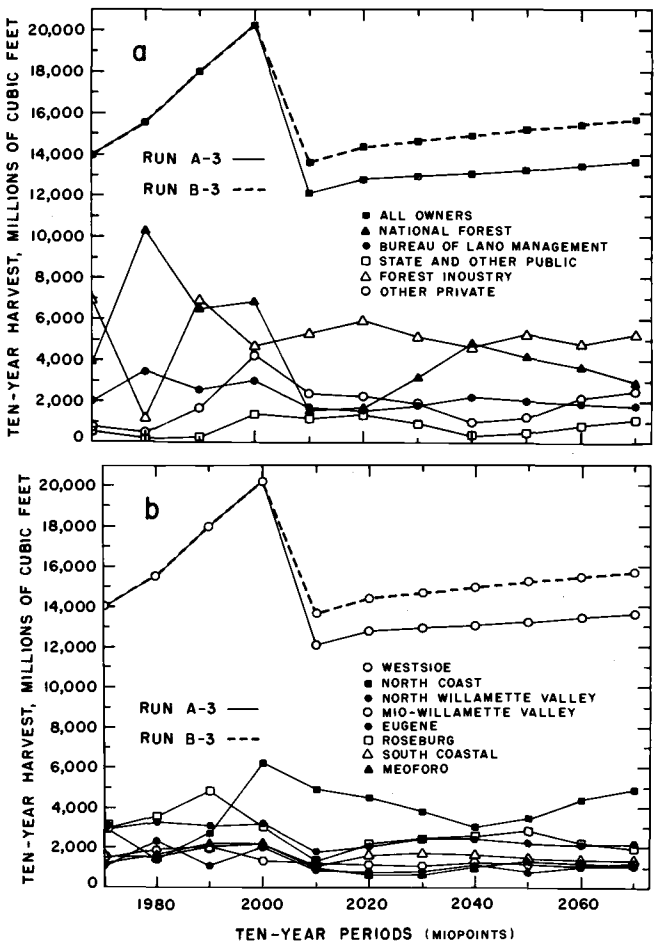

Figure 17. Harvest projections for eastern Oregon from RUNS A-3 and B-3, and projections from RUN A-3 for owner classes (a) and timbersheds (b).

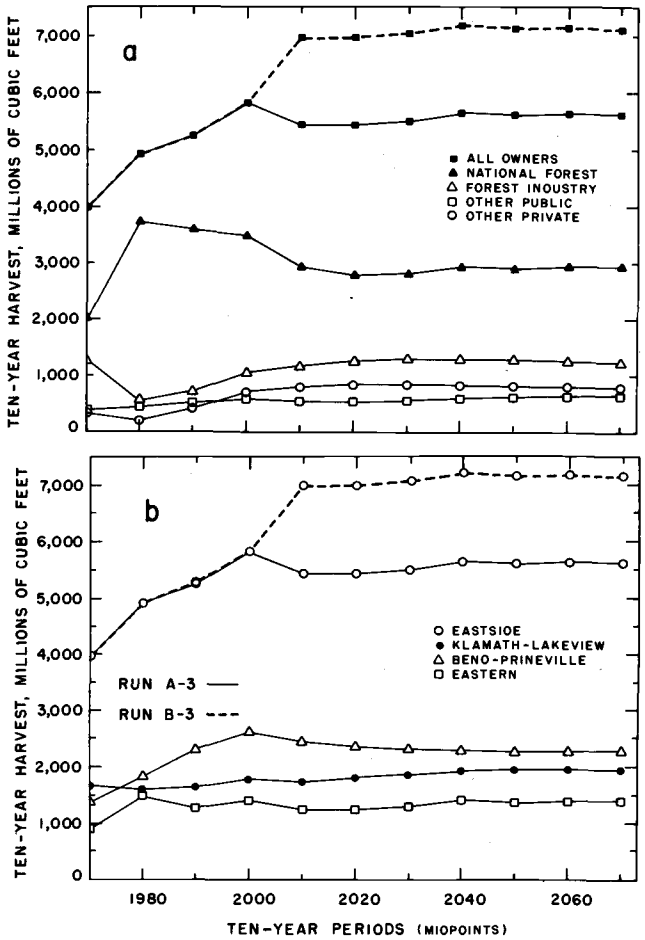

Figure 16. Harvest projections for western Oregon from RUNS A-3 and B-3, and projections from RUN A-3 for owner classes (a) and timbersheds (b).

a 47-percent increase in national consumption by the year 2000. Looking at the projection beyond 2000, one can see that the harvest declines, then rises steadily toward a long-run equilibrium. The harvest pattern for 1975-2005 was only one of many possible; we just as well could have called for an increase of 55 percent or 30 percent. These would have shown different trajectories, but all would tend toward the same equilibrium in the long run. The point is that there is much flexibility in managing the flow of timber in western Oregon. If the objective is to increase western Oregon's harvest, there are various alternatives for doing so. A thorough attempt to find an acceptable way would require specifying the limits of acceptability with regard to such things as period-to-period fluctuations in

timbershed or owner class harvest, and then evaluating the alternatives within those limits—a complex study in itself.

Eastern Oregon

It was predictable that eastern Oregon could meet the increases called for in RUNS A-3 and B-3 without much trouble. RUN A-2 showed the eastern Oregon harvest during 1995-2005 at 37 percent above the current harvest, and RUN B-2 showed it at 62 percent above current harvest (Figure 11b). RUN A-3 shows that the requested harvest during 1975-2005 could be met with a decline of only 7 percent during 2005-2015. RUN B-3 shows the requested harvests met, with the harvest continuing upward, increasing by 20 percent during 2005-2015, compared to 1995-2005 (top line in Figures 17a and 17b).

The fluctuations in harvest over time for owner classes and timbersheds are not as great in eastern Oregon as they were in western Oregon, although there are some pronounced changes from current cutting patterns (Figures 17a and 17b).

As in western Oregon, this analysis shows that increasing harvests to keep pace with an increase of 47 percent in national comsumption is possible. One should not conclude that harvests ought to be increased, nor that any increases should follow patterns among owner classes and timbersheds shown in RUN A-3 or RUN B-3. If the goal is to increase harvests, the alternatives for doing so should be evaluated carefully.

Table A1. Base Inventory Used for the Oregon Timber Resources Study. Western Oregon as of January 1, 1975, with Area in Thousands of Acres and Volume in Millions of Cubic Feet, by Owner Class.

Unit and location[1]	Land class[2]	Site class[3]	Species type[4]	Area[5]	Volume[6]
NATIONAL FOREST OWNER CLASS					
Mt. Hood	Standard	Medium	Douglas-fir	110.67	1,052
National Forest	Standard	Low	Douglas-fir	278.78	1,799
(Lies in the	Standard	Low	True fir	170.73	967
following timber-	Standard	Very low	Douglas-fir	37.55	128
sheds: North	Standard	Very low	True fir	45.49	141
Willamette, Mid-	Special	Medium	Douglas-fir	24.26	224
Willamette Valley,	Special	Low	Douglas-fir	61.12	384
Bend-Prineville)	Special	Low	True fir	37.44	207
	Special	Very low	Douglas-fir	8.23	27
	Special	Very low	True fir	9.98	30
	Marginal	Medium	Douglas-fir	1.63	
	Marginal	Low	Douglas-fir	4.10	
	Marginal	Low	True fir	2.51	
	Marginal	Very low	Douglas-fir	0.51	
	Marginal	Very low	True fir	0.67	
	Other objectives	Medium	Douglas-fir	10.50	
	(standard)	Low	Douglas-fir	26.46	
	(standard)	Low	True fir	16.20	490
	(standard)	Very low	Douglas-fir	3.56	
	(standard)	Very low	True fir	4.31	
	Other objectives	Medium	Douglas-fir	0.89	
	(special)	Low	Douglas-fir	2.24	
	(special)	Low	True fir	1.37	
	(special)	Very low	Douglas-fir	0.30	
	(special)	Very low	True fir	0.37	
	Nonstocked	Medium	--	0.68	--
	Nonstocked	Low	--	4.42	--
	Nonstocked	Very low	--	0.45	--
	All land classes	--	--	865.42	5,449
Rogue River	Standard	Medium	Douglas-fir	66.75	342
National Forest	Standard	Low	Douglas-fir	116.35	525
(Lies in the	Standard	Low	True fir	66.20	429
following timber-	Standard	Very low	Douglas-fir	9.88	35
sheds: Medford,	Standard	Very low	True fir	5.52	31
Roseburg, Klamath-	Special	Medium	Douglas-fir	14.41	81
Lakeview)	Special	Low	Douglas-fir	30.75	124
	Special	Low	True fir	11.02	101
	Special	Very low	Douglas-fir	5.52	8
	Marginal	Medium	Douglas-fir	12.68	7
	Marginal	Low	Douglas-fir	60.67	
	Marginal	Low	True fir	34.94	
	Marginal	Very low	Douglas-fir	10.34	
	Marginal	Very low	True fir	14.70	694
	Other objectives	Medium	Douglas-fir	1.77	
	(standard)	Low	Douglas-fir	1.81	
	(standard)	Low	True fir	5.50	

Table A1. (Continued).

Unit and location[1]	Land class[2]	Site class[3]	Species type[4]	Area[5]	Volume[6]
ROGUE RIVER NATIONAL FOREST (Continued)					
	(standard)	Very low	True fir	1.84	
	Nonstocked	Medium	--	1.84	--
	Nonstocked	Low	--	11.03	--
	Nonstocked	Very low	--	11.03	--
	All land classes	--	--	494.55	2,377
Siskiyou	Standard	Medium	Douglas-fir	84.00	524
National Forest	Standard	Low	Douglas-fir	262.00	915
(Lies in the	Standard	Low	Tanoak	25.92	108
following timber-	Standard	Very low	Douglas-fir	76.50	195
sheds; South	Special	Medium	Douglas-fir	18.52	81
Coast, Medford)	Special	Low	Douglas-fir	23.07	101
	Special	Very low	Douglas-fir	11.19	32
	Marginal	Medium	Douglas-fir	33.73	
	Marginal	Low	Douglas-fir	98.91	
	Marginal	Low	Tanoak	24.65	
	Marginal	Very low	Douglas-fir	28.87	1,100
	Other objectives	Medium	Douglas-fir	5.41	
	(special)	Low	Douglas-fir	9.33	
	(special)	Low	Tanoak	1.72	
	(special)	Very low	Douglas-fir	6.46	
	Nonstocked	Low	--	20.50	--
	Nonstocked	Very low	--	5.50	--
	All land classes	--	--	736.28	3,056
Siuslaw	Standard	High	Douglas-fir	233.01	1,991
National Forest	Standard	High	Mixed species	57.34	267
(Lies in the	Standard	High	Hardwoods	42.70	104
following timber-	Special	High	Douglas-fir	73.93	640
sheds; North	Special	High	Mixed species	18.19	86
Coast, Eugene,	Special	High	Hardwoods	13.55	33
Roseburg, South	Marginal	High	Douglas-fir	83.07	
Coast)	Marginal	High	Mixed species	20.44	
	Marginal	High	Hardwoods	15.22	
	Other	High	Douglas-fir	12.88	
	objectives	High	Mixed species	3.17	1,097
	(standard)	High	Hardwoods	2.36	
	Other	High	Douglas-fir	12.46	
	objectives	High	Mixed species	3.07	
	(special)	High	Hardwoods	2.28	
	All land classes	--	--	593.67	4,218
Umpqua	Standard	Medium	Douglas-fir	146.57	899
National Forest	Standard	Low	Douglas-fir	263.60	1,477
(Lies in the	Standard	Low	True fir	23.62	192
following timber-	Standard	Very low	Douglas-fir	28.91	89
sheds: Eugene,	Standard	Very low	True fir	25.33	125
Roseburg, Medford)	Special	Medium	Douglas-fir	45.36	360
	Special	Low	Douglas-fir	96.06	591
	Special	Low	True fir	14.87	77
	Special	Very low	Douglas-fir	22.01	36

Table A1. (Continued).

Unit and location[1]	Land class[2]	Site class[3]	Species type[4]	Area[5]	Volume[6]
UMPQUA NATIONAL FOREST (Continued)					
	Special	Very low	True fir	23.81	50
	Marginal	Medium	Douglas-fir	33.01	
	Marginal	Low	Douglas-fir	87.04	
	Marginal	Low	True fir	5.18	
	Marginal	Very low	Douglas-fir	6.67	1,433
	Other objectives	Low	Douglas-fir	3.17	
	(special)	Low	True fir	13.92	
	(special)	Very low	Douglas-fir	22.84	
	Nonstocked	Medium	--	1.80	--
	Nonstocked	Low	--	5.40	--
	All land classes	--	--	869.17	5,329
Willamette	Standard	Medium	Douglas-fir	305.75	2,240
National Forest	Standard	Low	Douglas-fir	318.64	1,813
(Lies in the	Standard	Low	True fir	120.04	839
following timber-	Standard	Very low	Douglas-fir	19.34	65
sheds: Eugene,	Standard	Very low	True fir	30.55	65
Mid-Willamette	Special	Medium	Douglas-fir	124.26	960
Valley, Roseburg)	Special	Low	Douglas-fir	67.30	777
	Special	Low	True fir	33.47	359
	Special	Very low	Douglas-fir	9.55	28
	Special	Very low	True fir	3.79	28
	Marginal	Medium	Douglas-fir	40.45	
	Marginal	Low	Douglas-fir	36.95	
	Marginal	Low	True fir	47.48	
	Marginal	Very low	Douglas-fir	0.60	
	Marginal	Very low	True fir	2.52	
	Other objectives	Medium	Douglas-fir	21.14	
	(standard)	Low	Douglas-fir	19.20	1,469
	(standard)	Low	True fir	24.76	
	(standard)	Very low	Douglas-fir	0.32	
	(standard)	Very low	True fir	1.32	
	Nonstocked	Medium	--	4.07	--
	Nonstocked	Low	--	2.30	--
	Nonstocked	Very low	--	0.17	--
	All land classes	--	--	1,233.97	8,643
BUREAU OF LAND MANAGEMENT OWNER CLASS					
Columbia and Alsea-	Standard	High	Douglas-fir	66.41	436
Rickreal Master	Standard	Medium	Douglas-fir	134.04	525
Units	Standard	Medium	Hardwoods	12.99	45
(Lies in the	Other objectives	High	Douglas-fir	3.46	
following timber-	(standard)	Medium	Douglas fir	6.99	10
sheds: North	(standard)	Medium	Hardwoods	0.68	
Coast, Eugene)	Nonstocked	High	--	0.74	--
	Nonstocked	Medium	--	1.49	--
	All land classes	--	--	226.78	1,016

Table A1. (Continued).

Unit and location[1]	Land class[2]	Site class[3]	Species type[4]	Area[5]	Volume[6]
BUREAU OF LAND MANAGEMENT OWNER CLASS (Continued)					
Clackamas and Mollala Master Units (Lies in the following timbersheds: North Willamette Valley, Mid-Willamette Valley)	Standard	Medium	Douglas-fir	53.69	321
	Standard	Medium	Hardwoods	1.21	5
	Other objectives (standard)	Medium	Douglas-fir	2.87	12
		Medium	Hardwoods	0.06	
	Nonstocked	Medium	--	0.52	--
	All land classes	--	--	58.35	338
Santiam River Master Unit (Lies in the following timbersheds: Mid-Willamette Valley, North Willamette Valley)	Standard	Medium	Douglas-fir	81.30	439
	Standard	Medium	Hardwoods	1.80	9
	Other objectives (standard)	Medium	Douglas-fir	4.33	
		Medium	Hardwoods	0.09	15
	Nonstocked	Medium	--	1.40	--
	All land classes	--	--	88.92	463
Siuslaw and Upper Willamette Master Units (Lies in the following timbersheds: Eugene, Roseburg, Mid-Willamette Valley)	Standard	High	Douglas-fir	67.25	286
	Standard	Medium	Douglas-fir	155.37	458
	Standard	Medium	Hardwoods	8.20	28
	Special	High	Douglas-fir	15.19	64
	Special	Medium	Douglas-fir	35.50	103
	Other objectives (standard)	High	Douglas-fir	4.22	6
		Medium	Douglas-fir	9.86	29
	(standard)	Medium	Hardwoods	0.43	
	Nonstocked	High	--	3.08	--
	Nonstocked	Medium	--	7.18	
	All land classes	--	--	306.28	974
South Umpqua and Douglas Master Units (Lies in the following timbersheds: Roseburg)	Standard	Medium	Douglas-fir	109.93	639
	Standard	Low	Douglas-fir	184.34	578
	Standard	Low	Hardwoods	18.72	47
	Special	Medium	Douglas-fir	17.79	97
	Special	Low	Douglas-fir	29.83	88
	Other objectives	Medium	Douglas-fir	6.84	7
	(standard)	Low	Douglas-fir	11.47	59
	(standard)	Low	Hardwoods	0.98	
	Nonstocked	Medium	--	0.62	--
	Nonstocked	Low	--	1.04	--
	All land classes	--	--	381.56	1,515
South Coast and Curry Master Units (Lies in the following timbersheds: South Coast Roseburg)	Standard	High	Douglas-fir	120.16	688
	Standard	Medium	Douglas-fir	127.08	587
	Standard	Medium	Hardwoods	27.95	84
	Other objectives (standard)	High	Douglas-fir	6.06	
		Medium	Douglas-fir	6.40	69
	(standard)	Medium	Hardwoods	1.47	
	Nonstocked	High	--	3.55	--
	Nonstocked	Medium	--	3.75	--
	All land classes	--	--	296.42	1,428

Table A1. (Continued).

Unit and location[1]	Land class[2]	Site class[3]	Species type[4]	Area[5]	Volume[6]
BUREAU OF LAND MANAGEMENT OWNER CLASS (Continued)					
Jackson, Josephine and Klamath Master Units (Lies in the following timbersheds: Medford, Roseburg, South Coastal)	Standard	Medium	Douglas-fir	182.63	970
	Standard	Low	Douglas-fir	365.32	1,091
	Standard	Low	Hardwoods	63.38	125
	Special	Medium	Douglas-fir	7.97	38
	Special	Low	Douglas-fir	15.95	48
	Other objectives (standard)	Medium	Douglas-fir	9.97	120
		Low	Douglas-fir	19.94	
		Low	Hardwoods	3.34	
	Nonstocked	Medium	--	1.06	--
	Nonstocked	Low	--	2.13	--
	All land classes	--	--	671.69	2,392
STATE AND OTHER PUBLIC OWNER CLASS					
Clatsop, Forest Grove, Tillamook and Western Oregon Districts; other public in Clatsop, Columbia, Tillamook and Washington Counties (Lies in the North Coast Timbershed)	Standard	High	Douglas-fir	89.05	114
	Standard	High	Hardwoods	12.34	26
	Standard	Medium	Douglas-fir	379.63	486
	Standard	Medium	Hardwoods	52.62	64
	Other objectives (standard)	High	Douglas-fir	7.74	60
		High	Hardwoods	1.07	
		Medium	Douglas-fir	33.01	
		Medium	Hardwoods	4.58	
	Nonstocked	High	--	1.86	--
	Nonstocked	Medium	--	7.93	--
	All land classes	--	--	589.83	750
Santiam District; other public in Clackamas and Hood River Counties (Lies in the following timbersheds: North Willamette Valley, Mid-Willamette Valley)	Standard	Medium	Douglas-fir	97.90	203
	Standard	Medium	Hardwoods	0.91	2
	Other objectives (standard)	Medium	Douglas-fir	8.51	18
		Medium	Hardwoods	0.08	
	Nonstocked	Medium	--	0.29	--
	All land classes	--	--	107.69	223
Lane District; no other public (Lies in Eugene timbershed)	Standard	Medium	Douglas-fir	20.75	49
	Standard	Medium	Hardwoods	0.74	2
	Other objectives (standard)	Medium	Douglas-fir	1.81	4
		Medium	Hardwoods	0.06	
	Nonstocked	Medium	--	0.14	--
	All land classes	--	--	23.50	55
Coos District; other public in Coos County (Lies in the following timbersheds: South Coast Roseburg)	Standard	Medium	Douglas-fir	77.28	330
	Standard	Medium	Hardwoods	9.84	34
	Other objectives (standard)	Medium	Douglas-fir	6.72	32
		Medium	Hardwoods	0.85	
	Nonstocked	Medium	--	0.07	--
	All land classes	--	--	94.76	396

Table A1. (Continued)

Unit and location[1]	Land class[2]	Site class[3]	Species type[4]	Area[5]	Volume[6]
STATE AND OTHER PUBLIC OWNER CLASS (Continued)					
Grants Pass District; other public in Douglas and Josephine Counties (Lies in the following timbersheds: Roseburg, Medford)	Standard	Medium	Douglas-fir	45.86	107
	Other objectives (standard)	Medium	Douglas-fir	3.99	9
	Nonstocked	Medium	--	0.09	--
	All land classes	--	--	49.94	116
FOREST INDUSTRY OWNER CLASS					
North Coast Timbershed	Standard	High	Douglas-fir	353.60	1,265
	Standard	High	W. hemlock	296.40	1,363
	Standard	High	Hardwoods	272.00	552
	Standard	Medium	Douglas-fir	151.30	551
	Standard	Medium	W. hemlock	34.58	96
	Standard	Medium	Hardwoods	47.00	71
	Standard	Low	Douglas-fir	34.20	25
	Standard	Low	W. hemlock	10.00	29
	Nonstocked	High	--	78.00	--
	Nonstocked	Medium	--	22.12	--
	Nonstocked	Low	--	1.80	--
	All land classes	--	--	1,301.00	3,952
North Willamette Valley Timbershed	Standard	High	Douglas-fir	27.16	72
	Standard	High	Hardwoods	11.00	24
	Standard	Medium	Douglas-fir	81.90	186
	Standard	Medium	Hardwoods	12.00	14
	Standard	Low	Douglas-fir	30.60	86
	Nonstocked	High	--	0.84	--
	Nonstocked	Medium	--	8.10	--
	Nonstocked	Low	--	5.40	--
	All land classes	--	--	177.00	382
Mid-Willamette Valley Timbershed	Standard	High	Douglas-fir	87.30	375
	Standard	High	Hardwoods	10.00	15
	Standard	Medium	Douglas-fir	198.37	792
	Standard	Medium	Hardwoods	8.00	6
	Standard	Low	Douglas-fir	48.00	129
	Nonstocked	High	--	2.70	--
	Nonstocked	Medium	--	40.63	--
	All land classes	--	--	395.00	1,317
Eugene Timbershed	Standard	High	Douglas-fir	177.63	555
	Standard	High	Hardwoods	15.00	24
	Standard	Medium	Douglas-fir	266.22	786
	Standard	Medium	Hardwoods	16.00	21
	Standard	Low	Douglas-fir	50.40	105
	Standard	Low	Hardwoods	9.00	5
	Nonstocked	High	--	13.37	--
	Nonstocked	Medium	--	39.78	--
	Nonstocked	Low	--	5.60	--
	All land classes	--	--	593.00	1,496

Table A1. (Continued).

Unit and location[1]	Land class[2]	Site class[3]	Species type[4]	Area[5]	Volume[6]
FOREST INDUSTRY OWNER CLASS (Continued)					
Roseburg Timbershed	Standard	High	Douglas-fir	247.38	1,440
	Standard	High	Hardwoods	50.00	104
	Standard	Medium	Douglas-fir	298.48	1,210
	Standard	Medium	Hardwoods	25.00	16
	Standard	Low	Douglas-fir	84.60	155
	Nonstocked	High	--	18.62	--
	Nonstocked	Medium	--	29.52	--
	Nonstocked	Low	--	9.40	--
	All land classes	--	--	763.00	2,925
South Coast Timbershed	Standard	High	Douglas-fir	176.64	776
	Standard	High	Hardwoods	67.00	163
	Standard	Medium	Douglas-fir	181.60	406
	Standard	Medium	Hardwoods	60.00	61
	Standard	Low	Douglas-fir	24.18	15
	Standard	Low	Hardwoods	9.00	4
	Nonstocked	High	--	7.36	--
	Nonstocked	Medium	--	45.40	--
	Nonstocked	Low	--	6.82	--
	All land classes	--	--	578.00	1,425
Medford Timbershed	Standard	Medium	Douglas-fir	79.17	187
	Standard	Low	Douglas-fir	135.52	286
	Standard	Low	Pine	10.56	36
	Standard	Low	Hardwoods	15.00	6
	Nonstocked	Medium	--	11.83	--
	Nonstocked	Low	--	19.92	--
	All land classes	--	--	272.00	515
OTHER PRIVATE OWNER CLASS					
North Coast Timbershed	Standard	High	Douglas-fir	146.51	733
	Standard	High	W. Hemlock	45.60	314
	Standard	High	Hardwoods	161.00	455
	Standard	Medium	Douglas-fir	76.26	317
	Standard	Medium	Hardwoods	74.00	150
	Standard	Low	Douglas-fir	21.85	47
	Standard	Low	Hardwoods	25.00	88
	Nonstocked	High	--	16.89	--
	Nonstocked	Medium	--	5.74	--
	Nonstocked	Low	--	1.15	--
	All land classes	--	--	574.00	2,104
North Willamette Valley Timbershed	Standard	High	Douglas-fir	59.40	325
	Standard	High	Hardwoods	48.00	151
	Standard	Medium	Douglas-fir	29.97	122
	Standard	Medium	Hardwoods	20.00	47
	Standard	Low	Douglas-fir	16.15	29
	Nonstocked	High	--	6.60	--
	Nonstocked	Medium	--	7.03	--
	Nonstocked	Low	--	0.85	--
	All land classes	--	--	188.00	674

Table A1. (Continued).

Unit and location[1]	Land class[2]	Site class[3]	Species type[4]	Area[2]	Volume[6]
OTHER PRIVATE OWNER CLASS (Continued)					
Mid-Willamette	Standard	High	Douglas-fir	55.68	237
Valley Timbershed	Standard	High	Hardwoods	22.00	34
	Standard	Medium	Douglas-fir	53.76	179
	Standard	Medium	Hardwoods	22.00	40
	Standard	Low	Douglas-fir	15.54	48
	Nonstocked	High	--	2.32	--
	Nonstocked	Medium	--	2.24	--
	Nonstocked	Low	--	5.46	--
	All land classes	--	--	179.00	538
Eugene Timbershed	Standard	High	Douglas-fir	45.05	189
	Standard	High	Hardwoods	20.00	44
	Standard	Medium	Douglas-fir	73.71	142
	Standard	Medium	Hardwoods	23.00	14
	Standard	Low	Douglas-fir	15.75	40
	Standard	Low	Hardwoods	12,00	41
	Nonstocked	High	--	7,95	--
	Nonstocked	Medium	--	17.29	--
	Nonstocked	Low	--	5.25	--
	All land classes	--	--	220.00	470
Roseburg Timbershed	Standard	High	Douglas-fir	59.20	245
	Standard	High	Hardwoods	36.00	61
	Standard	Medium	Douglas-fir	118.15	214
	Standard	Medium	Hardwoods	60.00	27
	Standard	Low	Douglas-fir	31.02	44
	Standard	Low	Hardwoods	20.00	17
	Nonstocked	High	--	14.80	--
	Nonstocked	Medium	--	20.85	--
	Nonstocked	Low	--	1.98	--
	All land classes	--	--	362.00	608
South Coast	Standard	High	Douglas-fir	51.70	286
Timbershed	Standard	High	Hardwoods	60.00	155
	Standard	Medium	Douglas-fir	59.04	159
	Standard	Medium	Hardwoods	62.00	78
	Standard	Low	Douglas-fir	10.92	15
	Standard	Low	Hardwoods	22.00	28
	Nonstocked	High	--	3.30	--
	Nonstocked	Medium	--	12.96	--
	Nonstocked	Low	--	2.08	--
	All land classes	--	--	284.00	721
Medford Timbershed	Standard	Medium	Douglas-fir	20.00	57
	Standard	Medium	Hardwoods	16.00	19
	Standard	Low	Douglas-fir	194.74	473
	Standard	Low	Pine	27.20	19
	Standard	Low	Hardwoods	78.65	164
	Nonstocked	Low	--	66.41	--
	All land classes	--	--	403.00	732

[1]The units shown are the ones used for this study. For National Forest, they correspond to working circles or forests. For BLM, they are made up of one or more Master Units. Master Units are combined when more than one predominate in a timbershed. For State and Other Public, they are one or more Districts of the State Forestry Department, and the Other Public for counties within the timbershed. For Forest Industry and Other Private, the unit corresponds to the timbershed.
The timbershed(s) in which each public agency unit lies is indicated below the unit name. The distribution of the area of each public unit among timbersheds is shown in Table A7.
The timbersheds are defined in terms of counties as follows (see Figure 1 also):
North Coast Timbershed comprised of Benton, Clatsop, Columbia, Lincoln, Polk, Tillamook, Washington, and Yamhill Counties.
North Willamette Valley Timbershed comprised of Clackamas, Hood River and Multnomah Counties.
Mid-Willamette Valley Timbershed comprised of Linn and Marion Counties.
Eugene Timbershed comprised of Lane County.
Roseburg Timbershed comprised of Douglas County.
South Coast Timbershed comprised of Coos and Curry Counties.
Medford Timbershed comprised of Jackson and Josephine Counties.
Klamath-Lakeview Timbershed comprised of Klamath and Lake Counties,
Bend-Prineville Timbershed comprised of Crook, Deschutes, Gilliam, Jefferson, Sherman, Wasco, and Wheeler Counties.
Eastern Timbershed comprised of Baker, Grant, Harney, Malheur, Morrow, Umatilla, Union, and Wallowa Counties.
[2]*Standard* is land devoted primarily to timber production and on which there are no anticipated yield restrictions.
Marginal is land suitable for timber production in the long run but is not now considered part of the timber production base because of economic or technical limitations. This class of land is assumed to become available for timber production over time.
Special is land suitable for timber production, but on which yields are restricted because of other use consideration, such as scenic roadsides.
Other Objectives is potentially commercial forest land devoted primarily to something other than timber production. The land is currently out of the timber production base even though it may contain merchantable timber. These acres may have come from the standard or special categories, as indicated.
Nonstocked Areas are deforested areas that now have less than 10 percent stocking of desirable trees. This is an imprecise definition for this study because different sources of data interpret the definition against different standards. For example, some lands that are nonstocked by one person's definition, which is keyed to conifers as desirable species, may be called well-stocked hardwoods by another person who considers hardwoods desirable for the site. In some instances, currently nonstocked acres are included in the -5 age class in anticipation of regeneration within 5 years. Thus, the nonstocked category as used here underestimates currently nonstocked acres. It included acres that are definitely nonstocked based on prevailing management objectives, but does not include all acres that might be considered nonstocked by definition.
[3]High site class = indices greater than 165 (McArdle *et al.* 1961).
Medium site class = McArdle site indices between 120 and 165, inclusive.
Low site class = McArdle site indices between 50 and 119, inclusive.
Very low site class = McArdle site indices between 20 and 49, inclusive.

[4]*Douglas-fir* includes Douglas-fir and other associated softwoods not shown separately.
Western Hemlock includes western hemlock, Sitka spruce, and western redcedar.
Mixed Species includes mixed softwoods and possibly some hardwoods with no species significantly dominant.
Pine includes all pine and associated softwoods.
Hardwoods include all hardwoods on sites primarily occupied by hardwoods at present, except for hardwoods shown separately.
Tanoak includes tanoak and associated species where tanoak predominates.
[5]The allocation of acres to different land classes is based on agency management plans. Where approved, up-to-date plans were not available, the allocation is based on a best estimate provided by agency personnel. Thus, the allocations are subject to change as new management plans are reviewed and approved. The acres shown are totals for the entire unit designated. Allocations to timbersheds can be approximated by using Table A7.
[6]Volume is in cubic feet of trees 5 inches dbh and larger. Utilization to a 4-inch top is assumed. This volume base is as of January 1, 1975. The utilization standard for this table is for ease of comparison with other published statistics. The utilization standard used for this study ranges from cubic feet, 7 inches dbh to a 5-inch top in 1980 to almost total cubic feet in 2070. (See section on utilization standards.)

Table A2. Percentage distribution of Acres and Volume by Age Class for Standard Land Class. Western Oregon, 1975.

Item	Age class, *Years*[2]								
	Non-stocked	-20 to 10	10 to 30	30 to 50	50 to 70	70 to 90	90 to 110	110 to 180	180+
NATIONAL FOREST OWNER CLASS[1] (National Forests)									
Mt. Hood									
Area	1	3	7	6	10	14	5	11	43
Cubic volume	-	-	-	1	5	11	5	13	65
Rogue River									
Area	7	-	3	3	4	10	3	20	50
Cubic volume	-	-	-	1	2	9	3	24	61
Siskiyou									
Area	5	4	8	5	6	8	5	14	45
Cubic volume	-	-	-	1	5	6	4	16	68
Siuslaw									
Area	-	13	6	6	13	22	18	19	3
Cubic volume	-	-	-	2	9	21	28	34	6
Umpqua									
Area	1	6	14	2	3	4	3	16	51
Cubic volume	-	-	-	-	1	4	3	16	76
Willamette									
Area	1	5	13	1	3	7	5	20	45
Cubic volume	-	-	-	-	2	6	5	23	64
BUREAU OF LAND MANAGEMENT OWNER CLASS (Master units)									
Columbia, Alsea-Rickreal									
Area	1	5	25	17	13	11	13	7	8
Cubic volume	-	-	2	12	16	15	23	16	16
Clackamas, Mollala									
Area	1	4	13	15	7	17	21	12	10
Cubic volume	-	-	-	8	6	20	30	18	18
Santiam River									
Area	2	6	33	14	5	7	7	10	26
Cubic volume	-	-	1	9	5	7	11	19	48
Siuslaw, Upper Willamette									
Area	4	9	24	21	7	5	4	8	18
Cubic volume	-	-	1	17	10	7	8	17	40
South Umpqua, Douglas									
Area	-	8	18	10	10	5	3	11	35
Cubic volume	-	-	-	5	8	7	5	17	58
South Coast, Curry									
Area	2	10	17	13	7	10	6	6	29
Cubic volume	-	-	-	8	8	12	8	12	52

Table A2. (continued).

Item	Age class, *Years*[2]								
	Non-stocked	-20 to 10	10 to 30	30 to 50	50 to 70	70 to 90	90 to 110	110 to 180	180+
BUREAU OF LAND MANAGEMENT OWNER CLASS (Master units) (continued)									
Jackson, Josephine, Klamath									
Area	-	6	4	11	7	14	6	13	39
Cubic volume	-	-	-	4	6	12	6	16	56
STATE AND OTHER PUBLIC OWNER CLASS (Districts)									
Clatsop, Tillamook, Forest Grove, Oregon, plus Other Public									
Area	2	9	46	29	7	2	5	-	-
Cubic volume	-	-	8	42	22	9	19	-	-
Santiam, plus Other Public									
Area	-	6	30	35	18	3	8	-	-
Cubic volume	-	-	3	39	33	6	19	-	-
Lane District									
Area	1	12	12	48	9	2	-	16	-
Cubic volume	-	-	1	46	15	4	-	34	-
Coos, plus Other Public									
Area	-	14	13	4	5	9	55	-	-
Cubic volume	-	-	-	2	5	11	82	-	-
Grants Pass, District, plus Other Public									
Area	-	13	24	14	12	3	-	34	-
Cubic volume	-	-	2	9	15	4	-	70	-
FOREST INDUSTRY OWNER CLASS (Timbersheds)									
North Coast									
Area	8	13	26	31	14	4	1	2	1
Cubic volume	-	-	8	42	22	9	18	1	-
North Willamette Valley									
Area	8	15	33	19	10	6	4	2	3
Cubic volume	-	-	3	21	23	17	14	9	13
Mid-Willamette Valley									
Area	11	12	25	26	7	2	-	-	17
Cubic volume	-	-	2	21	11	2	-	-	62
Eugene									
Area	10	18	31	20	7	3	2	1	8
Cubic volume	-	-	2	20	14	8	6	3	47
Roseburg									
Area	7	11	28	13	5	4	3	2	27
Cubic volume	-	-	2	4	6	6	3	6	73

Table A2. (Continued).

Item	Age class, Years[2]								
	Non-stocked	-20 to 10	10 to 30	30 to 50	50 to 70	70 to 90	90 to 110	110 to 180	180+
FOREST INDUSTRY OWNER CLASS (Timbershed) (continued)									
South Coast									
Area	10	18	31	17	7	4	2	1	10
Cubic volume	-	-	3	16	12	9	5	2	53
Medford									
Area	12	12	17	18	11	7	4	11	8
Cubic volume	-	-	1	11	15	9	9	35	20
OTHER PRIVATE OWNER CLASS (Timbersheds)									
North Coast									
Area	4	13	16	22	26	10	4	2	3
Cubic volume	-	-	2	23	38	15	12	4	6
North Willamette Valley									
Area	8	13	13	20	34	9	3	-	-
Cubic volume	-	-	3	20	53	13	9	2	-
Mid-Willamette Valley									
Area	6	11	21	21	17	8	6	6	4
Cubic volume	-	-	5	14	19	10	7	20	25
Eugene									
Area	14	8	22	20	11	8	3	7	7
Cubic volume	-	-	2	19	17	14	15	25	8
Roseburg									
Area	10	15	28	10	10	13	8	5	1
Cubic volume	-	-	3	8	18	26	19	20	6
South Coast									
Area	6	16	27	16	13	8	3	4	7
Cubic volume	-	-	6	20	21	18	8	12	15
Medford									
Area	17	6	10	6	12	12	13	5	19
Cubic volume	-	-	-	3	13	25	22	7	30

[1]For unit locations and other information on units see footnote 1 for Table A1.

[2]For discussion of nonstocked, see footnote 2 for Table A1. The first age class, -20 to 10, presumes a regeneration lag of up to 20 years. Thus, some acres in this category are nonstocked at present, but are assumed to be regenerated sometime between now and 20 years from now. The acres classed as nonstocked also can be regenerated at some rate by a separate assumption.

Table A3. Base Inventory as of January 1, 1975, Used for the Oregon Timber Resources Study: Eastern Oregon, with Area in Thousands of Acres and Volume in Millions of Cubic Feet.[1]

Unit/Location[2]	Land class[3]	Species type[4]	Area[5]	Volume[6]
NATIONAL FOREST OWNER CLASS				
Deschutes	Standard	Pine	797.74	--
National Forest	Special	Pine	208.56	--
(Lies in Bend-	Marginal	Pine	233.53	--
Prineville and	Other objectives, standard	Pine	18.97	--
Klamath-Lakeview	Nonstocked	--	3.02	--
Timbersheds)	All land classes	--	1,261.82	2,752
Fremont	Standard	Pine	535.74	--
National Forest	Special	Pine	171.69	--
(Lies in Klamath-	Marginal	Pine	58.22	--
Lakeview Timbershed)	Other objectives, standard	Pine	0.62	--
	Nonstocked	--	5.09	--
	All land classes	--	771.36	1,892
Malheur	Standard	Pine	974.86	--
National Forest	Special	Pine	35.21	--
(Lies in Eastern	Marginal	Pine	172.36	--
Timbershed)	All land classes	--	1,182.43	2,690
Ochoco	Standard	Pine	426.24	--
National Forest	Special	Pine	57.60	--
(Lies in Bend-	Marginal	Pine	69.12	--
Prineville and	Other objectives, standard	Pine	5.76	--
Eastern Timbersheds)	Nonstocked	--	17.28	--
	All land classes	--	576.00	1,532
Umatilla	Standard	Pine	672.95	--
National Forest	Special	Pine	48.20	--
(Lies in Eastern and	Marginal	Pine	198.36	--
Bend-Prineville	Other objectives, standard	Pine	22.25	--
Timbersheds)	All land classes	--	941.76	2,487
Wallowa-Whitman	Standard	Pine	809.70	--
National Forest	Special	Pine	119.15	--
(Lies in Eastern	Marginal	Pine	247.93	--
Timbershed)	Other objectives, standard	Pine	13.04	--
	All land classes	--	1,189.82	3,144
Winema National	Standard	Pine	643.93	--
Forest, plus Klamath	Special	Pine	106.79	--
Indian Trust	Marginal	Pine	76.76	--
(Lies in Klamath-	Other objectives, standard	Pine	11.36	--
Lakeview Timbershed)	Nonstocked	--	5.20	--
	All land classes	--	844.04	2,218

Table A3. (Continued).

Unit/Location[2]	Land class[3]	Species type[4]	Area[5]	Volume[6]
OTHER PUBLIC OWNER CLASS				
Klamath-Lakeview	Standard	Pine	113.53	--
Timbershed	Other objectives, standard	Pine	5.98	--
	All land classes	--	119.51	396
Bend-Prineville	Standard	Pine	363.49	--
Timbershed	Other objectives, standard	Pine	19.13	--
	All land classes	--	382.62	1,269
Eastern Timbershed	Standard	Pine	79.90	--
	Other objectives, standard	Pine	4.20	--
	All land classes	--	84.10	147
FOREST INDUSTRY OWNER CLASS				
Klamath-Lakeview	Standard	Pine	964.22	--
	All land classes	--	964.22	1,670
Bend-Prineville	Standard	Pine	285.66	--
Timbershed	All land classes	--	285.66	460
Eastern Timbershed	Standard	Pine	380.41	--
	All land classes	--	380.41	552
OTHER PRIVATE OWNER CLASS				
Klamath-Lakeview	Standard	Pine	269.21	--
	All land classes	--	269.21	312
Bend-Prineville	Standard	Pine	244.91	--
	All land classes	--	244.91	284
Eastern Timbershed	Standard	Pine	732.75	--
	All land classes	--	732.75	980

[1]Site class was not a variable in eastern Oregon. Differences in site are represented, presumably, by the empirical growth rates used for each administrative unit.

[2]The units shown are the ones used for this study. For National Forest, they correspond to working circles or forests. For State and Other Public, Forest Industry, and Other Private, the units are an aggregation of acres of each owner class within each timbershed as reported by Bassett and Choate (1974). That is, for these owner classes the unit corresponds to the timbershed.

The timbershed(s) in which each National Forest unit lies is indicated below the unit name. The distribution of the area of each public unit among timbersheds is shown in Table A7.

The timbersheds are defined in terms of counties as follows (see Figure 1 also):

North Coast Timbershed comprised of Benton, Clatsop, Columbia, Lincoln, Polk, Tillamook, Washington, and Yamhill Counties.

North Willamette Valley Timbershed comprised of Clackamas, Hood River, Multnomah Counties.

Mid-Willamette Valley Timbershed comprised of Linn and Marion Counties.
Eugene Timbershed comprised of Lane County.
Roseburg Timbershed comprised of Douglas County.
South Coast Timbershed comprised of Coos and Curry Counties.
Medford Timbershed comprised of Jackson and Josephine Counties.
Klamath-Lakeview Timbershed comprised of Klamath and Lake Counties.
Bend-Prineville Timbershed comprised of Crook, Deschutes, Gilliam, Jefferson, Sherman, Wasco, and Wheeler Counties.
Eastern Timbershed comprised of Baker, Grant, Harney, Malheur, Morrow, Umatilla, Union, and Wallowa Counties.

[3]*Standard* is land devoted primarily to timber production and on which there are not anticipated yield restrictions.
Marginal is land suitable for timber production in the long-run but not now considered part of the timber production base because of economic or technical limitations. This class of land is assumed to become available for timber production over time.
Special is land suitable for timber production, but on which yields are restricted because of other use considerations, such as scenic roadsides.
Other Objectives is potentially commercial forest land that is devoted primarily to something other than timber production. The land is currently out of the timber production base even though it may contain merchantable timber. These acres may have come from the standard or special categories, as indicated.
Nonstocked Areas are deforested areas that now have less than 10 percent stocking of desirable trees. This is an imprecise definition for this study because different sources of data interpret the definition against different standards. For example, some lands that are nonstocked by one person's definition that is keyed to conifers as desirable species, may be called well-stocked hardwoods by another person who considers hardwoods desirable for the site. In some instances, nonstocked areas are included in the -5 age class in anticipation of regeneration within 5 years. Thus, the nonstocked category as used here should *not* be considered an accurate measure of currently nonstocked acres. It includes acres that are definitely nonstocked based on prevailing management objectives, but does not include all acres that might be considered nonstocked by definition.

[4]The species type Pine is used to represent ponderosa pine and associated species. Differences in species mix are represented, presumably, by the empirical growth rates used for each administrative unit.

[5]The allocation of acres to different land classes is based on agency management plans. Where approved, up-to-date plans were not available, the allocation is based on a best estimate provided by agency personnel. Thus, the allocations are subject to change as new management plans are reviewed and approved. The acres shown are totals for the entire unit designated. Allocations to timbersheds can be approximated by using Table A7.

[6]Volume is in cubic feet of trees 5 inches dbh and larger. Utilization to a 4-inch top is assumed as of January 1, 1975. Total volume only is shown for each unit. No information was available to allocate the volume to the land classes; for the projections in this study, the volume was assumed to be distributed in the same proportion as the acres.

The utilization standard for this table is for ease of comparison with other published statistics. The utilization standard used for this study ranges from cubic feet, 7 inches dbh to a 5-inch top in 1980 to almost total cubic feet in 2070. (See section on utilization standards.)

Table A4. Some Basic Data as of January 1, 1975, Used in the Projections for Eastern Oregon for Management Intensity 3[1] for Starting Trees per Acre; 10-Year Diameter Growth in Inches; 10-Year Mortality, Percent, Based on Starting Trees; and Total Volume per Tree in Cubic Feet. Timbersheds are in Parentheses.

Unit/Location[2] and Land Class	Item	Diameter class midpoint, *inches*													
		3	7	11	15	19	23	27	31	35	39	43	47	51	All
NATIONAL FOREST OWNER CLASS															
Deschutes National Forest															
Standard and	Starting trees	298.13	120.44	30.40	9.95	4.19	2.38	1.66	1.04	0.58	0.29	0.13	0.06	0.09	469.34
Special	Diam. growth	0.684	0.733	0.756	0.759	0.745	0.717	0.679	0.636	0.590	0.546	0.507	0.477	0.459	--
(Bend-Prineville,	Mortality	2.3	2.5	2.6	2.7	2.8	3.0	3.1	3.4	3.7	4.1	4.7	5.3	6.2	--
Klamath-Lakeview)	Tree volume	0.8	4.6	16.3	35.2	60.8	92.5	129.8	172.1	218.8	269.4	323.3	379.8	438.5	--
Fremont National Forest															
Standard and	Starting trees	238.87	105.09	32.23	11.46	5.08	2.74	1.77	1.18	0.73	0.39	0.15	0.05	0.08	399.82
Special	Diam. growth	0.749	0.799	0.824	0.877	0.812	0.782	0.741	0.690	0.635	0.578	0.523	0.473	0.431	--
(Klamath-Lakeview)	Mortality	2.0	2.1	2.2	2.4	2.5	2.7	2.9	3.2	3.6	4.1	4.8	5.6	6.5	--
	Tree volume	0.5	3.1	13.3	30.7	55.2	86.4	124.0	167.7	217.3	272.4	332.9	398.3	468.4	--
Malheur National Forest															
Standard and	Starting trees	377.48	121.86	44.38	18.85	8.54	4.09	1.97	0.97	0.44	0.17	0.05	0.01	0.01	578.82
Special	Diam. growth	0.853	0.981	1.026	1.006	0.941	0.846	0.742	0.644	0.572	0.543	0.576	0.688	0.896	--
(Eastern)	Mortality	3.1	3.2	3.3	3.5	3.6	3.8	4.0	4.3	4.7	5.1	5.7	6.3	7.0	--
	Tree volume	1.3	4.1	15.6	35.7	64.6	102.3	148.8	204.1	268.4	341.6	424.8	515.1	615.4	--
Ochoco National Forest															
Standard and	Starting trees	298.48	74.68	24.30	10.67	5.57	3.28	2.21	1.52	0.94	0.48	0.24	0.11	0.09	422.57
Special	Diam. growth	0.921	0.955	0.949	0.911	0.851	0.778	0.700	0.627	0.569	0.533	0.530	0.568	0.656	--
(Bend-Prineville,	Mortality	3.0	2.8	2.6	2.6	2.6	2.6	2.7	2.9	3.2	3.5	3.9	4.3	4.9	--
Eastern)	Tree volume	0.4	3.2	14.2	33.2	59.8	94.0	135.4	183.9	239.3	301.2	369.6	444.1	524.5	--
Umatilla National Forest															
Standard and	Starting trees	376.93	122.11	40.83	16.14	7.28	3.60	2.08	0.92	0.40	0.14	0.03	0.00	0.01	570.47
Special	Diam. growth	0.643	0.909	1.065	1.130	1.128	1.081	1.009	0.936	0.882	0.870	0.923	1.060	1.306	--
(Bend-Prineville,	Mortality	9.3	7.0	5.9	5.9	6.8	8.1	9.9	11.8	13.6	15.1	16.0	16.1	15.3	--
Klamath-Lakeview)	Tree volume	1.6	4.8	17.1	38.2	67.6	104.9	149.5	201.0	259.0	323.0	392.5	467.2	546.5	--
Wallowa-Whitman National Forest															
Standard and	Starting trees	216.04	89.05	29.02	11.43	5.54	3.23	2.01	1.16	0.57	0.25	0.09	0.03	0.02	358.44
Special	Diam. growth	0.781	0.962	1.067	1.112	1.110	1.075	1.023	0.966	0.921	0.900	0.919	0.991	1.131	--
(Eastern)	Mortality	3.7	3.9	4.1	4.3	4.5	4.6	4.8	5.1	5.5	6.0	6.6	7.4	8.5	--
	Tree volume	1.5	4.6	16.5	36.9	65.2	101.2	144.3	194.1	250.3	312.3	379.8	452.4	529.6	--
Winema National Forest															
Standard and	Starting trees	386.65	100.48	28.27	10.48	5.11	3.06	2.04	1.26	0.72	0.39	0.19	0.08	0.10	538.83
Special	Diam. growth	0.645	0.767	0.855	0.914	0.946	0.954	0.943	0.914	0.871	0.817	0.755	0.689	0.622	--
(Klamath-Lakeview)	Mortality	2.4	2.4	2.4	2.4	2.4	2.5	2.5	2.6	2.7	2.8	2.9	3.0	3.1	--
	Tree volume	0.9	3.8	16.0	36.5	64.1	98.1	137.4	180.9	227.8	277.1	327.8	378.8	429.3	--
Winema Nationa Forest, Klamath Indian Lands															
(Klamath-Lakeview)	Starting trees	130.60	50.00	17.30	8.20	3.65	2.35	1.35	0.70	0.32	0.13	0.05	0.01	0	219.61
	Diam. growth	0.645	0.767	0.855	0.914	0.946	0.954	0.943	0.914	0.871	0.817	0.755	0.689	0.622	--
	Mortality	2.4	2.4	2.4	2.4	2.4	2.5	2.5	2.6	2.7	2.8	2.9	3.0	3.1	--
	Tree volume	0.9	3.8	16.0	36.5	64.1	98.1	137.4	180.9	227.8	277.1	327.8	378.8	429.3	--

Table A4. (Continued)

Unit/Location[2] Land Class	Item	Diameter class midpoint, *inches*													
		3	7	11	15	19	23	27	31	35	39	43	47	51	All
OTHER PUBLIC OWNER CLASS															
Standard	Starting trees	200.33	89.03	39.93	19.22	9.41	4.79	2.39	1.17	0.58	0.28	0.13	0.06	0.06	367.38
(Klamath-Lakeview)	Diam. growth	1.580	1.407	1.271	1.169	1.096	1.047	1.017	1.002	0.998	0.999	1.001	0.999	0.988	--
	Mortality	6.2	5.2	4.4	3.8	3.4	3.0	2.8	2.7	2.6	2.6	2.5	2.5	2.4	--
	Tree volume	0.7	5.5	17.7	37.8	66.2	103.3	149.8	206.0	272.5	349.6	438.0	538.0	650.1	--
Standard	Starting trees	200.33	89.03	39.93	19.22	9.41	4.79	2.39	1.17	0.58	0.28	0.13	0.06	0.06	367.38
(Bend-Prineville)	Diam. growth	1.580	1.407	1.271	1.169	1.096	1.047	1.017	1.002	0.998	0.999	1.001	0.999	0.998	--
	Mortality	6.2	5.2	4.4	3.8	3.4	3.0	2.8	2.7	2.6	2.6	2.5	2.5	2.4	--
	Tree volume	0.7	5.5	17.7	37.8	66.2	103.3	149.8	206.0	272.5	349.6	438.0	538.0	650.1	--
Standard	Starting trees	159.48	72.06	31.59	13.63	5.79	2.46	0.99	0.40	0.17	0.06	0.02	0.01	0	286.66
(Eastern)	Diam. growth	1.251	1.396	1.494	1.552	1.577	1.575	1.554	1.520	1.482	1.446	1.418	1.407	1.419	--
	Mortality	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	--
	Tree volume	0.9	4.6	15.3	33.7	60.1	95.0	138.9	192.2	255.4	328.9	413.3	508.8	616.2	--
FOREST INDUSTRY OWNER CLASS															
Standard	Starting trees	180.97	79.76	27.35	9.98	4.69	2.04	0.96	0.41	0.21	0.11	0.05	0.02	0.17	306.72
(Klamath-Lakeview)	Diam. growth	1.783	1.579	1.421	1.301	1.214	1.155	1.117	1.095	1.083	1.075	1.064	1.047	1.016	--
	Mortality	15.5	12.1	9.5	7.6	6.3	5.5	5.0	4.8	4.8	4.9	4.9	4.7	4.3	--
	Tree volume	1.1	4.3	15.7	35.7	64.1	101.0	146.6	201.0	264.1	336.2	417.1	507.1	606.3	--
Standard	Starting trees	105.69	66.23	34.58	15.13	5.66	1.70	0.44	0.05	0	0	0	0	0	229.48
(Bend-Prineville)	Diam. growth	1.783	1.579	1.421	1.301	1.214	1.155	1.117	1.095	1.083	1.075	1.064	1.047	1.016	--
	Mortality	15.5	12.1	9.5	7.6	6.3	5.5	5.0	4.8	4.8	4.9	4.9	4.7	4.3	--
	Tree volume	1.1	4.3	15.7	35.7	64.1	101.0	146.6	201.0	264.1	336.2	417.1	507.1	606.3	--
Standard	Starting trees	225.47	75.95	28.76	11.29	4.29	1.54	0.54	0.19	0.06	0.02	0.01	0	0	348.12
(Eastern)	Diam. growth	0.893	1.182	1.391	1.531	1.613	1.649	1.650	1.628	1.594	1.558	1.533	1.530	1.560	--
	Mortality	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8	--
	Tree volume	1.0	5.2	16.3	34.5	59.7	92.3	132.4	180.2	235.7	299.2	370.8	450.6	538.9	--
OTHER PRIVATE OWNER CLASS															
Standard	Starting trees	253.53	82.16	25.98	9.35	3.69	1.14	0.29	0.03	0	0	0	0	0	376.17
(Klamath-Lakeview)	Diam. growth	2.112	1.932	1.790	1.679	1.596	1.535	1.492	1.460	1.435	1.413	1.388	1.355	1.308	--
	Mortality	26.7	21.2	16.5	12.5	9.3	6.7	4.8	3.4	2.6	2.3	2.3	2.8	3.6	--
	Tree volume	1.4	3.8	14.7	34.3	63.3	102.0	150.9	210.3	280.9	363.0	457.0	563.4	682.6	--
Standard	Starting trees	253.53	82.16	25.98	9.35	3.69	1.14	0.29	0.03	0	0	0	0	0	376.17
(Bend-Prineville)	Diam. growth	2.112	1.932	1.790	1.679	1.596	1.535	1.492	1.460	1.435	1.413	1.388	1.355	1.308	--
	Mortality	26.7	21.2	16.5	12.5	9.3	6.7	4.8	3.4	2.6	2.3	2.3	2.8	3.6	--
	Tree volume	1.4	3.8	14.7	34.3	63.3	102.0	150.9	210.3	280.9	363.0	457.0	563.4	682.6	--
Standard	Starting trees	238.58	90.11	32.37	11.65	4.15	1.44	0.51	0.19	0.07	0.03	0.01	0	0	379.11
(Eastern)	Diam. growth	1.029	1.364	1.604	1.763	1.855	1.893	1.893	1.867	1.831	1.797	1.781	1.795	1.855	--
	Mortality	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	--
	Tree volume	1.0	4.8	15.2	32.2	56.0	86.7	124.4	169.3	221.4	280.9	347.9	422.6	505.0	--

[1]The same data apply to the higher management intensity, except that the growth rates for the higher management intensity are 30 percent higher. That is, multiply the growth rates in this table by 1.30 to get the growth rates for the higher management intensity.

The source of these data is the TRAS input of the Forest Survey Project, Pacific Northwest Forest and Range Experiment Station, except for the Winema National Forest and Forest Industry in the Klamath-Lakeview Timbershed. For these units, supplemental data were obtained from the Klamath Indian Trust and forest industry cooperators.

[2]Timbersheds are in parentheses.

Table A5. Percentage Distribution of Acres in the Standard Land Class[1] by Management Intensity, Currently and For Two Projections, for Western Oregon. Timbersheds Are in Parentheses.

Unit/Location[2]	Management[3] intensity	Distribution of acres				
		Current[4]	Target A[5]		Target B[6]	
			1975-2005	2005+	1975-2005	2005+
		%	%	%	%	%
NATIONAL FOREST OWNER CLASS						
Mt. Hood National Forest	2	13	--	--	--	--
(North Willamette Valley,	3	87	13	13	2	2
Mid-Willamette Valley,	4	--	48	48	1	1
Bend-Prineville)	5	--	39	39	25	25
	6	--	--	--	67	21
	7	--	--	--	5	51
Rogue River National						
Forest (Medford,	2	--	--	--	--	--
Roseburg,	3	100	6	6	15	15
Klamath-Lakeview	4	--	69	69	30	30
	5	--	25	25	14	14
	6	--	--	--	36	35
	7	--	--	--	5	6
Siskiyou National Forest	2	5	1	1	--	--
(South Coast,	3	95	23	23	23	23
Medford)	4	--	57	57	26	26
	5	--	19	19	28	28
	6	--	--	--	18	18
	7	--	--	--	5	5
Siuslaw National Forest	2	--	2	2	--	--
(North Coast,	3	100	--	--	13	13
Eugene,	4	--	--	--	5	5
Roseburg,	5	--	98	98	16	16
South Coast)	6	--	--	--	61	33
	7	--	--	--	5	33
Umpqua National Forest	2	--	--	--	--	--
(Roseburg,	3	100	11	11	7	7
Eugene, Medford)	4	--	59	59	25	25
	5	--	30	30	30	30
	6	--	--	--	33	31
	7	--	--	--	5	7
Willamette National	2	--	--	--	--	--
Forest (Eugene,	3	100	6	6	17	17
Mid-Willamette Valley,	4	--	75	75	16	16
Roseburg)	5	--	19	19	21	21
	6	--	--	--	41	38
	7	--	--	--	5	8

Table A5. (Continued).[1]

Unit/Location[2]	Management[3] intensity	Distribution of acres				
		Current[4]	Target A[5]		Target B[6]	
			1975-2005	2005+	1975-2005	2005+
		%	%	%	%	%
BUREAU OF LAND MANAGEMENT OWNER CLASS						
Columbia and	2	6	5	5	--	--
Alsea-Rickreal	3	89	7	7	13	13
Master Units	4	--	64	64	5	5
(North Coast,	5	5	24	24	16	16
Eugene)	6	--	--	--	61	33
	7	--	--	--	5	33
Clackamas and	2	2	2	2	--	--
Mollala Master	3	97	6	6	2	2
Units	4	--	58	58	1	1
(North Willamette Valley,	5	1	34	34	25	25
Mid-Willamette Valley)	6	--	--	--	67	21
	7	--	--	--	5	51
Santiam River	2	2	2	2	--	--
Master Unit	3	96	8	8	13	13
(Mid-Willamette Valley,	4	--	68	68	17	17
North Willamette Valley)	5	2	22	22	17	17
	6	--	--	--	48	33
	7	--	--	--	5	20
Siuslaw and	2	3	3	3	--	--
Upper Willamette	3	91	3	3	17	17
Master Units	4	--	41	41	16	16
(Eugene	5	6	51	51	21	21
Roseburg,	6	--	--	--	41	38
Mid-Willamette Valley)	7	--	--	--	5	8
South Umpqua	2	6	2	2	--	--
and Douglas	3	93	11	11	7	7
Master Units	4	1	61	61	25	25
(Roseburg)	5	--	26	26	30	30
	6	--	--	--	33	31
	7	--	--	--	5	7
South Coast	2	10	3	3	--	--
and Curry	3	88	7	7	23	23
Master Units	4	2	59	59	26	26
(South Coast,	5	--	31	31	28	28
Roseburg)	6	--	--	--	18	18
	7	--	--	--	5	5
Jackson, Josephine,	2	10	2	2	--	--
and Klamath	3	90	29	29	15	15
Master Units	4	--	22	22	30	30
(Medford,	5	--	47	47	14	14
Roseburg,	6	--	--	--	36	35
South Coast)	7	--	--	--	5	6

Table A5. (Continued).[1]

Unit/Location[2]	Management[3] intensity	Distribution of acres				
		Current[4]	Target A[5]		Target B[6]	
			1975-2005	2005+	1975-2005	2005+
		%	%	%	%	%
STATE AND OTHER PUBLIC OWNER CLASS						
Clatsop, Forest	2	12	5	5	--	--
Grove, Tillamook,	3	80	72	72	13	13
Western Oregon Districts;	4	3	7	7	5	5
Other Public in	5	5	16	16	16	16
Clatsop, Columbia	6	--	--	--	61	33
	7	--	--	--	5	33
Santiam District;	2	1	1	1	--	--
Other Public in	3	90	69	69	13	13
Clackamas, Hood	4	5	13	13	17	17
River Counties	5	4	17	17	17	17
(North Willamette Valley,	6	--	--	--	48	33
Mid-Willamette Valley)	7	--	--	--	5	20
Lane District;	2	3	1	1	--	--
no Other Public	3	91	66	66	17	17
(Eugene)	4	3	19	19	16	16
	5	3	14	14	21	21
	6	--	--	--	41	38
	7	--	--	--	5	8
Coos District;	2	11	5	5	--	--
Other Public	3	86	82	82	23	23
in Coos County	4	2	2	2	26	26
(South Coast,	5	1	11	11	28	28
Roseburg)	6	--	--	--	18	18
	7	--	--	--	5	5
Grants Pass District;	2	--	2	2	--	--
Other Public in	3	99	86	86	15	15
Douglas and Josephine	4	1	12	12	30	30
Counties	5	--	--	--	14	14
(Roseburg, Medford)	6	--	--	--	36	35
	7	--	--	--	5	6
FOREST INDUSTRY OWNER CLASS						
(North Coast)	2	25	5	2	--	--
	3	23	15	18	13	13
	4	27	45	40	5	5
	5	18	24	24	16	16
	6	7	11	11	61	33
	7	--	--	5	5	33
(North Willamette Valley)	2	13	2	1	--	--
	3	35	15	10	2	2
	4	21	39	40	1	1
	5	19	26	26	25	25
	6	12	18	18	67	21
	7	--	--	5	5	51

Table A5. (Continued).[1]

Unit/Location[2]	Management[3] intensity	Distribution of acres				
		Current[4]	Target A[5]		Target B[6]	
			1975-2005	2005+	1975-2005	2005+
		%	%	%	%	%
FOREST INDUSTRY OWNER CLASS (Continued)						
(Mid-Willamette Valley)	2	5	1	1	--	--
	3	47	21	15	13	13
	4	21	30	30	17	17
	5	25	35	35	17	17
	6	2	13	14	48	33
	7	--	--	5	5	20
(Eugene)	2	7	1	1	--	--
	3	58	26	20	17	17
	4	8	40	40	16	16
	5	18	23	23	21	21
	6	9	10	11	41	38
	7	--	--	5	5	8
(Roseburg)	2	10	2	1	--	--
	3	50	36	30	7	7
	4	17	40	40	25	25
	5	16	15	15	30	30
	6	7	7	9	33	31
	7	--	--	5	5	7
(South Coast)	2	24	5	2	--	--
	3	49	40	35	23	23
	4	14	40	40	26	26
	5	7	8	8	28	28
	6	6	7	10	18	18
	7	--	--	5	5	5
(Medford)	2	5	2	1	--	--
	3	78	75	65	15	15
	4	12	19	19	30	30
	5	3	3	8	14	14
	6	2	1	2	36	35
	7	--	--	5	5	6
OTHER PRIVATE OWNER CLASS						
(North Coast)	2	45	10	5	5	2
	3	53	60	55	15	18
	4	2	30	30	45	40
	5	--	--	10	20	20
	6	--	--	--	15	15
	7	--	--	--	--	5
(North Willamette Valley)	2	36	10	5	2	1
	3	64	80	70	15	10
	4	--	10	20	39	40
	5	--	--	5	26	26
	6	--	--	--	18	18
	7	--	--	--	--	5

Table A5. (Continued).[1]

Unit/Location[2]	Management[3] intensity	Distribution of acres				
		Current[4]	Target A[5]		Target B[6]	
			1975-2005	2005+	1975-2005	2005+
		%	%	%	%	%
OTHER PRIVATE OWNER CLASS (Continued)						
(Mid-Willamette Valley)	2	24	3	2	1	1
	3	49	63	45	21	15
	4	26	33	40	30	30
	5	1	1	13	35	35
	6	--	--	--	13	14
	7	--	--	--	--	5
(Eugene)	2	25	4	2	1	1
	3	73	70	65	26	20
	4	2	26	30	40	40
	5	--	--	3	23	23
	6	--	--	--	10	11
	7	--	--	--	--	5
(Roseburg)	2	32	7	3	2	1
	3	68	70	65	36	30
	4	--	23	23	40	40
	5	--	--	9	15	15
	6	--	--	--	7	9
	7	--	--	--	--	5
(South Coast)	2	51	10	5	5	2
	3	49	75	65	40	35
	4	--	15	20	40	40
	5	--	--	10	8	8
	6	--	--	--	7	10
	7	--	--	--	--	5
(Medford)	2	24	7	4	2	1
	3	74	80	75	75	65
	4	2	13	16	19	19
	5	--	--	5	3	8
	6	--	--	--	1	2
	7	--	--	--	--	5

[1]Management intensity 1 is assumed for all acres in the special land class, regardless of unit and location, and regardless of whether the standard land class is assigned Target A or Target B. Management intensity targets are not needed for other classes of land, because the other classes are not handled as separate administrative units in the projections. When managed for timber, the other classes of land are brought into the standard land class and treated in the same manner as that class.

[2]Locations in parentheses are timbersheds described in Table A1, footnote.

[3]Management intensities are defined as follows:
MI-1 is softwood species type with no management intensification. The basic yield function for the appropriate softwood species applies for this MI, except that yields are reduced for environmental reasons. Reductions are accomplished by the imposition of more severe ending conditions for the projection than are used for MI-3, which implies much longer rotations for MI-1.

MI-2 is hardwood species type with no management intensification. The basic hardwood yield function applies.
MI-3 is softwood species type with no management intensification. The basic yield function for the appropriate softwood species type applies for this MI. Growth is adjusted to take into account the present stocking of the stand relative to the basic (standard) yield function.
MI-4 is softwood species type, including commercial thinning. The thinning rules for this analysis are: A) Only acres that are greater than or equal to 70 percent stocked compared to the basic yield function (MI-3) are eligible for thinning, provided the timber is between ages 35 and 95, inclusive for the high and medium site classes, and ages 45 and 105, inclusive for the low and very low site classes (see footnote No. 3, Table A1 for site class definitions); B) Volume to be removed in thinning is determined such that the stand after thinning is 60 percent stocked compared to the basic yield function, or such that the stand after thinning has 67 percent of the before-thinning volume per acre, using whichever leaves the greatest volume per acre in the stand after thinning; C) If the thinning volume calculated as above is less than 800 cubic feet per acre, no thinning occurs.
Growth after thinning is calculated as 90 percent of gross growth (the basic yield function (MI-3) plus mortality). When no thinning occurs, growth is calculated as for MI-3.
MI-5 is softwood species type, including stocking control (precommercial thinning) and commercial thinning. Stocking control is assumed to occur at age 15 for the high and medium site classes, and age 25 for the low and very low site classes (see footnote 3, Table A1 for site class definitions). At the time of stocking control, the basic yield function is shifted such that yields occur earlier as follows: For high and medium site classes, shift basic yield function such that comparable yields occur 5 years earlier than for the basic yield function (MI-3); for low and very low site classes, shift basic yield function such that comparable yields occur 10 years earlier than for the basic yield function.
After stocking control occurs, the thinning rules for MI-4 apply, except that the inclusive ages are 25 to 95 for the high and medium site classes and 35 to 105 for the low and very low site classes.
Growth after thinning is calculated as 90 percent of gross MI-5 growth (MI-5 yield function, plus mortality). When no thinning occurs growth is calculated as for MI-3.
MI-6 is softwood species type, including stocking control, commercial thinning and fertilization. This management intensity is basically the same as MI-5, except that fertilization is assumed to occur such that yields are raised by the following specified amounts: For the high site class, MI-6 yields = 1.10 x MI-5 yields; For the medium site class, MI-6 yields = 1.15 x MI-5 yields; for the low and very low site classes; MI-6 yields = 1.20 x MI-5 yields.
For this analysis, fertilization is allowed only between the following ages: For the high and medium site classes, ages 15 to 75, inclusive; for the low and very low site classes, ages 25 to 85, inclusive.
Thinning rules and growth are applied as for MI-5 except that the MI-6 yield function is used for calculating growth after thinning.
MI-7 is softwood species type, including genetically improved stock, stocking control, commercial thinning and fertilization. For this study, MI-7 is treated exactly as MI-6 for thinning and growth. Although no gain in growth is assumed for MI-7 compared to MI-6, higher yields can be expected because MI-7 is accompanied by more optimistic regeneration assumptions. That is, it is assumed that regeneration lag is less, the failure rate for regeneration is less, higher stocking levels are attained, and fewer acres revert to hardwoods for MI-7.

[4]The current distribution of acres by management intensity reflects the starting inventory as of January 1, 1975.

[5]Target A distribution was intended to be a moderate, likely-to-be-attained movement from current management intensities based on interviews with land managers.

[6]Target B distribution is a distribution for all owner classes within a timbershed, except other private, which is based on interviews with forest industry land managers. In general, forest industry land managers are more optimistic than others about management intensification, so this was intended to be the "high" distribution. The "other private" distributions was arbitrarily determined at a lower level than that used for the other owner classes.

Table A6. Percentage Distribution of Acres in the Standard Land Class[1] By Management Intensity, Currently and For Two Projections, for All Timbersheds in Eastern Oregon.

Management intensity[2]	Current[3]	Target A[4]		Target B[5]	
		1975-2005	2005+	1975-2005	2005+
	%	%	%	%	%
ALL PUBLIC OWNER CLASSES					
2	--	--	--	--	--
3	100	100	80	25	25
4	--	--	--	--	--
5	--	--	--	--	--
6	--	--	20	75	75
7	--	--	--	--	--
FOREST INDUSTRY OWNER CLASS					
2	--	--	--	--	--
3	100	50	50	25	25
4	--	--	--	--	--
5	--	--	--	--	--
6	--	50	50	75	75
7	--	--	--	--	--
OTHER PRIVATE OWNER CLASS					
2	--	--	--	--	--
3	100	100	90	100	50
4	--	--	--	--	--
5	--	--	--	--	--
6	--	--	10	--	50
7	--	--	--	--	--

[1]This table applies only to the standard land class (see footnote 2, Table A3).

[2]Management intensity 3 is assumed for all acres in the special land class, regardless of unit or location, and regardless of whether the standard land class is assigned Target A or Target B.

Management intensity targets are not needed for other classes of land because the other classes are not handled as separate administrative units in the projections. When managed for timber, the other classes of land are brought into the standard land class and treated in the same manner as that class.

Management intensities are defined as follows:

MI-2 is not applicable in eastern Oregon.

MI-3 is softwood species type with no management intensification. Diameter growth rates used are based on Forest Survey data from the Pacific Northwest Forest and Range Experiment Station, Portland, Oregon, with the exception of the Winema National Forest Industry owner class in the Klamath-Lakeview Timbershed. The Winema growth rates were modified by inclusion of data for the Klamath Indian Trust; the Forest Industry growth rates were modified by use of supplemental data provided by industry cooperators (see Table A4).

MI-4 and MI-5 are not applicable in eastern Oregon.

MI-6 is an arbitrarily assigned higher management intensity with diameter growth rates 30 percent higher than for MI-3. No specific practices are prescribed--this is just assumed to be an attainable result of management intensification based on limited information.

MI-7 is not applicable in eastern Oregon.

[3]All acres are assumed to be managed at MI-3, currently.

[4]An arbitrary low management intensity distribution.

[5]An arbitrary high management intensity distribution.

Table A7. Percentage of Unit Area By Timbershed For Public Owner Classes, Based on Total Unit Area.

North Coast	North Willamette Valley	Mid-Willamette Valley	Eugene	Rose-burg	South Coast	Med-ford	Klamath-Lakeview	Bend-Prineville	East-ern	Outside Oregon
NATIONAL FOREST OWNER CLASS (National Forests)										
Siuslaw										
49	--	--	39	10	2	--	--	--	--	--
Mount Hood										
--	78	6	--	--	--	--	--	16	--	--
Willamette										
--	--	36	61	3	--	--	--	--	--	--
Umpqua										
--	--	--	15	84	--	1	--	--	--	--
Siskiyou										
--	--	--	--	--	63	34	--	--	--	3
Rogue River										
--	--	--	--	11	--	69	12	--	--	8
Winema										
--	--	--	--	--	--	--	100	--	--	--
Fremont										
--	--	--	--	--	--	--	100	--	--	--
Deschutes										
--	--	--	--	--	--	--	29	71	--	--
Ochoco										
--	--	--	--	--	--	--	--	70	30	--
Malheur										
--	--	--	--	--	--	--	--	--	100	--
Umatilla										
--	--	--	--	--	--	--	--	3	75	22
Wallowa-Whitman										
--	--	--	--	--	--	--	--	--	100	--
BUREAU OF LAND MANAGEMENT OWNER CLASS (Master units)										
Columbia River, Alsea-Rickreal										
97	--	--	3	--	--	--	--	--	--	--

Table A7. (Continued).

North Coast	North Willamette Valley	Mid-Willamette Valley	Eugene	Rose-burg	South Coast	Med-ford	Klamath-Lakeview	Bend-Prineville	East-ern	Outside Oregon
BUREAU OF LAND MANAGEMENT OWNER CLASS (Continued)										
Clackamas-Mollala										
--	99	1	--	--	--	--	--	--	--	--
Santiam River										
--	3	97	--	--	--	--	--	--	--	--
Siuslaw, Upper Willamette										
--	--	6	87	7	--	--	--	--	--	--
South Umpqua, Douglas										
--	--	--	--	100	--	--	--	--	--	--
South Coast, Curry										
--	--	--	--	40	60	--	--	--	--	--
Jackson, Josephine, Klamath Master Units										
--	--	--	--	10	2	88	--	--	--	--
STATE AND OTHER PUBLIC OWNER CLASS										
Clatsop, Tillamook, Forest Grove, Western Oregon Districts; Other Public in Columbia, Tillamook, Washington Counties										
--	100	--	--	--	--	--	--	--	--	--
Santiam District; Other Public in Clackamas, Hood River Counties										
--	58	42	--	--	--	--	--	--	--	--
Lane District										
--	--	--	100	--	--	--	--	--	--	--
Coos District; Other Public in Coos County										
--	--	--	--	27	73	--	--	--	--	--
Grants Pass District; Other Public in Douglas, Josephine Counties										
--	--	--	--	53	--	47	--	--	--	--
All Other Public, Including State and BLM, Klamath-Lakeview Timbershed										
--	--	--	--	--	--	--	100	--	--	--
All Other Public, Including State and BLM, Bend-Prineville Timbershed										
--	--	--	--	--	--	--	--	100	--	--
All Other Public, Including State and BLM, Eastern Timbershed										
--	--	--	--	--	--	--	--	--	100	--

Table A8. Example of a Yield and Thinning Profile in Total Cubic Feet per Acre by Management Intensity, Assuming Four Different Stocking Percentages at Age 25 on a Medium Site in Douglas-Fir.[1]

Age class mid-point	Net volume yield	Thinning volume	Residual volume	Cumulative volume	Ten-year growth	Net volume yield	Thinning volume	Residual volume	Cumulative volume	Ten-year growth
Years										
			25 PERCENT STOCKING							
		Management Intensity 3					Management Intensity 4			
15	57	--	57	57	564	57	--	57	57	564
25	621	--	621	621	862	621	--	621	621	862
35	1,483	--	1,483	1,483	1,071	1,483	--	1,483	1,483	1,071
45	2,554	--	2,554	2,554	1,206	2,554	--	2,554	2,554	1,206
55	3,760	--	3,760	3,760	1,282	3,760	--	3,760	3,760	1,282
65	5,042	--	5,042	5,042	1,312	5,042	--	5,042	5,042	1,312
75	6,354	--	6,354	6,354	1,306	6,354	--	6,354	6,354	1,306
85	7,660	--	7,660	7,660	1,269	7,660	--	7,660	7,660	1,269
95	8,929	--	8,929	8,929	1,215	8,929	1,203	7,726	8,929	1,398
105	10,144	--	10,144	10,144	1,144	9,124	--	9,124	10,327	1,191
115	11,288	--	11,288	11,288	1,061	10,315	--	10,315	11,518	1,115
125	12,349	--	12,349	12,349		11,430	--	11,430	12,633	
		Management Intensity 5					Management Intensity 6 and 7			
15	225	--	225	225	644	259	--	259	259	250
25	869	--	869	869	919	999	--	999	999	1,057
35	1,788	--	1,788	1,788	1,107	2,056	--	2,056	2,056	1,274
45	2,895	--	2,895	2,895	1,227	3,330	--	3,330	3,330	1,411
55	4,122	--	4,122	4,122	1,289	4,741	--	4,741	4,741	1,482
65	5,411	--	5,411	5,411	1,309	6,223	--	6,223	6,223	1,506
75	6,720	--	6,720	6,720	1,294	7,729	--	7,729	7,729	1,487
85	8,014	--	8,014	8,014	1,251	9,216	--	9,216	9,216	1,439
95	9,265	1,248	8,017	9,265	1,348	10,655	1,435	9,220	10,655	1,467
105	9,365	--	9,365	10,613	1,172	10,687	--	10,687	12,122	1,354
115	10,537	--	10,537	11,785	1,097	12,041	--	12,041	13,476	1,265
125	11,634	--	11,634	12,882		13,306	--	13,306	14,741	
			55 PERCENT STOCKING							
		Management Intensity 3					Management Intensity 4			
15	178	--	178	178	1,187	178	--	178	178	1,187
25	1,365	--	1,365	1,365	1,313	1,365	--	1,365	1,365	1,313
35	2,678	--	2,678	2,678	1,384	2,678	--	2,678	2,678	1,384
45	4,062	--	4,062	4,062	1,410	4,062	--	4,062	4,062	1,410
55	5,472	--	5,472	5,472	1,399	5,472	--	5,472	5,472	1,399
65	6,871	--	6,871	6,871	1,365	6,871	1,293	5,578	6,871	1,704
75	8,236	--	8,236	8,236	1,307	7,282	908	6,374	8,575	1,601
85	9,543	--	9,543	9,543	1,234	7,975	886	7,089	10,176	1,499
95	10,777	--	10,777	10,777	1,151	8,588	862	7,726	11,675	1,398
105	11,928	--	11,928	11,928	1,062	9,124	--	9,124	13,073	1,191
115	12,990	--	12,990	12,990	966	10,315	--	10,315	14,264	1,115
125	13,956	--	13,956	13,956		11,430	--	11,430	15,379	

Table A8 (Continued).

Age class mid-point	Net volume yield	Thinning volume	Residual volume	Cumulative volume	Ten-year growth	Net volume yield	Thinning volume	Residual volume	Cumulative volume	Ten-year growth
Years										
				55 PERCENT STOCKING (continued)						
		Management Intensity 5					Management Intensity 6			
15	706	--	706	706	1,206	813	--	813	813	1,385
25	1,912	--	1,912	1,912	1,317	2,198	--	2,198	2,198	1,515
35	3,229	--	3,229	3,229	1,376	3,712	--	3,712	3,713	1,583
45	4,605	--	4,605	4,605	1,394	5,296	--	5,296	5,296	1,602
55	5,999	850	5,149	5,999	1,755	6,898	977	5,921	6,898	1,956
65	6,904	917	5,987	7,754	1,653	7,877	992	6,885	8,854	1,832
75	7,640	898	6,742	9,407	1,550	8,717	964	7,753	10,686	1,707
85	8,292	875	7,417	10,957	1,538	9,460	930	8,530	12,393	1,583
95	8,864	847	8,017	12,495	1,348	10,113	893	9,220	13,976	1,467
105	9,365	--	9,365	13,752	1,172	10,687	--	10,687	15,443	1,354
115	10,537	--	10,537	14,924	1,087	12,041	--	12,041	16,797	1,265
125	11,634	--	11,634	16,021		13,306	--	13,306	18,0622	
				85 PERCENT STOCKING						
		Management Intensity 3					Management Intensity 4			
15	299	--	299	299	1,811	299	--	299	299	1,811
25	2,110	--	2,110	2,110	1,764	2,110	--	2,110	2,110	1,764
35	3,874	--	3,874	3,874	1,696	3,874	1,218	2,656	3,874	2,009
45	5,570	--	5,570	5,570	1,614	4,665	941	3,724	5,883	1,908
55	7,184	--	7,184	7,184	1,518	5,632	936	4,696	7,791	1,806
65	8,702	--	8,702	8,702	1,416	6,502	924	5,578	9,597	1,704
75	10,118	--	10,118	10,118	1,308	7,282	908	6,374	11,301	1,601
85	11,426	--	11,426	11,426	1,199	7,975	886	7,089	12,902	1,499
95	12,625	--	12,625	12,625	1,088	8,588	862	7,726	14,401	1,398
105	13,713	--	13,713	13,713	978	9,124	--	9,124	15,799	1,191
115	14,691	--	14,691	14,691	873	10,315	--	10,315	16,990	1,115
125	15,564	--	15,564	15,564		11,430	--	11,430	18,105	
		Management Intensity 5					Management Intensity 6 and 7			
15	1,188	--	1,188	1,188	1,767	1,366	--	1,366	1,366	2,031
25	2,955	869	2,086	2,955	2,059	3,397	999	2,398	3,397	2,311
35	4,145	943	3,202	5,014	1,959	4,709	1,026	3,683	5,708	2,188
45	5,161	939	4,222	6,973	1,858	5,871	1,016	4,855	7,896	2,066
55	6,080	931	5,149	8,831	1,755	6,921	1,000	5,921	9,962	1,956
65	6,904	917	5,987	10,586	1,653	7,877	992	6,885	11,918	1,832
75	7,640	898	6,742	12,239	1,550	8,717	964	7,753	13,750	1,707
85	8,292	875	7,417	13,789	1,538	9,460	930	8,530	15,457	1,583
95	8,864	847	8,017	15,327	1,348	10,113	893	9,220	17,040	1,467
105	9,365	--	9,365	16,584	1,172	10,687	--	10,687	18,507	1,354
115	10,537	--	10,537	17,756	1,097	12,041	--	12,041	19,861	1,265
125	11,634	--	11,634	18,853		13,306	--	13,306	21,126	

Table A8 (Continued).

Age class mid-point	Net volume yield	Thinning volume	Residual volume	Cumulative volume	Ten-year growth	Net volume yield	Thinning volume	Residual volume	Cumulative volume	Ten-year growth
Years										
				115 PERCENT STOCKING						
		Management Intensity 3					Management Intensity 4			
15	421	--	421	421	2,433	421	--	421	421	2,433
25	2,854	--	2,854	2,854	2,215	2,854	--	2,854	2,854	2,215
35	5,069	--	5,069	5,069	2,009	5,069	1,673	3,396	5,069	2,009
45	7,078	--	7,078	7,078	1,817	5,405	1,681	3,724	7,078	1,908
55	8,895	--	8,895	8,895	1,637	5,632	936	4,696	8,986	1,806
65	10,532	--	10,532	10,532	1,468	6,502	924	5,578	10,792	1,704
75	12,000	--	12,000	12,000	1,311	7,282	908	6,374	12,496	1,601
85	13,311	--	13,311	13,311	1,161	7,975	886	7,089	14,097	1,499
95	14,472	--	14,472	14,472	1,025	8,588	862	7,726	15,596	1,398
105	15,497	--	15,497	15,497	898	9,124	--	9,124	16,994	1,191
115	16,395	--	16,395	16,395	776	10,315	--	10,315	18,195	1,115
125	17,171	--	17,171	17,171		11,430	--	11,430	19,300	
		Management Intensity 5					Management Intensity 6 and 7			
15	1,670	--	1,670	1,670	2,327	1,921	--	1,921	1,921	2,676
25	3,997	1,319	2,678	3,997	2,048	4,597	1,517	3,080	4,597	2,310
35	4,726	1,524	3,202	6,045	1,959	5,390	1,707	3,683	6,907	2,188
45	5,161	939	4,222	8,004	1,858	5,871	1,016	4,855	9,095	2,066
55	6,080	931	5,149	9,862	1,755	6,920	1,000	5,921	11,161	1,956
65	6,904	917	5,987	11,617	1,653	7,877	992	6,885	13,117	1,832
75	7,640	898	6,742	13,270	1,550	8,717	964	7,753	14,949	1,707
85	8,292	875	7,417	14,820	1,447	9,460	930	8,530	16,656	1,583
95	8,864	847	8,017	16,267	1,348	10,113	893	9,220	18,239	1,467
105	9,365	--	9,365	17,615	1,172	10,687	--	10,687	19,706	1,354
115	10,537	--	10,537	18,787	1,097	12,041	--	12,041	21,060	1,265
125	11,634	--	11,634	19,884		13,306	--	13,306	22,325	

[1]These tables were derived from the system of equations used in the projection model. They are intended to show the yields that would occur under various management intensities. The column to key on for comparing management intensities and the impact of different initial stocking levels is the one headed cumulative volume. The medium site class includes McArdle Site Indices from 120 to 165, inclusive. The definitions for management intensities 3 through 7 are included in footnote 3 for Table A5. Total cubic feet is for trees 1.5 inches dbh and larger, from ground level to tip.

Table A9. Average Annual Harvest in Millions of Board Feet and Cubic Feet Volume by Timbershed and Annual Harvest[1] by Public and Private Owner Classes in the First Three Projection Periods Needed to Maintain Annual Cubic Volume of 1969-1973 for RUN A-1 and RUN B-1.

Timbershed	Current harvest[2] Scribner	Volume	Projection period 1975-1985 Public	1975-1985 Private	1985-1995 Public	1985-1995 Private	1995-2005 Public	1995-2005 Private
North Coast	1,297.0	301.1	80.3	220.8	87.9	213.2	93.5	207.6
North Willamette	498.8	98.7	60.0	38.7	60.3	38.4	60.2	38.5
Mid-Willamette	762.3	145.5	60.7	84.8	62.2	83.3	61.2	83.7
Eugene	1,526.1	286.1	142.9	143.2	142.9	143.2	143.2	142.8
Roseburg	1,600.0	292.2	133.7	158.5	133.2	159.0	134.2	158.0
South Coast	862.4	154.2	53.3	100.9	52.5	101.7	54.6	99.6
Medford	603.3	118.6	82.0	36.6	81.9	36.7	81.9	36.7
Western Oregon	7,149.9	1,396.4	612.9	783.5	620.9	775.5	629.5	766.9
Klamath-Lakeview	814.1	163.8	69.1	94.7	69.1	94.7	69.1	94.7
Bend-Prineville	439.9	90.0	66.5	23.5	66.5	23.5	66.5	23.5
Eastern	745.3	136.1	93.7	42.4	93.7	42.4	93.7	42.4
Eastern Oregon	1,999.3	389.9	299.3	160.6	229.3	160.6	229.3	160.6
Total Oregon	9,149.2	1,786.3	842.2	944.1	850.2	936.1	858.8	927.5

[1]The public harvest comes from the allowable cuts by unit (Table A10) allocated to timbersheds proportionate to where the unit acres are (Table A7). The private harvest is the residual needed to meet the average annual timbershed total. The cubic volumes are total cubic feet. They were used as the timbershed harvest for the first three periods for all projections with Harvest Control Assumption 1. As the starting utilization standard for the projections is trees of 7 inches dbh to a 5-inch top, the use of total cubic to set the harvest is a slight overestimation. As most harvest comes from larger trees, the problem is minimized--the called-for timbershed harvests for the first three periods are no more than 2 percent above the average for 1968-1973. This should be well within the statistical error contained in the Oregon Timber Harvest reports.

[2]Empirical Scribner timber harvest was obtained from "Oregon Timber Harvest" (annual) published by the Pacific Northwest Forest and Range Experiment Station, U.S. Forest Service.

Table A10. Annual Allowable Cuts in Millions of Board Feet Scribner[1] and Cubic Feet Volume[2] for Public Owner Class Units in Western Oregon.

Unit	Decade					
	1975-1985		1985-1995		1995-2000	
	Volume	Scribner	Volume	Scribner	Volume	Scribner
NATIONAL FOREST OWNER CLASS[3] (National Forests)						
Mt. Hood	61.59	301.8	61.59	301.8	61.59	301.8
Rogue River	34.52	165.7	34.52	165.7	34.52	165.7
Siskiyou	34.87	188.3	34.87	188.3	34.87	188.3
Siuslaw	65.67	361.2	65.67	361.2	65.67	361.2
Umpqua	74.38	357.0	74.38	357.0	74.38	357.0
Willamette	118.94	618.5	118.94	618.5	118.94	618.5
All National Forests	389.97	1,992.5	389.97	1,992.5	389.97	1,992.5
BUREAU OF LAND MANAGEMENT OWNER CLASS[4] (Master Units)						
Columbia, Alsea-Rickreal	24.34	158.0	24.34	158.0	24.34	158.0
Clackamas, Mollala	5.56	32.0	5.56	32.0	5.56	32.0
Santiam River	8.45	54.0	8.45	54.0	8.45	54.0
Siuslaw, Upper Willamette	35.44	219.0	35.44	219.0	35.44	219.0
South Umpqua, Douglas	30.88	201.0	30.88	201.0	30.88	201.0
South Coast, Curry	36.22	234.0	36.22	234.0	36.22	234.0
Jackson, Josephine	50.98	260.0	50.98	260.0	50.98	260.0
All BLM Units	191.87	1,158.0	191.87	1,158.0	191.87	1,158.0
STATE AND OTHER PUBLIC OWNER CLASS[5] (Districts)						
Clatsop, Forest Grove Tillamook, Western Oregon, etc.	24.51	93.1	32.07	121.9	37.71	143.3
Santiam etc.	9.95	37.8	11.78	44.8	11.36	43.2
Lane	2.06	8.2	1.98	7.9	2.41	9.6
Coos etc.	9.23	43.8	8.04	38.2	11.23	53.3
Grants Pass	3.11	15.6	2.90	14.5	2.76	13.8
All districts	48.86	198.5	56.77	227.3	65.47	263.2
Total Western Oregon	630.70	3,349.0	638.61	3,377.8	647.31	3,413.7

[1]Scribner log rule is presumed to be trees 12 inches or larger in dbh to an 8-inch top, based on 32-foot logs, except for BLM, which is based on 16-foot logs.

[2]Total cubic foot volume of trees 1.5 inches and larger in dbh, from ground level to tip.

[3]National Forest allowable cuts were obtained from: "Potential Yield Summary" for Region 6. Sept. 4, 1974, by Eldon Manthey (unpublished).

[4]BLM allowable cuts were obtained from "An Allowable Cut Plan For Western Oregon," March 1970 (unpublished).

[5]State of Oregon allowable cuts were obtained from correspondence with Oregon Department of Forestry. Allowable cuts were given for three decades as "State SIMAC cut per decade" (unpublished). For Other Public, appropriate reductions were made for reserved areas and the allowable cut for the remainder was assumed proportionate to that of the State or Oregon lands it was associated with, based on acres.

Table A11. Profile of Average Annual Growth in Cubic Feet per Acre and As a Percentage of Inventory (Rate) for Three 10-Year Periods During the Projection of RUN A-2 for Western Oregon. Timbersheds are in parentheses.

Unit/Location	Land class	Period	Annual growth		Hardwood growth, part of total
			Volume	Rate[1]	
				%	%
NATIONAL FOREST OWNER CLASS (National forests)					
Mt. Hood	Standard	1975-1985	37	0.69	0
(North Willamette, Mid-Willamette,	and	2015-2025	64	1.65	0
Bend-Prineville)	special	2065-2075	72	2.25	0
Rogue River	Standard	1975-1985	27	0.71	0
(Medford, Roseburg,	and	2015-2025	41	1.42	0
Klamath-Lakeview)	special	2065-2075	50	2.23	0
Siskiyou	Standard	1975-1985	22	0.71	6
(South Coast, Medford)	and	2015-2025	49	2.02	4
	special	2065-2075	52	2.39	4
Siuslaw	Standard	1975-1985	121	2.06	9
(North Coast, Eugene,	and	2015-2025	183	3.40	4
Roseburg, South Coast)	special	2065-2075	190	3.30	3
Umpqua	Standard	1975-1985	29	0.60	0
(Eugene, Roseburg,	and	2015-2025	62	1.67	0
Medford)	special	2065-2075	73	2.24	0
Willamette	Standard	1975-1985	34	0.59	0
(Eugene, Mid-Willamette,	and	2015-2025	69	1.62	0
Roseburg)	special	2065-2075	79	2.25	0
BUREAU OF LAND MANAGEMENT OWNER CLASS (Master units)					
Columbia, Alsea-Rickreal	Standard	1975-1985	113	2.64	5
(North Coast,	class	2015-2025	134	3.52	5
Eugene)	only	2065-2075	141	3.80	5
Clackamas, Mollala	Standard	1975-1985	97	1.84	5
(North Willamette,	class	2015-2025	120	2.89	3
Mid-Willamette)	only	2065-2075	125	3.46	3
Santiam River	Standard	1975-1985	81	1.71	5
(Eugene, Roseburg,	class	2015-2025	120	3.18	4
Mid-Willamette)	only	2065-2075	123	3.57	4
Siuslaw, Upper Willamette	Standard	1975-1985	91	2.97	5
(Eugene, Roseburg,	and	1975-1985	128	3.90	3
Mid-Willamette)	special	2065-2075	139	3.55	3

Table A11. (Continued).

Unit/Location	Land class	Period	Annual growth		Hardwood growth, part of total
			Volume	Rate[1]	
				%	%
BUREAU OF LAND MANAGEMENT OWNER CLASS (continued)					
South Umpqua, Douglas (Roseburg)	Standard and special	1975-1985	50	1.42	7
		2015-2025	79	2.70	5
		2065-2075	80	2.85	5
South Coast, Curry (South Coast, Roseburg)	Standard class only	1975-1985	89	1.92	11
		2015-2025	135	3.61	7
		2065-2075	143	3.82	7
Jackson, Josephine, Klamath (Medford, Roseburg, South Coast)	Standard and special	1975-1985	46	1.44	1
		2015-2025	67	2.48	1
		2065-2075	71	2.80	1
STATE AND OTHER PUBLIC OWNER CLASS (Districts)					
Clatsop, Forest Grove, Tillamook, W. Oregon; other public in Columbia Tillamook, Washington Counties (North Coast)	Standard class only	1975-1985	96	5.22	7
		2015-2025	114	5.08	3
		2065-2075	125	4.03	3
Santiam; other public in Clackamas, Hood River Counties (North Willamette, Mid-Willamette)	Standard class only	1975-1985	84	3.96	0
		2015-2025	112	4.20	0
		2065-2075	117	3.75	1
Lane; no other public (Eugene)	Standard class only	1975-1985	87	3.65	2
		2015-2025	111	3.93	0
		2065-2075	114	3.70	1
Coos; other public in Coos County (South Coast, Roseburg)	Standard class only	1975-1985	74	2.08	6
		2015-2025	113	4.84	2
		2065-2075	111	5.30	3
Grants Pass; other public in Douglas, Josephine Counties (Roseburg, Medford)	Standard class only	1975-1985	78	1.89	0
		2015-2025	115	3.36	1
		2065-2075	111	3.24	1
FOREST INDUSTRY OWNER CLASS					
(North Coast timbershed)	Standard class only	1975-1985	109	4.40	12
		2015-2025	163	6.17	5
		2065-2075	173	5.67	3
(North Willamette Valley timbershed)	Standard class only	1975-1985	65	3.89	8
		2015-2025	111	6.12	1
		2065-2075	122	5.72	1
(Mid-Willamette Valley timbershed)	Standard class only	1975-1985	72	2.80	3
		2015-2025	121	5.40	1
		2065-2075	130	5.54	1

Table A11. (Continued).

Unit/Location	Land class	Period	Annual growth		Hardwood growth, part of total
			Volume	Rate[1]	
				%	%
FOREST INDUSTRY OWNER CLASS (continued)					
(Eugene timbershed)	Standard class only	1975-1985	69	3.58	4
		2015-2025	116	5.83	2
		2065-2075	125	5.59	1
(Roseburg timbershed)	Standard class only	1975-1985	60	2.08	8
		2015-2025	110	4.84	3
		2065-2075	118	5.30	1
(South Coast timbershed)	Standard class only	1975-1985	62	3.36	14
		2015-2025	114	5.64	5
		2065-2075	124	5.52	3
(Medford timbershed)	Standard class only	1975-1985	36	2.48	2
		2015-2025	63	4.75	2
		2065-2075	64	4.70	2
(North Coast timbershed)	Standard class only	1975-1985	88	2.94	24
		2015-2025	111	4.44	14
		2065-2075	124	4.94	5
(North Willamette Valley timbershed)	Standard class only	1975-1985	82	2.70	23
		2015-2025	104	4.37	14
		2065-2075	111	4.78	9
(Mid-Willamette Valley timbershed)	Standard class only	1975-1985	90	3.74	15
		20]5-2025	98	4.62	8
		2065-2075	108	5.07	4
(Eugene timbershed)	Standard class only	1975-1985	69	4.10	16
		2015-2025	91	5.05	6
		2065-2075	93	4.93	4
(Roseburg timbershed)	Standard class only	1975-1985	70	5.53	9
		2015-2025	90	4.98	5
		2065-2075	91	4.94	3
(South Coast timbershed)	Standard class only	1975-1985	73	3.57	25
		2015-2025	92	4.38	15
		2065-2075	102	4.92	8
(Medford timbershed)	Standard class only	1975-1985	19	1.36	5
		2015-2025	35	3.53	4
		2065-2075	35	3.98	2

[1]Expressed as a percentage of total inventory.

Table A12. Profile of Average Annual Growth in Cubic Feet per Acre and As a Percentage of Inventory (Rate) for Three 10-Year Periods During the Projection of RUN B-2 for Western Oregon. Timbersheds are in parentheses.

Unit/Location	Land class	Period	Annual growth		Hardwood growth, part of total
			Volume	Rate[1]	
				%	%
NATIONAL FOREST OWNER CLASS (National forests)					
Mt. Hood	Standard	1975-1985	40	0.74	0
(North Willamette, Mid-Willamette,	and	2015-2025	76	1.87	0
Bend-Prineville)	special	2065-2075	87	2.47	0
Rogue River	Standard	1975-1985	27	0.72	0
(Medford, Roseburg,	and	2015-2025	49	2.12	0
Klamath-Lakeview	special	2065-2075	60	2.52	0
Siskiyou	Standard	1975-1985	23	0.71	5
(South Coast,	and	2015-2025	54	1.60	4
Medford)	special	2065-2075	59	2.38	3
Siuslaw	Standard	1975-1985	121	2.04	9
(North Coast, Eugene,	and	2015-2025	182	3.26	3
Roseburg, South Coast)	special	2065-2075	191	3.17	3
Umpqua	Standard	1975-1985	32	0.65	0
(Eugene, Roseburg,	and	2015-2025	70	1.80	0
Medford)	special	2065-2075	80	2.31	0
Willamette	Standard	1975-1985	36	0.62	0
(Eugene, Mid-Willamette,	and	2015-2025	76	1.72	0
Roseburg)	special	2065-2075	85	2.26	0
BUREAU OF LAND MANAGEMENT OWNER CLASS (Master units)					
Columbia, Alsea-Rickreal	Standard	1975-1985	121	2.84	5
(North Coast,	class	2015-2025	155	3.99	1
Eugene)	only	2065-2075	170	4.11	1
Clackamas, Mollala	Standard	1975-1985	106	1.95	4
(North Willamette,	class	2015-2025	143	3.41	1
Mid-Willamette)	only	2065-2075	154	3.85	0
Santiam River	Standard	1975-1985	87	1.83	4
(Eugene, Roseburg,	class	2015-2025	134	3.44	1
Mid-Willamette)	only	2065-2075	143	3.82	1
Siuslaw, Upper Willamette	Standard	1975-1985	93	3.05	5
(Eugene, Roseburg,	and	2015-2025	138	4.07	2
Mid-Willamette)	special	2065-2075	149	3.64	2
South Umpqua, Douglas	Standard	1975-1985	53	1.52	2
(Roseburg)	and	2015-2025	90	2.94	2
	special	2065-2075	92	3.03	2

Table A12. (Continued).

Unit/Location	Land class	Period	Annual growth		Hardwood growth, part of total
			Volume	Rate[1]	
				%	%
BUREAU OF LAND MANAGEMENT OWNER CLASS (continued)					
South Coast, Curry	Standard	1975-1985	92	1.98	10
(South Coast, Roseburg)	class	2015-2025	145	3.75	4
	only	2065-2075	153	3.87	4
Jackson, Josephine, Klamath	Standard	1975-1985	46	1.46	1
(Medford, Roseburg,	and	2015-2025	72	2.72	0
South Coast)	special	2065-2075	80	3.00	0
STATE AND OTHER PUBLIC OWNER CLASS (Districts)					
Clatsop, Forest Grove, Tillamook	Standard	1975-1985	69	5.75	7
W. Oregon; other public in Columbia	class	2015-2025	148	7.62	0
Tillamook, Washington Counties	only	2065-2075	163	5.15	0
(North Coast)					
Santiam; other public in Clackamas,	Standard	1975-1985	86	4.20	0
Hood River Counties	class	2015-2025	132	5.41	0
(North Willamette, Mid-Willamette)	only	2065-2075	145	4.56	0
Lane; no other public	Standard	1975-1985	92	4.00	2
(Eugene)	class	2015-2025	130	4.87	0
	only	2065-2075	139	4.29	0
Coos; other public in Coos County	Standard	1975-1985	80	2.07	5
(South Coast,	class	2015-2025	128	4.03	0
Roseburg)	only	2065-2075	131	3.87	0
Grants Pass; other public in	Standard	1975-1985	80	3.30	0
Douglas, Josephine Counties	class	2015-2025	132	5.04	0
(Roseburg, Medford)	only	2065-2075	136	4.35	0
FOREST INDUSTRY OWNER CLASS (Timbersheds)					
(North Coast)	Standard	1975-1985	108	4.42	11
	class	2015-2025	192	6.97	1
	only	2065-2075	206	5.85	1
(North Willamette)	Standard	1975-1985	65	3.85	8
	class	2015-2025	134	7.18	0
	only	2065-2075	149	5.99	0
(Mid-Willamette)	Standard	1975-1985	73	2.83	3
	class	2015-2025	132	5.77	1
	only	2065-2075	142	5.64	0
(Eugene)	Standard	1975-1985	69	3.58	2
	class	2015-2025	129	6.37	0
	only	2065-2075	140	5.74	0

Table A12. (Continued)

Unit/Location	Land class	Period	Annual growth		Hardwood growth, part of total
			Volume	Rate[1]	
				%	%
FOREST INDUSTRY OWNER CLASS (Continued)					
(Roseburg)	Standard	1975-1985	61	2.11	8
	class	2015-2025	127	5.51	1
	only	2065-2075	137	5.57	0
(South Coast)	Standard	1975-1985	62	3.37	14
	class	2015-2025	127	6.27	2
	only	2065-2075	137	5.72	1
(Medford)	Standard	1975-1985	37	2.57	2
	class	2015-2025	76	5.31	1
	only	2065-2075	80	4.77	0
OTHER PRIVATE OWNER CLASS (Timbersheds)					
(North Coast)	Standard	1975-1985	92	3.11	23
	class	2015-2025	124	5.02	9
	only	2065-2075	142	5.38	2
(North Willamette)	Standard	1975-1985	88	2.96	22
	class	2015-2025	123	5.35	7
	only	2065-2075	136	5.47	3
(Mid-Willamette)	Standard	1975-1985	90	3.73	15
	class	2015-2025	115	5.49	4
	only	2065-2075	129	5.47	2
(Eugene)	Standard	1975-1985	67	3.95	7
	class	2015-2025	103	5.88	4
	only	2065-2075	111	5.50	2
(Roseburg)	Standard	1975-1985	67	5.24	10
	class	2015-2025	97	5.63	3
	only	2065-2075	103	5.40	1
(South Coast)	Standard	1975-1985	72	2.16	25
	class	2015-2025	99	4.86	12
	only	2065-2075	111	5.73	5
(Medford)	Standard	1975-1985	19	1.35	5
	class	2015-2025	36	3.76	3
	only	2065-2075	38	4.21	1

[1]Expressed as a percentage of total inventory.

Table A13. Annual Allowable Cuts in Millions of Cubic Feet Volume[1] and Board Feet[2] for Public Owner Class Units in Eastern Oregon for Three Decades.

	1975-1985		1985-1995		1995-2005	
	Volume	Scribner	Volume	Scribner	Volume	Scribner
NATIONAL FOREST OWNER CLASS[3]						
Winema National Forest[4]	25.3	129.1	25.3	129.1	25.3	129.1
Fremont National Forest	26.7	143.0	26.7	143.0	26.7	143.0
Deschutes National Forest	21.0	137.5	21.0	137.5	21.0	137.5
Ochoco National Forest	22.7	131.0	22.7	131.0	22.7	131.0
Wallowa-Whitman National Forest	28.7	163.0	28.7	163.0	28.7	163.0
Malheur National Forest	29.9	169.6	29.9	169.6	29.9	169.6
Umatilla National Forest	34.6	135.1	34.6	135.1	34.6	135.1
All National Forest	188.9	1,008.9	188.9	1,008.3	188.9	1,008.3
OTHER PUBLIC OWNER CLASS[5]						
Klamath-Lakeview timbershed	11.1	41.4	11.1	41.4	11.1	41.4
Bend-Prineville timbershed	24.8	93.9	24.8	93.9	24.8	93.9
Eastern timbershed	2.3	11.5	2.3	11.5	2.3	11.5
All Other Public	38.2	146.8	38.2	146.8	38.2	146.8
Total Eastern Oregon	227.1	1,155.1	227.1	1,155.1	227.1	1,155.1

[1]Total cubic feet of trees 1.5 inches and more in dbh, from ground level to top.
[2]Scribner log rule is presumed to be for trees 12 inches or more in dbh to an 8-inch top, based on 16-foot logs.
[3]National Forest allowable cuts were obtained from: "Potential Yield Summary" for Region 6, Sept. 14, 1974, by Eldon Manthey (unpublished). The allowable cut for the Klamath Indian Trust portion of the Winema National Forest was assumed to be about the same as the allowable cut set by the trustee before the purchase by the Forest Service--30 million board feet.
[4]Includes the Klamath Indian Trust lands.
[5]The Other Public cut for the Klamath-Lakeview timbershed is based on correspondence from the Oregon Department of Forestry, which gave the allowable cut for the State of Oregon. The remainder of the Other Public allowable cut was estimated. The Other Public cuts in the Bend-Prineville and Eastern timbersheds were assumed to be equivalent to the empirical average harvest for Other Public based on experience for 1968-1973.

Table A14. Profile of Average Annual Growth in Millions of Cubic Feet Volume[1] and Board Feet[2] During Three 10-Year Periods of the Projection of RUN A-2 for Eastern Oregon. Timbersheds Are in Parentheses.

Unit/Location	Land class	Period	Annual growth		Hardwood growth, part of total
			Volume	Part of total	
				%	%
NATIONAL FOREST OWNER CLASS (National Forests)					
Deschutes	Standard	1975-1985	35	1.81	0
(Bend-Prineville,	and	2015-2025	51	1.95	0
Klamath-Lakeview	special	2065-2075	45	1.53	0
Fremont	Standard	1975-1985	32	1.67	0
(Klamath-Lakeview)	and	2015-2025	52	2.23	0
	special	2065-2075	49	1.87	0
Malheur	Standard	1975-1985	41	1.93	0
(Eastern)	and	2015-2025	58	2.66	0
	special	2065-2075	59	2.56	0
Ochoco	Standard	1975-1985	34	1.63	0
(Bend-Prineville,	and	2015-2025	58	2.76	0
Eastern)	special	2065-2075	60	2.45	0
Umatilla	Standard	1975-1985	50	1.75	0
(Eastern,	and	2015-2025	65	2.15	0
Bend-Prineville)	special	2065-2075	62	2.04	0
Wallowa-Whitman	Standard	1975-1985	56	2.23	0
(Eastern)	and	2015-2025	66	2.12	0
	special	2065-2075	70	2.10	0
Winema, including	Standard	1975-1985	36	1.80	0
Klamath Indian Trust	and	2015-2025	46	2.10	0
(Klamath-Lakeview)	special	2065-2075	50	2.03	0
OTHER PUBLIC OWNER CLASS (Timbersheds)					
(Klamath-Lakeview)	Standard	1975-1985	80	2.67	0
	class	2015-2025	121	3.99	0
	only	2065-2075	132	3.72	0
(Bend-Prineville)	Standard	1975-1985	80	2.93	0
	class	2015-2025	120	4.18	0
	only	2065-2075	131	3.81	0
(Eastern)	Standard	1975-1985	40	2.94	0
	class	2015-2025	50	3.70	0
	only	2065-2075	52	3.52	0

Table A14. (Continued).

Unit/Location	Land class	Period	Annual growth		Hardwood growth, part of total
			Volume	Part of total	
				%	%
FOREST INDUSTRY OWNER CLASS (Timbersheds)					
(Klamath-Lakeview	Standard	1975-1985	65	4.61	0
	class	2015-2025	87	4.72	0
	only	2065-2075	90	4.13	0
(Bend-Prineville	Standard	1975-1985	58	4.12	0
	class	2015-2025	68	4.27	0
	only	2065-2075	69	4.10	0
(Eastern)	Standard	1975-1985	34	2.69	0
	class	2015-2025	38	2.61	0
	only	2065-2075	39	2.64	0
OTHER PRIVATE OWNER CLASS (Timbersheds)					
(Klamath-Lakeview)	Standard	1975-1985	48	5.23	0
	class	2015-2025	61	4.46	0
	only	2065-2075	62	3.68	0
(Bend-Prineville)	Standard	1975-1985	48	5.22	0
	class	2015-2025	61	4.45	0
	only	2065-2075	62	3.68	0
(Eastern)	Standard	1975-1985	50	4.25	0
	class	2015-2025	59	3.77	0
	only	2065-2075	62	3.56	0

Table A15. Profile of Average Annual Growth in Millions of Cubic Feet Volume[1] and Board Feet[2] During Three 10-Year Periods of the Projection of RUN B-2 for Eastern Oregon. Timbersheds Are in Parentheses.

Unit/Location	Land class	Period	Annual growth		Hardwood growth, part of total
			Volume	Part of total	
				%	%
NATIONAL FOREST OWNER CLASS (National Forests)					
Deschutes	Standard	1975-1985	44	2.30	0
(Bend-Prineville,	and	2015-2025	61	2.26	0
Klamath-Lakeview)	special	2065-2075	56	1.75	0
Fremont	Standard	1975-1985	40	2.14	0
(Klamath-Lakeview)	and	2015-2025	55	2.44	0
	special	2065-2075	60	2.32	0
Malheur	Standard	1975-1985	54	2.65	0
(Eastern)	and	2015-2025	73	3.19	0
	special	2065-2075	75	3.02	0
Ochoco	Standard	1975-1985	45	2.21	0
(Bend-Prineville,	and	2015-2025	74	3.33	0
Eastern)	special	2065-2075	76	2.90	0
Umatilla	Standard	1975-1985	70	2.51	0
(Eastern,	and	2015-2025	84	2.61	0
Bend, Prineville)	special	2065-2075	80	2.45	0
Wallowa-Whitman	Standard	1975-1985	75	3.04	0
(Eastern)	and	2015-2025	86	2.61	0
	special	2065-2075	90	2.51	0
Winema, including	Standard	1975-1985	40	2.39	0
Klamath Indian Trust	and	2015-2025	55	2.45	0
(Klamath-Lakeview)	special	2065-2075	60	2.32	0
OTHER PUBLIC OWNER CLASS (Timbersheds)					
(Klamath-Lakeview)	Standard	1975-1985	112	4.02	0
	class	2015-2025	160	4.88	0
	only	2065-2075	169	4.31	0
(Bend-Prineville)	Standard	1975-1985	112	4.20	0
	class	2015-2025	159	4.98	0
	only	2065-2075	169	4.37	0
(Eastern)	Standard	1975-1985	57	3.98	0
	class	2015-2025	68	4.11	0
	only	2065-2075	69	3.99	0

Table A15. (Continued).

Unit/Location	Land class	Period	Annual growth		Hardwood growth, part of total
			Volume	Part of total	
				%	%
FOREST INDUSTRY OWNER CLASS (Timbersheds)					
(Klamath-Lakeview)	Standard	1975-1985	71	5.19	0
	class	2015-2025	97	5.21	0
	only	2065-2075	101	4.48	0
(Bend-Prineville)	Standard	1975-1985	63	4.58	0
	class	2015-2025	75	4.70	0
	only	2065-2075	76	4.44	0
(Eastern)	Standard	1975-1985	38	3.08	0
	class	2015-2025	43	2.89	0
	only	2065-2075	43	2.86	0
OTHER PRIVATE OWNER CLASS (Timbersheds)					
(Klamath-Lakeview)	Standard	1975-1985	48	5.45	0
	class	2015-2025	75	7.20	0
	only	2065-2075	84	5.26	0
(Bend-Prineville)	Standard	1975-1985	48	5.48	0
	class	2015-2025	75	7.22	0
	only	2065-2075	84	5.26	0
(Eastern)	Standard	1975-1985	50	4.31	0
	class	2015-2025	65	4.75	0
	only	2065-2075	71	4.42	0

Table A16. Timber Production and Employment Trends by Timbershed for Three Oregon Timber Flow Projections, 1975-2005, Shown as Ratios to Current Harvest or Employment, 1975-1985.[1]

Timbershed	Decade	Timber harvest			Timber-dependent employment		
		RUN A-1	RUN A-2	RUN B-2	RUN A-1	RUN A-2	RUN B-2
North Coast	1975-1985	current	1.20	1.25	current	1.14	1.17
	1985-1995	1.00	1.19	1.26	0.92	1.05	1.09
	1995-2005	1.00	1.24	1.33	0.84	0.99	1.05
North Willamette Valley	1975-1985	current	1.27	1.33	current	1.10	1.12
	1985-1995	0.79	1.19	1.26	0.89	1.00	1.02
	1995-2005	0.69	1.17	1.26	0.80	0.92	0.95
Mid-Willamette Valley	1975-1985	current	0.97	1.00	current	0.99	1.01
	1985-1995	0.99	0.92	0.96	0.91	0.89	0.91
	1995-2005	0.87	0.91	0.96	0.77	0.82	0.85
Eugene	1975-1985	current	0.86	0.88	current	0.92	0.94
	1985-1995	0.73	0.83	0.86	0.79	0.84	0.86
	1995-2005	0.59	0.84	0.87	0.64	0.78	0.80
Roseburg	1975-1985	current	0.96	0.99	current	0.97	1.00
	1985-1995	1.00	0.92	0.96	0.93	0.87	0.97
	1995-2005	0.78	0.92	0.97	0.67	0.80	0.84
South Coast	1975-1985	current	1.02	1.04	current	1.01	1.03
	1985-1995	1.00	1.00	1.03	0.92	0.91	0.94
	1995-2005	0.64	1.02	1.06	0.63	0.85	0.89
Medford	1975-1985	current	1.11	1.14	current	1.06	1.09
	1985-1995	1.00	1.03	1.06	0.92	0.94	0.97
	1995-2005	0.98	1.03	1.08	0.76	0.87	0.91
Klamath-Lakeview	1975-1985	current	1.06	1.21	current	1.06	1.18
	1985-1995	1.00	1.06	1.22	0.93	0.98	1.10
	1995-2005	1.00	1.07	1.23	0.86	0.91	1.04
Bend-Prineville	1975-1985	current	1.59	1.82	current	1.36	1.51
	1985-1995	1.00	1.47	1.75	0.93	1.20	1.36
	1995-2005	1.00	1.47	1.77	0.86	1.11	1.28
Eastern	1975-1985	current	1.70	1.99	current	1.79	2.11
	1985-1995	1.00	1.68	1.98	0.93	1.64	1.96
	1995-2005	1.00	1.67	1.99	0.86	1.50	1.82

[1]Each group of values in the table stands by itself. The harvest of 1975-1985 for RUN A-1 is the current harvest defined as the average for 1968-1973. The employment for 1975-1985 associated with RUN A-1 thus represents current employment. The ratios in each group are with regard to the current harvest or employment for the location specified.

Table A17. Timber Harvest and In-Lieu Payment Trends For Public Lands Based on Three Timber-Flow Projections for 1975-2005, Shown as Ratios to Timber Harvest or In-Lieu Payments, 1975-1985.[1]

		Timber harvest from public lands			In-lieu payments from public lands		
Timbershed	Decade	RUN A-1	RUN A-4	RUN B-4	RUN A-1	RUN A-2	RUN B-2
North Coast	1975-1985	current	1.46	1.56	current	1.43	1.51
	1985-1995	1.09	1.49	1.61	1.46	1.69	1.80
	1995-2005	1.16	1.53	1.67	1.93	2.31	2.51
North Willamette Valley	1975-1985	current	1.44	1.52	current	1.35	1.40
	1985-1995	1.02	1.34	1.44	1.34	1.64	1.73
	1995-2005	1.01	1.29	1.40	1.83	2.21	2.36
Mid-Willamette Valley	1975-1985	current	1.17	1.07	current	1.14	1.20
	1985-1995	1.01	1.11	1.18	1.36	1.45	1.52
	1995-2005	1.01	1.08	1.15	1.80	1.87	2.00
Eugene	1975-1985	current	1.13	1.18	current	1.19	1.25
	1985-1995	1.00	1.10	1.15	1.37	1.57	1.64
	1995-2005	1.00	1.09	1.15	1.81	2.04	2.16
Roseburg	1975-1985	current	1.14	1.20	current	1.17	1.22
	1985-1995	1.00	1.09	1.16	1.34	1.49	1.56
	1995-2005	1.00	1.08	1.15	1.77	1.96	2.07
South Coast	1975-1985	current	1.28	1.33	current	1.26	1.31
	1985-1995	0.98	1.24	1.30	1.33	1.57	1.62
	1995-2005	1.03	1.24	1.31	1.76	2.08	2.17
Medford	1975-1985	current	1.13	1.17	current	1.19	1.24
	1985-1995	1.00	1.05	1.09	1.35	1.51	1.59
	1995-2005	1.00	1.06	1.11	1.81	2.03	2.14
Klamath Lakeview	1975-1985	current	1.25	1.49	current	1.24	1.46
	1985-1995	1.00	1.23	1.48	1.31	1.58	1.84
	1995-2005	1.00	1.22	1.48	1.69	1.97	2.23
Bend-Prineville	1975-1985	current	1.68	1.95	current	1.59	1.84
	1985-1995	1.00	1.52	1.85	1.33	1.96	2.27
	1995-2005	1.00	1.51	1.86	1.74	2.42	2.73
Eastern	1975-1985	current	1.87	2.26	current	1.86	2.25
	1985-1995	1.00	1.84	2.25	1.31	2.32	2.77
	1995-2005	1.00	1.82	2.25	1.70	2.82	3.28

[1]Each group of values in the table stands by itself. The harvest of 1975-1985 for RUN A-1 is the current harvest. The in-lieu payments for 1975-1985 associated with RUN A-1 thus represent current in-lieu payments. The ratios in each group are with relationship to the current harvest or employment for the location specified.

Table A18. Timber Inventory, Timber Harvest, and Timber Tax Trends for Private Lands Based on Three Timber-Flow Projections for 1975-2005, shown as Ratios to Private Timber Inventory, Harvest, or Taxes, 1975-1985.[1]

Timbershed	Decade	Private timber inventory			Private timber harvest			Private timber taxes		
		RUN A-1	RUN A-2	RUN B-2	RUN A-1	RUN A-2	RUN B-2	RUN A-1	RUN A-2	RUN B-2
North Coast	1975-1985	current	0.98	0.97	current	1.10	1.13	current	0.98	0.98
	1985-1995	1.03	0.97	0.95	0.97	1.09	1.14	1.26	1.17	1.18
	1995-2005	1.07	0.93	0.90	0.94	1.13	1.21	1.67	1.48	1.49
North Willamette Valley	1975-1985	current	1.00	0.99	current	1.01	1.03	current	0.89	0.90
	1985-1995	1.05	0.96	0.95	0.45	0.96	1.01	1.19	1.09	1.12
	1995-2005	1.22	0.91	0.89	0.21	0.99	1.05	1.82	1.32	1.37
Mid-Willamette Valley	1975-1985	current	1.05	1.05	current	0.83	0.84	current	1.02	1.02
	1985-1995	0.79	0.95	0.94	0.98	0.79	0.81	0.92	1.04	1.05
	1995-2005	0.63	0.90	0.89	0.77	0.79	0.82	0.89	1.11	1.11
Eugene	1975-1985	current	1.23	1.23	current	0.59	0.59	current	0.98	0.98
	1985-1995	0.62	1.13	1.13	0.46	0.57	0.58	0.60	0.99	1.00
	1995-2005	0.58	1.13	1.11	0.17	0.59	0.60	0.64	1.01	1.04
Roseburg	1975-1985	current	1.05	1.05	current	0.82	0.83	current	1.03	1.03
	1985-1995	0.75	0.92	0.91	1.00	0.77	0.79	0.88	1.06	1.05
	1995-2005	0.67	0.88	0.85	0.59	0.78	0.81	0.74	1.03	1.01
South Coast	1975-1985	current	1.03	1.03	current	0.89	0.89	current	1.03	1.03
	1985-1995	0.86	0.97	0.96	1.01	0.87	0.89	0.97	1.05	1.06
	1995-2005	0.81	0.97	0.95	0.44	0.90	0.93	1.09	1.10	1.10
Medford	1975-1985	current	0.99	0.99	current	1.06	1.08	current	0.96	0.96
	1985-1995	0.91	0.87	0.87	0.95	0.98	1.00	1.13	0.96	0.97
	1995-2005	0.85	0.79	0.79	0.39	0.97	1.01	1.27	1.02	1.02
Klamath Lakeview	1975-1985	--[2]	--	--	current	0.90	0.98	current	1.04	1.09
	1985-1995	--	--	--	1.00	0.92	1.01	1.15	1.23	1.28
	1995-2005	--	--	--	1.00	0.94	1.04	1.32	1.49	1.53
Bend-Prineville	1975-1985	--	--	--	current	1.32	1.43	current	1.11	1.17
	1985-1995	--	--	--	1.00	1.34	1.47	1.17	1.30	1.37
	1995-2005	--	--	--	1.00	1.36	1.51	1.37	1.57	1.63
Eastern	1975-1985	--	--	--	current	1.31	1.38	current	1.08	1.14
	1985-1995	--	--	--	1.00	1.31	1.40	1.15	1.27	1.33
	1995-2005	--	--	--	1.00	1.32	1.42	1.34	1.53	1.59

[1]Each group of values in the table stands by itself. The inventory for 1975-1985 and harvest for RUN A-1 are the current inventory and harvest. The taxes for 1975-1985 associated with RUN A-1 thus represent current taxes. The ratios in each cell are relationships to the current inventory, harvest, or taxes for the location specified.

[2]The inventory is a factor for the western Oregon ad valorem tax only. Thus, it is not shown for eastern Oregon and the entire state.