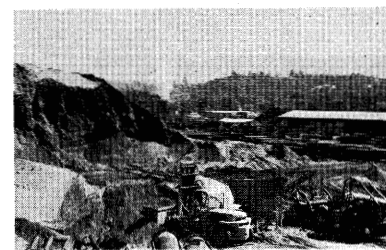
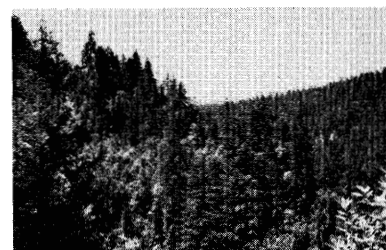
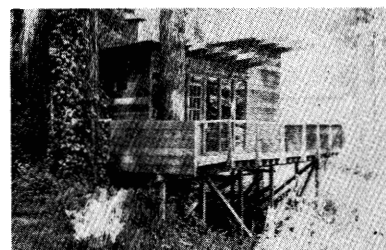
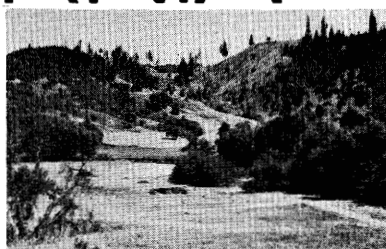


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# TIMBER RESOURCES OF MENDOCINO AND SONOMA COUNTIES, CALIFORNIA

CALIFORNIA RESOURCE AGENCY  
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APR 15 1972



**Keywords: Forest surveys, forest appraisal, forest industries,  
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The California Division of Forestry provided maps and information on timber harvest.

Other public agencies and private landowners provided information on access to forest lands.

# PREFACE

This report presents the findings of the first complete inventory of timber resources in Mendocino and Sonoma Counties. Past Forest Survey inventories have included these counties, but they were designed to provide only area statistics at the county level; volume estimates were compiled only for large, multi-county regions.

Data for this inventory were collected during several field seasons. On Mendocino National Forest, fieldwork was completed in 1964. Data on lands other than National Forests were collected in the summer of 1965 in Sonoma County and 1967 in Mendocino County.

This inventory was conducted by the Forest Survey, a nationwide project of the Forest Service, U. S. Department of Agriculture, authorized by the McSweeney-McNary Forest

Research Act of 1928 and subsequent amendments. The purpose of the Forest Survey is to periodically inventory the extent and condition of forest lands and the amount and kind of timber on them, to determine rates of forest growth and depletion, to estimate timber cut and probable future trends in timber requirements, and to analyze and make available information needed to formulate forest policies and programs. Surveys are made periodically to update basic information.

The Forest Survey is conducted in the various forest regions of the Nation by the U. S. Department of Agriculture Forest Service Experiment Stations. The Pacific Northwest Forest and Range Experiment Station at Portland, Oregon, is responsible for the Forest Survey in California, Oregon, Washington, Alaska, and Hawaii.

# ABSTRACT

The findings of the first complete inventory of the timber resources of Mendocino and Sonoma Counties, California, indicate there is 19.1 billion board feet of sawtimber on 1,564,000 acres of unreserved commercial forest land in these two counties. Forest industries own about 34 percent of the commercial forest area and 37 percent of the timber volume; farm and miscellaneous private ownerships account for 53 percent of the area but only 42 percent of the volume; and public ownerships account for 13 percent of the area and 21 percent of the volume.

Almost half the commercial forest area in these two counties is stocked with low value hardwoods and scattered conifers. This condition has resulted from wild fires, logging, and unsuccessful or abandoned attempts to convert timberland to grazing land. Redwood is the

area's most abundant conifer, predominating on 368,000 acres; sawtimber volume in this species is 9.6 billion board feet. Douglas-fir type is found on 281,000 acres; sawtimber volume is 6.5 billion board feet.

The forests in these counties are predominantly young, 79 percent of the area having stands under 100 years old. These young forests are responsible for almost all of Mendocino-Sonoma's 499 million board feet of net annual growth.

In recent years, the forest industries of these counties have been utilizing old-growth timber, more Douglas-fir than redwood, and have been relying heavily on their own holdings. In the next 10 to 15 years, the realities of raw material availability will likely lead industry to greater reliance on young redwood sawtimber, much of it from farm and miscellaneous private lands.

# CONTENTS

|                                                                                            | Page |
|--------------------------------------------------------------------------------------------|------|
| INTRODUCTION . . . . .                                                                     | 1    |
| THE FOREST RESOURCES . . . . .                                                             | 6    |
| Redwood is most extensive coniferous type . . . . .                                        | 6    |
| Redwood stands are mostly young . . . . .                                                  | 7    |
| Douglas-fir type covers large area . . . . .                                               | 7    |
| Hardwood types cover almost half of<br>Mendocino-Sonoma's commercial forest area . . . . . | 7    |
| Capability of hardwood type area to support conifers<br>offset by other factors . . . . .  | 8    |
| Mendocino-Sonoma's forests are predominately young growth . . . . .                        | 10   |
| Most of timbered area is stocked with sawtimber . . . . .                                  | 11   |
| Redwood is most abundant species; Douglas-fir is second . . . . .                          | 12   |
| Apparent change in commercial forest area is slight . . . . .                              | 13   |
| GROWTH AND MORTALITY . . . . .                                                             | 14   |
| Net annual growth is 499 million board feet . . . . .                                      | 14   |
| Redwood is most important growth component . . . . .                                       | 14   |
| Mortality is light in Mendocino-Sonoma's young forests . . . . .                           | 15   |
| Salvable dead sawtimber totals 134 million board feet . . . . .                            | 15   |
| CHARACTERISTICS OF TIMBER RESOURCE OWNERSHIP IN<br>MENDOCINO AND SONOMA COUNTIES . . . . . | 16   |
| Public timberlands . . . . .                                                               | 16   |
| Forest industry timberlands . . . . .                                                      | 18   |
| Farmer and miscellaneous private timberlands . . . . .                                     | 19   |
| THE COUNTIES AS RESOURCE UNITS . . . . .                                                   | 21   |
| Mendocino County . . . . .                                                                 | 21   |
| Sonoma County . . . . .                                                                    | 22   |
| THE RESOURCE AND DEPENDENT INDUSTRIES . . . . .                                            | 26   |
| Mendocino-Sonoma timber resource<br>supplies resident industries . . . . .                 | 26   |
| Cut is concentrated in old-growth timber . . . . .                                         | 26   |
| Cut-growth comparisons . . . . .                                                           | 26   |
| Growth exceeds cut in young sawtimber stands . . . . .                                     | 27   |
| Douglas-fir is still major species<br>used by resident industries . . . . .                | 27   |

|                                                                                      |    |
|--------------------------------------------------------------------------------------|----|
| Decline in Douglas-fir harvest will continue . . . . .                               | 27 |
| Redwood harvest can be maintained . . . . .                                          | 27 |
| Most logs came from industry lands . . . . .                                         | 28 |
| Farmer and miscellaneous private lands should<br>be increasingly important . . . . . | 28 |
| The outlook for forest industries . . . . .                                          | 28 |
| RELIABILITY OF CURRENT INVENTORY DATA . . . . .                                      | 68 |
| Forest Land Area and Timber Volume . . . . .                                         | 68 |
| FOREST SURVEY PROCEDURES . . . . .                                                   | 70 |
| National Forest Lands . . . . .                                                      | 70 |
| Lands Outside National Forests . . . . .                                             | 70 |
| DEFINITION OF TERMS . . . . .                                                        | 72 |
| TREE SPECIES . . . . .                                                               | 75 |
| LITERATURE CITED . . . . .                                                           | 76 |

# TABLES

|                                                                                                                                                                                       | Page |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| 1. Area by land class and county, Mendocino and Sonoma Counties, California, January 1, 1968 . . . . .                                                                                | 29   |
| 2. Area of commercial forest land, by ownership class and county, Mendocino and Sonoma Counties, California, January 1, 1968 . . . . .                                                | 29   |
| 3. Area of commercial forest land, by stand-size, age, and ownership classes, Mendocino and Sonoma Counties, California, January 1, 1968 . . . . .                                    | 30   |
| 4. Area of commercial forest land, by county, stand-size, age, and ownership classes, Mendocino and Sonoma Counties, California, January 1, 1968 . . . . .                            | 31   |
| 5. Area of commercial forest land, by stand-size and ownership classes, Mendocino and Sonoma Counties, California, January 1, 1968 . . . . .                                          | 32   |
| 6. Area of commercial forest land, by stand volume and ownership class, Mendocino and Sonoma Counties, California, January 1, 1968 . . . . .                                          | 32   |
| 7. Area of commercial forest land, by cubic-foot site and ownership classes, Mendocino and Sonoma Counties, California, January 1, 1968 . . . . .                                     | 33   |
| 8. Area of commercial forest land, by stocking class of growing-stock trees and by ownership group, Mendocino and Sonoma Counties, California, January 1, 1968 . . . . .              | 33   |
| 9. Area of commercial forest land, by forest type and ownership class, Mendocino and Sonoma Counties, California, January 1, 1968 . . . . .                                           | 34   |
| 10. Area of commercial forest land, by forest type and ownership class, Mendocino County, California, January 1, 1968 . . . . .                                                       | 34   |
| 11. Area of commercial forest land, by forest type and ownership class, Sonoma County, California, January 1, 1968 . . . . .                                                          | 35   |
| 12. Area of commercial forest land by forest type, stand-size class, and ownership, Mendocino and Sonoma Counties, California, January 1, 1968 . . . . .                              | 36   |
| 13. Area of commercial forest land and volume of growing stock and sawtimber by stand age and ownership classes, Mendocino and Sonoma Counties, California, January 1, 1968 . . . . . | 37   |
| 14. Area of noncommercial forest land, by forest type, Mendocino and Sonoma Counties, California, January 1, 1968 . . . . .                                                           | 38   |

|                                                                                                                                                                                               |    |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| 15. Number of growing-stock trees on commercial forest land, by diameter and ownership classes, Mendocino and Sonoma Counties, California, January 1, 1968 . . . . .                          | 38 |
| 16. Number of growing-stock trees on commercial forest land, by species and diameter classes, Mendocino and Sonoma Counties, California, January 1, 1968 . . . . .                            | 39 |
| 17. Volume of growing stock and sawtimber on commercial forest land, by ownership class and by softwoods and hardwoods, Mendocino and Sonoma Counties, California, January 1, 1968 . . . . .  | 40 |
| 18. Volume of growing stock and sawtimber on commercial forest land, by stand-size class and by softwoods and hardwoods, Mendocino and Sonoma Counties, California, January 1, 1968 . . . . . | 41 |
| 19. Volume of timber on commercial forest land, by class of timber and by softwoods and hardwoods, Mendocino and Sonoma Counties, California, January 1, 1968 . . . . .                       | 42 |
| 20. Volume of growing stock and sawtimber on commercial forest land, by county and ownership class, Mendocino and Sonoma Counties, California, January 1, 1968 . . . . .                      | 43 |
| 21. Volume of growing stock on commercial forest land by species and ownership class, Mendocino and Sonoma Counties, California, January 1, 1968 . . . . .                                    | 44 |
| 22. Volume of growing stock on commercial forest land by species and county, Mendocino and Sonoma Counties, California, January 1, 1968 . . . . .                                             | 45 |
| 23. Volume of sawtimber on commercial forest land by species and ownership class, Mendocino and Sonoma Counties, California, January 1, 1968 (International 1/4-inch rule) . . . . .          | 46 |
| 24. Volume of sawtimber on commercial forest land by species and ownership class, Mendocino and Sonoma Counties, California, January 1, 1968 (Scribner rule) . . . . .                        | 47 |
| 25. Volume of sawtimber on commercial forest land, by species and county, Mendocino and Sonoma Counties, California, January 1, 1968 (International 1/4-inch rule) . . . . .                  | 48 |
| 26. Volume of growing stock on commercial forest land, by forest type and ownership class, Mendocino and Sonoma Counties, California, January 1, 1968 . . . . .                               | 49 |
| 27. Volume of sawtimber on commercial forest land by forest type and ownership class, Mendocino and Sonoma Counties, California, January 1, 1968 (International 1/4-inch rule) . . . . .      | 50 |
| 28. Volume of growing stock and sawtimber on commercial forest land, by forest type and county, Mendocino and Sonoma Counties, California, January 1, 1968 . . . . .                          | 51 |
| 29. Volume of growing stock on commercial forest land, by species and diameter class, Mendocino and Sonoma Counties, California, January 1, 1968 . . . . .                                    | 52 |
| 30. Volume of sawtimber on commercial forest land, by species and diameter class, Mendocino and Sonoma Counties, California, January 1, 1968 (International 1/4-inch rule) . . . . .          | 53 |
| 31. Net annual growth of growing stock and sawtimber on commercial forest land, by ownership class and softwoods and hardwoods, Mendocino and Sonoma Counties, California, 1967 . . . . .     | 54 |

|                                                                                                                                                                                                       |    |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| 32. Net annual growth of growing stock on commercial forest land, by species and ownership class, Mendocino and Sonoma Counties, California, 1967 . . . . .                                           | 55 |
| 33. Net annual growth of sawtimber on commercial forest land, by species and ownership class, Mendocino and Sonoma Counties, California, 1967 (International 1/4-inch rule) . . . . .                 | 56 |
| 34. Net annual growth of sawtimber on commercial forest land, by species and ownership class, Mendocino and Sonoma Counties, California, 1967 (Scribner rule) . . . . .                               | 57 |
| 35. Net annual growth of growing stock and sawtimber on commercial forest land, by species and county, Mendocino and Sonoma Counties, California, 1967 . . . . .                                      | 58 |
| 36. Net annual growth of growing stock and sawtimber on commercial forest land, by forest type and county, Mendocino and Sonoma Counties, California, 1967 . . . . .                                  | 59 |
| 37. Net annual growth of growing stock and sawtimber on commercial forest land, by stand age and by softwoods and hardwoods, Mendocino and Sonoma Counties, California, 1967 . . . . .                | 60 |
| 38. Average annual mortality of growing stock and sawtimber on commercial forest land, by softwoods and hardwoods and by cause of death, Mendocino and Sonoma Counties, California, 1963-67 . . . . . | 61 |
| 39. Average annual mortality of growing stock on commercial forest land, by species and ownership class, Mendocino and Sonoma Counties, California, 1963-67 . . . . .                                 | 62 |
| 40. Average annual mortality of sawtimber on commercial forest land, by species and ownership class, Mendocino and Sonoma Counties, California, 1963-67 (International 1/4-inch rule) . . . . .       | 63 |
| 41. Average annual mortality of growing stock on commercial forest land, by forest type and ownership class, Mendocino and Sonoma Counties, California, 1963-67 . . . . .                             | 64 |
| 42. Average annual mortality of sawtimber on commercial forest land, by forest type and ownership class, Mendocino and Sonoma Counties, California, 1963-67 (International 1/4-inch rule) . . . . .   | 64 |
| 43. Average annual mortality of growing stock and sawtimber on commercial forest land by species and county, Mendocino and Sonoma Counties, California, 1963-67 . . . . .                             | 65 |
| 44. Net volume of salvable dead sawtimber on commercial forest land, by species and county, Mendocino and Sonoma Counties, California, January 1, 1968 . . . . .                                      | 66 |
| 45. Net volume of salvable dead sawtimber on commercial forest land, by volume-per-acre class and by county, Mendocino and Sonoma Counties, California, January 1, 1968 . . . . .                     | 66 |
| 46. Reported timber production, Mendocino and Sonoma Counties, California, 1947-69 . . . . .                                                                                                          | 67 |
| 47. Sampling errors of estimates of forest area and timber volume . . . . .                                                                                                                           | 68 |
| 48. Approximate sampling error by size of estimate . . . . .                                                                                                                                          | 69 |

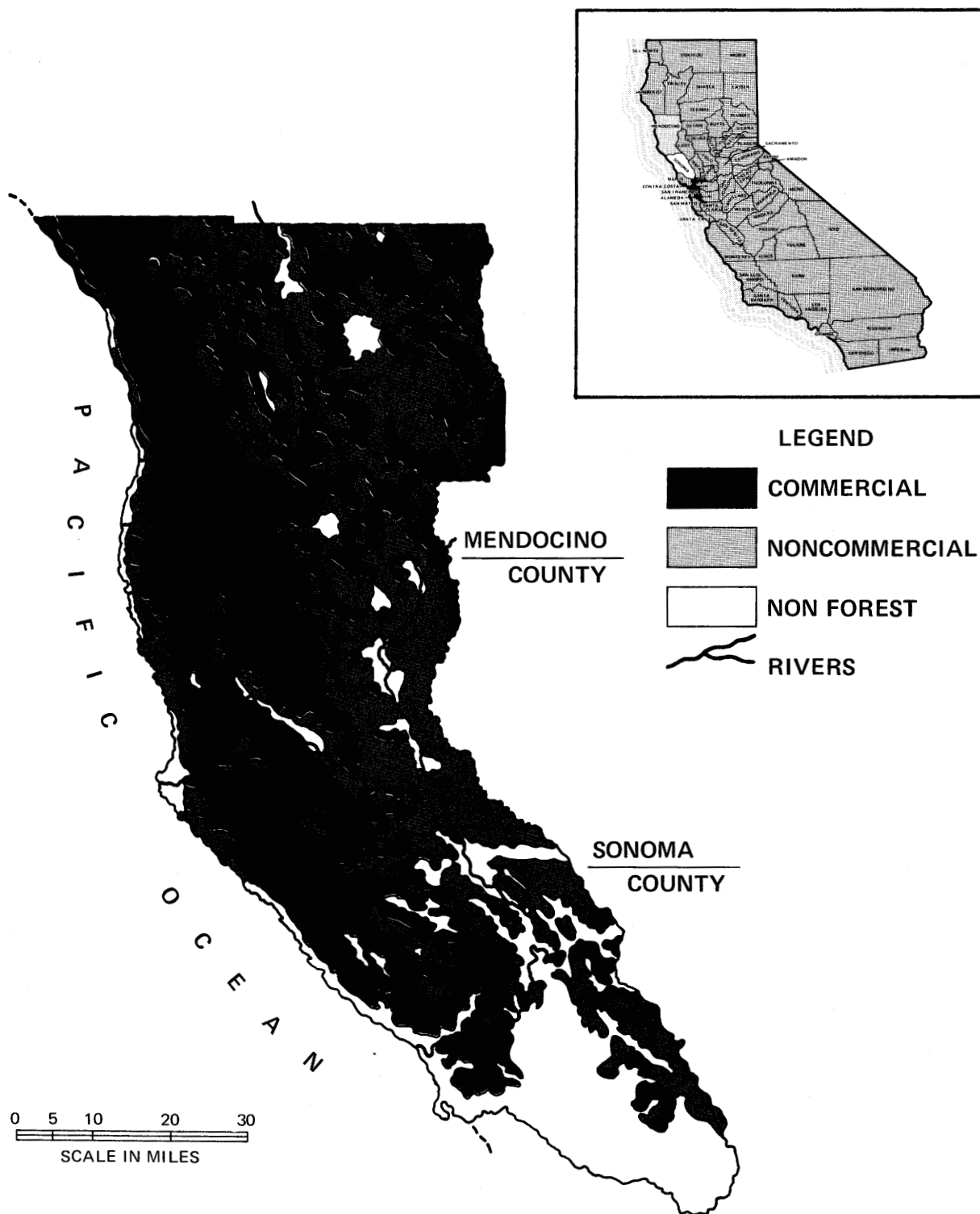


Figure 1. — Forest areas of Mendocino and Sonoma Counties.

# INTRODUCTION

The area that is now Mendocino and Sonoma Counties in northern California remained unexplored long after the Spanish had established settlements on the California coast. The Spanish, who were interested in precious metals and furs and needed protected harbors and grazing lands, had avoided the northern coast in favor of the coastal areas south of San Francisco. The mountainous character of the Mendocino-Sonoma area, the rugged coastline without protected natural harbors, and the lack of natural inland transportation routes were contributing causes to the lack of early exploration.

The topography of these two coastal counties is dominated by the two main ridges of the Coast Ranges running from north to south, the higher of the two ridges forming the eastern boundary. The area is drained by two major rivers, the north-flowing Eel River and the south-flowing Russian River. The interior valleys are small and discontinuous, except in southern Sonoma County. The Mendocino coast is characterized by numerous small rivers flowing westward from the western crest of the Coast Ranges (fig. 1). In contrast, the Sonoma coast has few west-flowing streams; the Gualala River, which parallels most of the northern coast of the county a mile or two from tide-water, is a barrier to inland penetration from the coast.

Timber covers much of the area of these two counties (fig. 1). Redwood predominates in the western part of both counties, extending from near the coast to as much as 25 miles inland for the entire length of the Mendocino coast and much of the Sonoma coast. Douglas-fir and other species intermingle with redwood in this belt and predominate in the interior and on the eastern side of the counties.

The establishment of the Russian colony at Fort Ross on the Sonoma coast marked the first settlement in this area. The Russians were attracted by the seals and sea otters and the potential for agriculture and lumber to provide for their Alaska settlements. The first known lumbering in the northern coast occurred in the vicinity of Fort Ross during the period of Russian settlement, 1812 through 1836.

The Spanish, alerted to the Russian colonization in Spanish territory, extended their missions north into Sonoma County in the 1820's. The establishment of missions at Sonoma and Santa Rosa led to the settlement of interior valleys of southern Sonoma County. Land grants were made to Mexican citizens, partially to prevent the Russians' extending their holdings beyond Fort Ross and Bodega. A sea captain, John B. R. Cooper, was granted El Molino Rancho, which extended from near present day Sebastopol to the Russian River. On this property, Cooper constructed California's first waterpowered sawmill in 1834 (Bauer 1951). Cooper's mill produced little if any lumber before being destroyed by a flood. Sonoma County was also the site of California's first steampowered mill, established on a land grant by Captain Stephen Smith near Bodega in 1843 (May 1953). Smith's mill operated for several years before being dismantled and moved to the Mendocino coast.

This early Sonoma milling activity, as well as earlier production of hand-hewn and whipsawn lumber and timbers at Fort Ross and Bodega and the missions at Santa Rosa and Sonoma, predated the period of significant lumbering activity in the northern coast — and in California.

Although the earliest timber cutting and first sawmills were located in what became Sonoma County, the Mendocino coast pro-



*Figure 2. — Coastal bluff looking south toward Mendocino townsite. On the point of land in the distance, Harry Meiggs commenced operation of Mendocino's first sawmill in 1852.*

vided a greater opportunity for development of the lumber industry. All commerce and transportation for this isolated area was by water. Coastal location was necessary for mills producing for coastal or offshore markets. The largest and most easily logged timber — primarily redwood — occurred in the river bottoms of the coastal streams, most of which were on the Mendocino coastline. Commonly, logs were left in the river bottoms until the water level rose following rainstorms and carried the logs downstream to the millsites at or near the coast.

Large-scale development of the industry on the Mendocino coast started in 1852 when Harry Meiggs, using the machinery from Smith's Bodega mill, erected a sawmill at the mouth of Big River (Palmer 1880), the location of the city of Mendocino (fig. 2). The California gold rush had triggered rapid development of San Francisco and other Bay Area communities, including Oakland and San Jose. The limited timber supplies near those cities were rapidly depleted. Mills were built at the mouths of several coastal rivers along the Mendocino coast in the 1850's. These early millsites became some of the earliest communities in Mendocino County.

In the late 1850's, and early 1860's, mills were established in the interior of both coun-

ties. Mills were established along the Russian River in Sonoma County to exploit the large redwoods growing on the bottom lands. The North Pacific Coast Railroad later pushed a track north to the Russian River to reach the lumber mills in that area and transport the lumber to San Francisco Bay. The early interior mills in Mendocino County located in the Anderson Valley and near Laytonville, Covelo, Ukiah, and Willits. These mills cut redwood, fir, or pine, depending on location, and supplied local markets.

From these early beginnings, the lumber industry in the Mendocino-Sonoma area grew rapidly and the area became the most important lumber-producing region in the State. Mendocino had six mills operating in 1859. From the early 1860's through the mid-1870's, Mendocino was California's leading lumber county, as the number of mills varied from 10 to 20, and lumber production varied between 30 and 70 million board feet. Although other counties surpassed Mendocino as the leading producer from that time on, the Mendocino industry continued to grow, producing 120 million board feet in 1895. In the first decade of the 20th century, lumber shipments from Mendocino fluctuated between 97 and 219 million board feet; the high point in 1907 was in response to the raw material requirements for

rebuilding San Francisco after the earthquake and fire of 1906. During this period, shingles, cordwood, rail ties, and tanbark (for extraction of tannin used in tanning leather) were companion products to lumber in the northern coast.

From 1910 to 1930, Mendocino production fluctuated around 200 million board feet annually, then plunged to 33 million board feet in the early 1930's, followed by a climb to pre-depression levels by the end of World War II.

Sonoma County's lumber industry lagged behind Mendocino's during the early years due to the less favorable location of the timber with respect to water transportation. The early mills were smaller than those of the Mendocino coast and probably oriented to production for local needs. But after completion of a rail line linking San Francisco Bay with the timbered inland stretches of the Russian River in the mid-1870's, Sonoma County lumber production spurted ahead, exceeding Mendocino's during the latter half of the 1870's. Peak production during this early history of the county was 60 million board feet in 1876 and again in 1877. By the turn of the century, the limited stands of timber in the Russian River drainage were depleted. The mills and timbering operations moved to inland locations near the northern coast of the county. And in the first two decades of the 20th century, the annual lumber production plummeted to less than 6 million board feet. Production continued to fall during the 1920's, bottoming at 200,000 board feet in 1932. By the end of World War II, production was averaging about 5 million board feet annually.

The industry that developed in this first century of lumbering along the California coast — from Santa Cruz north — was oriented to one species, redwood. The location of redwood near the coast and on the river flats, and its many desirable characteristics, led to the development of the "redwood industry." Even as the bull teams and river drives gave way to the more far-reaching combination of donkey engines for skidding and logging railroads, the lumber industry continued to concentrate on the extensive redwood stands in the western parts of the counties. However, other species were har-

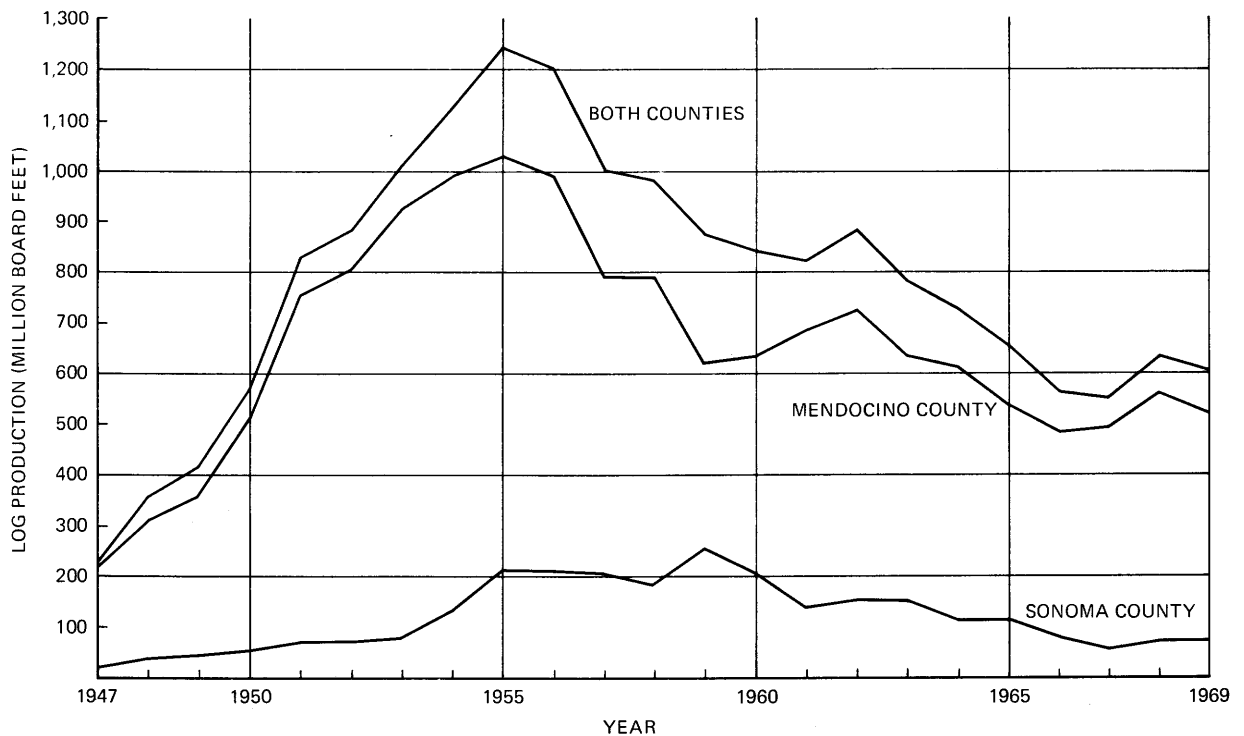
vested. Douglas-fir was sawn and shipped with redwood, and grand fir when encountered was sawn for local use. Tanoak trees were stripped of their bark when found in sufficient quantities, and fuelwood in large quantities was shipped to San Francisco. But most of the timber cut was redwood — probably over 90 percent until 1900, followed by 80 to 90 percent until World War II.

The post-World War II era was accompanied by a building boom in California and the Nation, stimulating interest in the little-used Douglas-fir forests in the interiors of Sonoma-Mendocino, as well as other counties in the northern coast. A new industry, the Douglas-fir lumber industry, rapidly developed, and Douglas-fir production eventually exceeded redwood production. The Douglas-fir plywood industry also became established in Mendocino-Sonoma following World War II.

Log production in Mendocino and Sonoma Counties soared to alltime highs during the 1950's. Mendocino's log harvest was about 1 billion board feet yearly from 1954 through 1956. Sonoma's log harvest exceeded 200 million board feet for 5 of the 6 years from 1955 to 1960 (fig. 3).

Since the peak years — 1955 for Mendocino and 1959 for Sonoma — log harvests have dropped sharply due to depletion of available supplies of privately owned old-growth timber. Mendocino's sharpest declines in log production came in 1957 and 1959; by 1959 log harvest had plummeted nearly 40 percent from the mid-fifties' peak. And after a period of recovery in the early 1960's, Mendocino's log harvest declined again. In 1969 Mendocino's log harvest was 525 million board feet, 51 percent of the peak year harvest and about equal to the 1950 harvest. Sonoma's log harvest had by 1969 declined 70 percent, from 257 million board feet in 1959 to 78 million board feet.

The two counties differ greatly in their dependence on forest industries. Mendocino County's major and dominant industry is still the lumber and wood products industry, despite the decline in timber harvest and product output since the mid-1950's. In 1968, 35 percent of all reported employment was in



SOURCE: CALIFORNIA DIVISION OF FORESTRY (1948-71).

Figure 3. — Log production in Mendocino and Sonoma Counties, 1947-69.

lumber and wood products manufacture. Payrolls in this economic sector totaled over \$29 million or 47 percent of the county's total payrolls (California Department of Employment 1969). Mendocino's population in 1970 was unchanged from the 1960 level, reflecting the continued single industry orientation of the economy, and the cessation of growth in that industry.

Sonoma County's economy has outgrown dependence on any single industry. Even before lumbering declined at the turn of the century, agriculture had become increasingly important (fig. 4). Today Sonoma is the northern coast's leading agricultural county; its major products are from dairies, orchards, and vineyards. Within the last three decades, the character of Sonoma's economy has undergone a partial metamorphosis from rural agricultural to urban-suburban. The southern part of the county is within commuting distance of the Bay Area, and the broad expanses of level farmland offer easy opportunities for real estate development. Proximity to the Bay Area has made the county a prime

locale for light industry. In addition, Santa Rosa, the county seat, has developed as the major service center for the southern half of the northern coast. In the last decade, the county's economy has achieved a balance between agricultural, manufacturing, and service and trade activities, accompanied by a 39-percent increase in population.

The timberlands and farmlands that account for most of Sonoma County's area still contribute significantly to the economy. In 1968, agriculture accounted for 12 percent of reported employment, and food processing almost 6 percent. Lumber and wood products accounted for 6 percent of reported employment and 8 percent of all payrolls. As a result of the urbanization and economic ties to the Bay Area, the character of this county's forest industry is changing. Although manufacture of primary wood products has declined sharply in the last decade, increases in employment in secondary manufacture of wood products in millwork and prefabrication plants have offset the losses of employment in primary manufacturing.



*Figure 4. — Korbey vineyards on former timberlands along the Russian River, Sonoma County. The Korbey brothers, pioneer lumbermen on the Russian River, switched from lumber to grape and wine production after they logged their prime redwood timberlands a century ago.*

# THE FOREST RESOURCES



*Figure 5.—Old-growth redwood stand in Mendocino County. As the result of 120 years of logging, Mendocino-Sonoma's redwood stands over 100 years old total only 90,000 acres; almost half this acreage has been partially cut.*

Sonoma and Mendocino Counties have a combined land area of 3,255,000 acres, 70 percent of which is forested. Commercial forest land<sup>1</sup> totals 1,564,000 acres or 48 percent of the two-county area. Other forested land includes 9,000 acres of productive-reserved forests in State parks and 714,000 acres of unproductive forest land. The latter area is forested with chaparral or hardwoods of no commercial value; its major values are for watershed, livestock grazing, and wildlife habitat.

The commercial forests of Mendocino and Sonoma<sup>2</sup> Counties contain an estimated 19.1 billion board feet (International 1/4-inch rule) of sawtimber; 17.8 billion board feet or 93 percent of the volume is in softwood species and 1.3 billion board feet is in hardwood species. In terms of cubic feet of growing stock, the resource totals 4.3 billion cubic feet: 3.6 billion cubic feet or 85 percent in softwood species, and 661 million cubic feet in hardwood species.

## **Redwood is most extensive coniferous type**

The redwood forest type occupies 368,000 acres or 24 percent of the commercial forest land area of Mendocino-Sonoma (fig. 5). Most commercial scale timber harvesting operations occur in coniferous types. Although redwood occupies only a fourth of the total commer-

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<sup>1</sup>Definitions of terms used in this report are in "Definition of Terms."

<sup>2</sup>The two-county area will hereafter be referred to as Mendocino-Sonoma.

cial forest area, it accounts for half the area in coniferous types. Despite extensive cutting in the past, it is still the dominant conifer in these counties.

The redwood forests of this area are set apart from those of the counties to the north by a break in the natural redwood range in southern Humboldt County, a few miles north of the Mendocino County line. The type extends — unbroken — from the Mendocino-Humboldt County line for 100 miles to 1 mile north of the Russian River in Sonoma County. From the river, it extends about 10 miles farther south. The redwood type, though not tolerant of direct exposure to ocean winds (Roy 1966), is found within a mile of the ocean along much of the Mendocino-Sonoma coast.

This type extends inland less than 10 miles in northern Mendocino and is found as far as 20 miles inland near Willits in central Mendocino; in Sonoma the type occurs generally within 5 to 15 miles of the coast. Isolated stands are found in southeastern Sonoma County, 25 miles inland.

Although the redwood type is generally thought to consist of pure stands of redwood, such stands occur in relatively limited areas, on the moist alluvial flats of coastal streams and on the lower slopes and benches below 1,000 feet in elevation (Roy 1966). Most of the redwood forest type is composed of mixed stands in which redwood predominates. Douglas-fir, its most common conifer associate, is found throughout the redwood type range. Grand fir and western hemlock are also found in the redwood stands near the coast of Mendocino-Sonoma. Sugar pine is found in a very limited area in northwestern Sonoma County. Common hardwood associates are tanoak and madrone; other hardwood associates include California laurel, bigleaf maple, and red alder.

The redwood forest type contains 8.97 billion board feet (International 1/4-inch rule) of sawtimber — 47 percent of Mendocino-Sonoma's sawtimber volume and, of more significance, 59 percent of the sawtimber volume found in coniferous stands. The average sawtimber volume per acre in the redwood forest type is 24,400 board feet.

### **Redwood stands are mostly young**

It is not surprising that in recent efforts to establish more redwood parks, little attention has been focused on Mendocino-Sonoma's redwoods. Cutting on the original redwood stands in these counties has come almost full circle. Of the 368,000 acres in this type, 278,000 acres (75 percent) are stocked by stands under 100 years old. And of the 90,000 acres of redwoods over 100 years, almost half (42,000 acres) have been partially cut at some time in the past.

### **Douglas-fir type covers large area**

Douglas-fir is the predominant species on 281,000 acres or 18 percent of the Mendocino-Sonoma's commercial forest area. Douglas-fir accounts for 38 percent of the area of coniferous forests in the two counties. It intermingles with the redwood type through much of western Mendocino-Sonoma but is the predominant coniferous type at higher elevations and on the drier exposures. Douglas-fir stands in the interior are often found interspersed with noncommercial forest land and natural grasslands. They intermingle with ponderosa pine and white fir stands in the higher elevations of northeastern Mendocino County.

Common conifer associates of Douglas-fir in the Douglas-fir type include redwood in the western part of the two counties and ponderosa pine and white fir in eastern Mendocino County. Common hardwood associates include tanoak, madrone, California black oak, and canyon live oak.

The Douglas-fir type contains 4.98 billion board feet of sawtimber, 26 percent of the sawtimber volume in the two counties. Douglas-fir stands average only 17,700 board feet per acre, reflecting their young age structure; over three-fourths of the Douglas-fir stands are less than 100 years old.

### **Hardwood types cover almost half of Mendocino-Sonoma's commercial forest area**

Hardwood forests combined occupy 768,000 acres or 49 percent of Mendocino-

Sonoma's commercial forest area. Tanoak is the principal species on 418,000 acres; this forest type occupies more area than any other in the two-county area. Other hardwood types include Pacific madrone (100,000 acres), California black oak (63,000 acres), and Oregon white oak (61,000 acres).

The hardwood forests in Mendocino-Sonoma frequently contain substantial amounts of redwood, Douglas-fir, or pines — the conifer component depending on the location of the hardwood stand. Although the hardwoods are the more numerous species, there is usually more softwood sawtimber volume in the hardwood stands of Mendocino-Sonoma; three-fourths of the saw-

timber volume in the hardwood type is accounted for by conifers.

The average sawtimber volume per acre in the hardwood types — for both hardwood and softwood species — is about 5,000 board feet, of which 3,700 board feet per acre is in softwood species. Because of today's economics of utilization and available alternatives, most of the hardwood type area is not being logged. Although almost half of Mendocino-Sonoma's commercial forest area is composed of these types, they contain only 3.87 billion board feet (20 percent) of Mendocino's sawtimber. The tanoak type, the most prevalent of the hardwood types, contains 2.6 billion board feet of sawtimber.

#### **Capability of hardwood type area to support conifers offset by other factors**

The presence of conifers in most of the hardwood type area in these two counties is an indication of changes from conifer types to hardwoods that have taken place in the past. Most of the hardwood type area has supported predominantly coniferous forests at some time in the past. Ninety-seven percent (747,000 acres) of the hardwood type is on land capable of producing crops of coniferous species.

Some of the hardwoods have followed wild fires, which have periodically denuded large acreages throughout Mendocino-Sonoma. But much of the conversion from conifer to hardwood type is a result of man's activities. In the early days of logging, it was common practice to burn all remaining vegetation and slash after the trees were felled to facilitate removal of the logs. Thus, hardwoods often succeeded conifers — especially when repeated fires occurred in the cutover areas.

In recent years, much logging has been guided by "economic selection." The merchantable timber was felled and unmerchantable trees — often predominately hardwoods — were left. Even though coniferous seed trees have been left on logged lands as required by the California Forest Practices Act (State of California n.d.), the residual hardwoods, many of which sprout and are prolific seed producers, often rapidly dominate such areas (fig. 6).



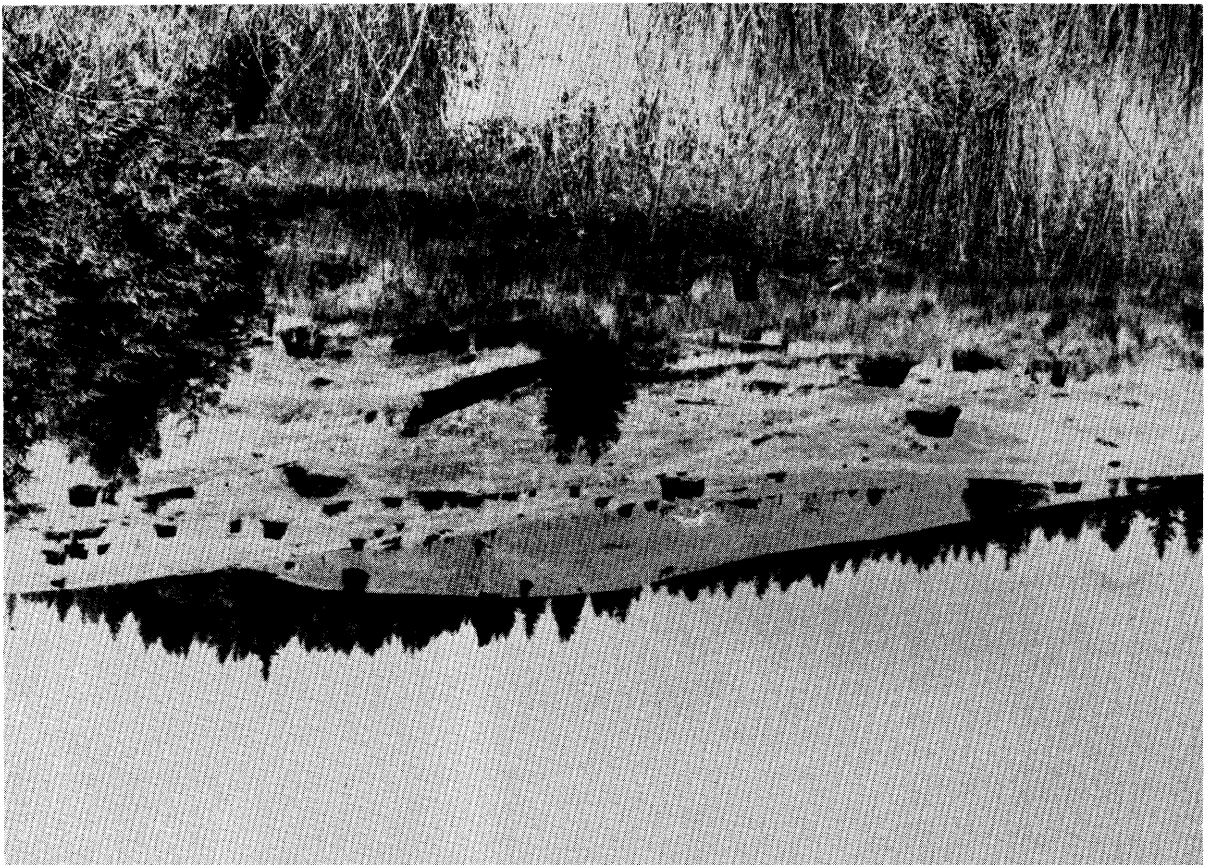
*Figure 6. — Hardwood stands, such as this tanoak, occupy 768,000 acres or 49 percent of the commercial forest land in Mendocino-Sonoma. Most of this area is capable of producing coniferous timber crops and has conifers scattered among the hardwoods.*

Attempted conversion of timberland for other uses, primarily grazing, has also contributed to the extensive hardwood acreage. Conversion of timberland for grazing and farming undoubtedly dates back to the earliest days of settlement and homesteading in Mendocino-Sonoma. Repeated fires or logging followed by repeated fires were techniques used. Many of the bona fide conversion attempts were successful, as evidenced by the many "stump ranches" visible on the Mendocino-Sonoma landscape (fig. 7). However, many conversion attempts have been unsuccessful in varying degrees. Although there are no records, studies of recent timberland conversion attempts indicate a high degree of failure.

Since 1946, timberland conversions have required filing of a timberland conversion affidavit with the California Division of Forestry. Since 1946, timberland conversions have required filing of a timberland conversion affidavit with the California Division of Forestry.

in accordance with the California Forest Practices Act of 1945. In an eight-county area of northwestern California that includes Mendocino-Sonoma, timberland conversion affidavits have been filed for 545,000 acres since 1946. Evidence that these conversions are many times unsuccessful is found in two unpublished surveys — conducted by the Division of Forestry — of timberlands for which conversion affidavits were filed. In the most recent study, 57 percent of the area of timberland conversions filed for in California between 1946 and 1960 was sampled in 1964. It was found that on timberland cutover under conversion affidavit, conversion to grassland was completed on only 17 percent of the area. Conversion was incomplete on 70 percent of the area and abandoned on 13 percent. Partially completed or abandoned conversions are certainly a significant factor con-

*Figure 7. — A successful conversion of timberland to grazing land in western Mendocino County. This area was converted to grassland by repeated fires following harvest of the redwoods. Redwood stump sprouts have persisted despite the repeated fires.*





*Figure 8. — Incomplete conversions of timberland to grazing land are a familiar sight on the Mendocino-Sonoma landscape. Such practices often result in the conversion of conifer timberlands to low value hardwoods.*

tributing to the large acreage of hardwood type found in Mendocino-Sonoma today (fig. 8).

#### **Mendocino-Sonoma's forests are predominately young growth**

Young-growth forests — under 100 years old — occupy 1,242,000 acres or 79 percent of the commercial forests of Mendocino and Sonoma Counties. Even-aged stands account for 735,000 acres or 59 percent of the young growth. The historical evolution of cutting and subsequent second growth establishment has created an uneven distribution of area and volume in these even-aged forests (fig. 9). The 80- to 100-year-old stands, which were formed in the most accessible areas in the early days of logging, total only 51,000 acres. There are 146,000 acres in stands 60 to 80 years old; 168,000 acres in stands 40 to 60

years old; and 82,000 acres in 20- to 40-year-old stands. Even-aged stands originating in the last 20 years total 288,000 acres, 39 percent of Mendocino-Sonoma's young even-age stands.

This uneven-age class distribution will probably be of little significance in constraining the timing of wood supply availability in Mendocino-Sonoma. Half of the area and three-fourths of the sawtimber volume in young even-aged stands are in stands 40 years and older — with most of the area and volume in the 40- to 80-year range. Similar volume and area distributions probably occur in the mixed-age young forests. Though the oldest and largest of the young timber is preferred by processors, an expanding young-growth economy will likely accept all ages of young sawtimber in the timber markets. This should make most timber over 40 years old mer-

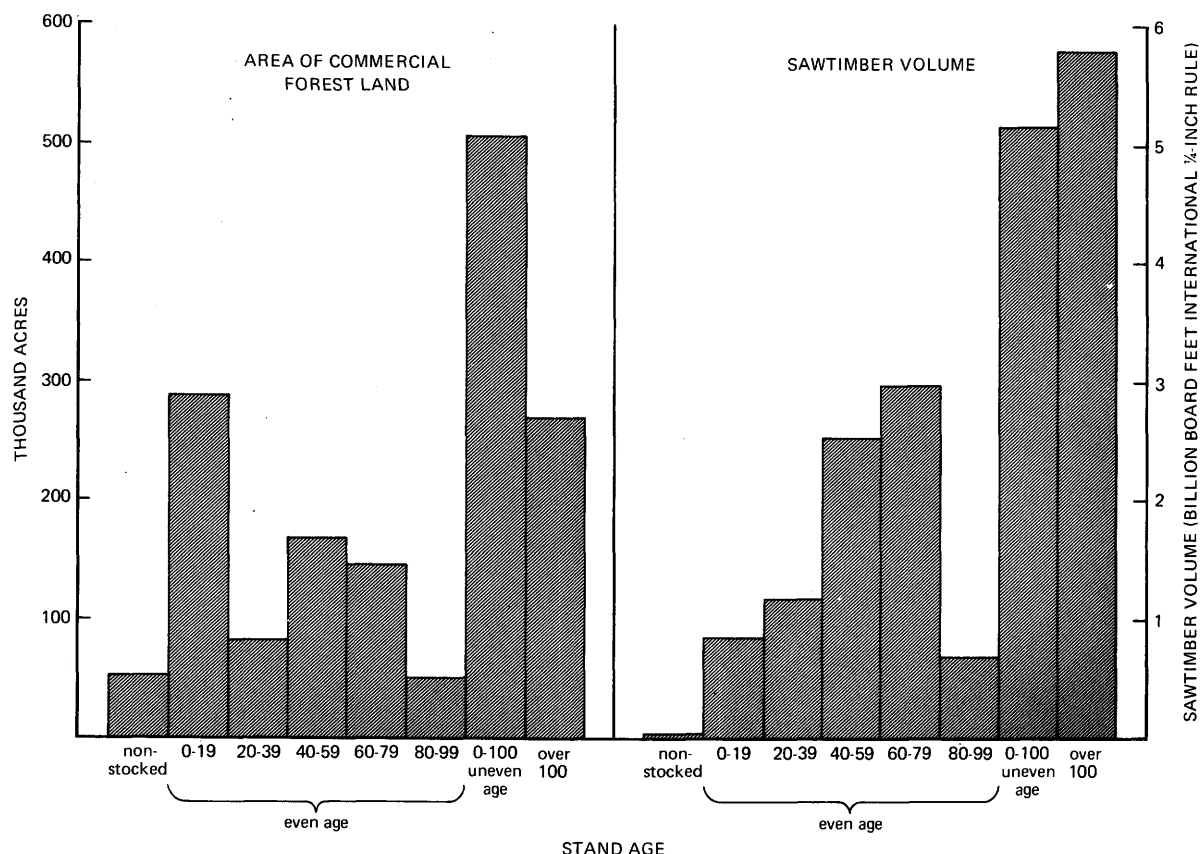


Figure 9. — Area of commercial forest land and sawtimber volume by age class.

chantable and minimize the significance of the seemingly unbalanced age class distribution in the area.

#### Most of timbered area is stocked with sawtimber

Mendocino-Sonoma's commercial forest land is stocked primarily with sawtimber stands. These stands account for 1,118,000 acres or 71 percent of the commercial forest area of the two counties. The remaining area has poletimber stands (56,000 acres), sapling and seedling stands (337,000 acres), and non-stocked conditions (53,000 acres).

The coniferous stands in Mendocino-Sonoma are mostly sawtimber stands. Of the 743,000 acres of coniferous type, 645,000 acres (87 percent) are stocked with sawtimber. Fully 90 percent of the important redwood type area has sawtimber size stands. The hardwood types are more evenly distributed among all size classes than are the

conifers; 62 percent of their area is sawtimber and 38 percent, poletimber, seedlings, and saplings. The hardwood types account for three-fourths of all poletimber and seedling and sapling stands in Mendocino-Sonoma. The concentration of stands of small tree sizes — especially seedlings and saplings — in the hardwood types is yet another indication of the magnitude of the hardwood intrusions onto cutover conifer lands.

Three-fourths of Mendocino-Sonoma's sawtimber area has stands less than 100 years old (fig. 10). This 853,000-acre area contains 12.3 billion board feet of sawtimber, almost two-thirds of the area's sawtimber volume. Average per-acre volume in these stands is about 14,400 board feet.

Old-growth sawtimber stands total 265,000 acres and contain 5.8 billion board feet of sawtimber. Much of the old-growth area has been partially cut in the past, resulting in lower stand volumes than might be ex-



*Figure 10. — Young-growth sawtimber stands occupy 853,000 acres of Mendocino-Sonoma's commercial forest area and account for almost two-thirds of the sawtimber volume in the two counties. This young redwood forest is near the coast in Mendocino County.*

pected. The average per-acre volume in these stands in Mendocino-Sonoma is 21,700 board feet.

**Redwood is most abundant species; Douglas-fir is second**

Mendocino-Sonoma's redwoods — more numerous than the ubiquitous tanoak — have a sawtimber volume of 9.6 billion board feet or 50 percent of the area's sawtimber volume. Although the redwood forests are predominately young growth, 83 percent of the redwood volume is in trees 19 inches and larger in diameter; 50 percent of the volume is in trees 29 inches and larger.

Douglas-fir sawtimber volume is 6.5 billion board feet, 34 percent of Mendocino-Sonoma's total sawtimber. Eighty-three percent of Douglas-fir volume is in trees over 19

inches and 54 percent is in trees 29 inches and larger. The remaining softwood species — true firs, ponderosa pine, and other conifers — total 1.8 billion board feet or 9 percent of the area's sawtimber. These species, which are relatively old and have not been extensively cut, have 60 percent of their sawtimber volume in trees over 29 inches in diameter.

The sawtimber volume for hardwood species is only 1.3 billion board feet. Tanoak accounts for almost half, with substantial quantities of Pacific madrone, California black oak, and canyon live oak.

Though the hardwoods account for only 7 percent of Mendocino-Sonoma's sawtimber volume, their share of cubic growing-stock volume is 661 million cubic feet, or 15 percent of the two-county total. The hardwoods do not grow as large as the conifers, and their

numbers and volume are more heavily concentrated in poletimber-size trees; 27 percent of all hardwood cubic volume is in poletimber trees, compared with only 5 percent for conifer species.

#### **Apparent change in commercial forest area is slight**

Mendocino and Sonoma Counties were first inventoried as part of the Forest Survey in 1948 (Baker and Poli 1951, 1952). These earlier inventories provided estimates only of area and ownership — no estimates were developed for inventory volumes or growth. Consequently, only area statistics can be compared.

The definition of commercial forest land has remained essentially unchanged. Although designs of the samples used to estimate commercial forest area have changed, impacts of these changes on the estimates are thought to be slight. The **apparent** decrease in commercial forest area in Mendocino-Sonoma between 1948 and 1968 is only 37,000 acres or about 2 percent of the 1948 base. Evidently the conversion of timberlands to other uses has had less impact than generally believed. This is due to the low success rate of timberland conversion to range and to the offsetting effect of volunteer reforestation of former grazing lands.

No direct comparison of forest type acreages can be made between the published data in the earlier reports and the estimates in this report. The earlier estimates were based upon economics-oriented type definitions that defined areas in terms of presence of valuable species (i.e., redwood), gave less weight to species of less value at that time (i.e., Douglas-fir), and did not consider species with

little or no economic value at that time (i.e., hardwoods). Nonstocked areas and areas stocked by hardwoods were classed as coniferous types, based on evaluation of potential to grow conifers. The economic classification, depending as it does on recognition of only the conifer component of the stand, is not sensitive to changes in the total stand. Current type definitions are biologic in nature — that is, classification of an area is based on what is growing on it in most abundance; no relative weights based on economic value are assigned. And the basic difference in sampling techniques — generalized cover type mapping in 1948 and point sampling in the recent inventories — further hinders direct comparisons.

In order to compare extent of forest types for the two inventory periods, it was necessary to recalculate forest types for both inventories on a common base. In terms of the earlier economics-oriented types, the distribution of commercial forest area among those types has remained unchanged in Mendocino-Sonoma over the last 20 years. In other words, if we had conducted the most recent inventory using the 1948 definitions, area by forest type in 1968 would have remained about the same.

Although the forest-type data for the earlier inventory could not be recast in the current type definitions to allow comparisons, study of the current inventory data — and field observation — indicates that in terms of biologic type, considerable changes have taken place in recent years. If we could state the type acreages of the earlier as well as present inventory in terms of a biologic type, we would find an increase in hardwood types at the expense of conifer type acreages.

# GROWTH AND MORTALITY

Net annual growth is  
499 million board feet

The net annual growth of sawtimber in Mendocino-Sonoma is 499 million board feet, International 1/4-inch rule, 2.6 percent of the sawtimber inventory. In comparison, net annual growth for all of California is about 1 percent of the State's sawtimber inventory. Mendocino-Sonoma's high rate of timber growth reflects the preponderance of young stands and good sites. The average growth per acre for all commercial forest land in the two-county area is 319 board feet.

Redwood is most  
important growth component

Net annual sawtimber growth in the redwood forest type is 280 million board feet, or 56 percent of all sawtimber growth in Mendocino-Sonoma. The annual growth per acre averages 761 board feet. Well-stocked young redwood stands on the best sites in these counties far exceed this average, with 2,000 to 2,800 board feet per acre reported. The redwood type exceeds all others in sawtimber growth and yields. Within its natural range, it should be the favored type if maximum wood production becomes a goal of forest management.

Sawtimber growth for the redwood species — regardless of type occurrence — is 298 million board feet, 60 percent of all sawtimber growth in Mendocino-Sonoma and two-thirds of all softwood sawtimber growth. The young-growth trees of this species — trees under 100 years of age — account for 270 million board feet or over 90 percent of all redwood sawtimber growth.

Douglas-fir forests, second in economic im-

portance only to redwood, account for over 93 million board feet or 19 percent of all sawtimber growth. The per-acre growth is not half that of redwood. Sawtimber growth for the Douglas-fir species is substantially higher than for the forest type, reflecting the widespread occurrence of this tree species in other forest types. Sawtimber growth for this species totals 131 million board feet, 26 percent of all sawtimber growth and 29 percent of softwood sawtimber growth. A considerable amount of the Douglas-fir growth is accruing on scattered trees within the hardwood type; much of this growth is not economically available due to low volume concentrations and may not become so for many years.

The hardwood types combined have sawtimber growth of 103 million board feet, 21 percent of the sawtimber growth for Mendocino-Sonoma. Much of the growth in these hardwood stands is on softwoods, primarily Douglas-fir. Seventy-two million board feet, or 70 percent of the sawtimber growth, and half of the growing-stock growth in these stands is accruing on softwood trees.

The following tabulation presents sawtimber growth by species on coniferous and on hardwood types. Numbers are in million board feet, International 1/4-inch rule:

|                  | Total      | Soft-<br>wood | Hard-<br>wood |
|------------------|------------|---------------|---------------|
| Coniferous types | 396        | 384           | 12            |
| Hardwood types   | <u>103</u> | <u>72</u>     | <u>31</u>     |
| All types        | 499        | 456           | 43            |

Growth as a percent of sawtimber inventory is about 2.7 percent in the hardwood type forests. But this statistic in itself is mis-

leading; the low inventory density of these stands results in an annual per-acre growth of only 134 board feet compared with an average per-acre growth of 533 board feet in the coniferous types.

The hardwood species, in contrast to the hardwood type, accounts for only 43 million board feet of sawtimber growth, less than 9 percent of the sawtimber growth in the two counties. However, over 20 percent of all growing-stock growth is accounted for by hardwood species, an indication of the large numbers of small hardwood trees.

#### **Mortality is light in Mendocino-Sonoma's young forests**

Average annual mortality for the 5-year period preceding the inventory was 49.4 million board feet — one-quarter of 1 percent of the sawtimber inventory. Growing-stock losses averaged 10 million cubic feet annually. Over 70 percent of the sawtimber mortality was in Douglas-fir. This species suffered losses in the early and mid-1960's from storms and insects; in addition, concentrations of old-growth Douglas-fir in some public ownerships have been susceptible to substantial losses from disease. Average annual mortality for Douglas-fir was 35 million board feet, about one-half of 1 percent of sawtimber inventory.

The true firs in Mendocino-Sonoma occur primarily in old stands. These old firs are sus-

ceptible to disease and other destructive agents; mortality averaged over 8 million board feet annually — a loss in excess of 1 percent of true fir sawtimber inventory. These species accounted for 17 percent of all sawtimber mortality.

Redwood, which is highly resistant to insects and disease, has sawtimber mortality of less than 1 million board feet annually, a negligible percentage of the redwood sawtimber inventory.

#### **Salvable dead sawtimber totals 134 million board feet**

Sound dead sawtimber in Mendocino-Sonoma totals 134 million board feet, over 80 percent of which is Douglas-fir. This material is salvable only in the sense that it would have value for conversion into wood products if it were sufficiently concentrated and conveniently located for economically feasible harvest. Most of this dead material is scattered throughout the timberlands of these two counties. Over two-thirds of it occurs in per-acre concentrations of less than 2,500 board feet. Generally, the only part of this sound dead sawtimber that is economically salvable consists of large concentrations that have resulted from fires, insects, or wind damage; or scattered trees that either can be harvested with green timber or are next to existing roads.

# CHARACTERISTICS OF TIMBER RESOURCE OWNERSHIP IN MENDOCINO AND SONOMA COUNTIES

## Public timberlands

The public forest lands of Mendocino-Sonoma are administered by four government agencies — three Federal and one State. Collectively they account for 206,000 acres of commercial forest land, 13 percent of the two-county total. This commercial forest acreage in public ownerships is 47,000 acres less than was reported for 1948. This decrease is due largely to the return of tax-deeded properties — lands deeded to the State due to tax delinquency — to the private tax rolls through public sale or redemption by prior owners.

The land administered by the U. S. Forest Service is within the Mendocino National Forest in the northeastern part of Mendocino County (fig. 11). Commercial forest area in this ownership totals 107,000 acres, about half the publicly owned commercial timberlands, but only 7 percent of all timberlands in the two-county area. Sawtimber volume on the National Forest land totals almost 2.3 billion board feet or 12 percent of the two-county total.

The commercial forests in the Mendocino National Forest differ from those of other owners in Mendocino-Sonoma. The forest lands are at higher elevations than those of other owners, some exceeding 6,000 feet. The forests are composed of a mixture of species — Douglas-fir, ponderosa pine, and white fir as major components and incense-cedar and sugar pine in lesser amounts.

Douglas-fir predominates on 45,000 acres, white fir on 28,000 acres, and ponderosa pine on 18,000 acres. Sawtimber volume is concen-

trated in four species: Douglas-fir (995 million board feet), true firs (585 million board feet), ponderosa pine (439 million board feet), and sugar pine (180 million board feet).

Ninety percent of the commercial forest area in the Mendocino National Forest is in sawtimber stands, and almost two-thirds of the forest area is occupied by stands over 100 years of age. These old-growth stands contain 1.9 billion board feet of sawtimber, one-third of the old-growth volume in the two-county area.

The average sawtimber volume per acre here is high — about 21,000 board feet (International 1/4-inch rule); 50 percent of the commercial forest area has stand volumes in excess of 20,000 board feet.

These old stands of timber are susceptible to the higher mortality associated with old age. Average annual mortality on National Forest land was 24 million board feet, almost half of the sawtimber mortality in the two-county area. The mortality — concentrated in Douglas-fir and true firs — averaged 223 board feet per acre. This high mortality and the slow growth of these old stands yield a net annual growth of only 2.8 million board feet, an average of only 26 board feet per acre on National Forest timberlands.

The other publicly owned commercial forest lands in Mendocino-Sonoma are managed by one State and two Federal agencies.

State lands are concentrated in Jackson State Forest, which extends inland from the central Mendocino coast near Fort Bragg. This block of timberland, acquired by the State from industry in 1947, is well stocked with mature young stands of redwood. It is

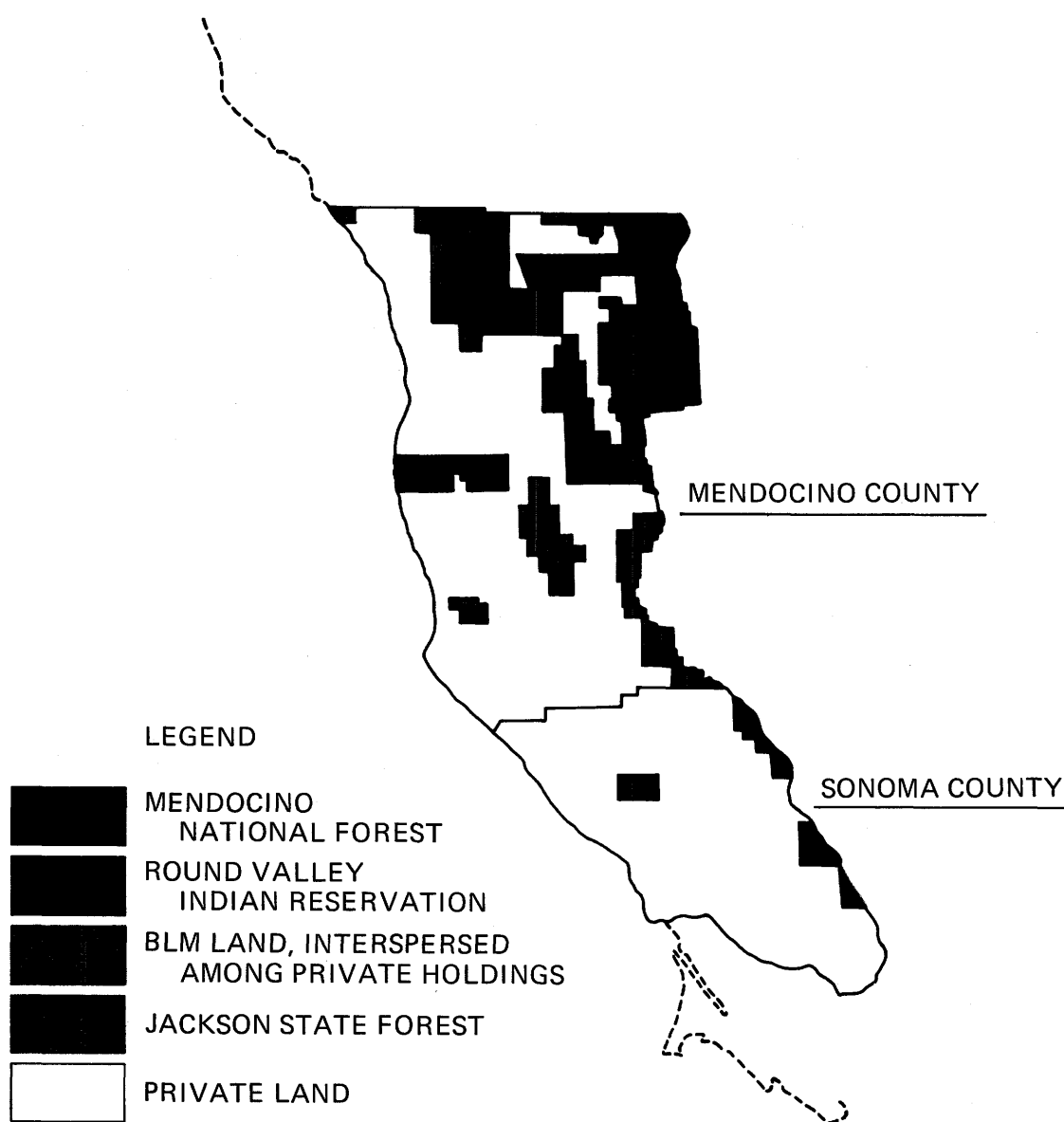


Figure 11. — Land ownership pattern in Mendocino and Sonoma Counties.

managed as a demonstration forest for the production of timber.

The other Federal lands are administered by the Bureau of Land Management (BLM) and Bureau of Indian Affairs (BIA). The BLM forest lands are scattered through much of the eastern half of Mendocino County. The Indian trust forest lands — administered by the BIA — are in the Round Mountain Indian Reservation in northeastern Mendocino County. The forest lands administered by these two Federal agencies in Mendocino-Sonoma are relatively low in productivity. They are stocked with hardwoods and relatively light concentrations of Douglas-fir and ponderosa pine.

The “other public” ownerships — State,

BLM, and BIA — have a total of 99,000 acres of commercial forest land in Mendocino-Sonoma, of which 28,000 acres are redwood type and 9,000, Douglas-fir type. The remainder of the area is occupied by hardwoods, primarily tanoak. These ownerships contain 1.65 billion board feet of sawtimber, 9 percent of the two-county total. Over 1 billion board feet of the sawtimber volume is redwood; most of the remainder is Douglas-fir.

All the acreage in these “other public” ownerships is in young stands, 80 percent of which are sawtimber size. Net annual growth — which totals 50 million board feet — averages over 500 board feet per acre. Seventy percent of this sawtimber growth occurs in

the young stands of redwoods found on State lands. Mortality is negligible, averaging only 4 board feet per acre annually.

### Forest industry timberlands

Forest industries own 529,000 acres of commercial forest land, one-third of the two-county total. Although much of this has been held by the forest industries for many years, forest industry ownership of commercial forest land in the past 20 years has increased 35 percent. This increase is largely from ranch holdings that contained substantial tracts of timber. Although the period of expansion of industrial landholdings was largely coincident with the postwar development of the Douglas-fir lumber and plywood industries in Mendocino-Sonoma and north coastal California, industry has continued to acquire available timberlands to this date.

The timberlands owned by forest industry today reflect the long history of cutting in Mendocino-Sonoma—concentrated on the redwood holdings of industry until recent years. Seventy-six percent of the area has forests under 100 years of age. And two-thirds of the 386,000 acres of sawtimber are young stands.

The industry-owned forests have 7.1 billion board feet of sawtimber, 37 percent of the two-county total. The young-growth forests account for almost two-thirds of industry's sawtimber volume. Though old-growth sawtimber stands occupy a smaller area and contain less volume than the young stands in this ownership, the 2.6 billion board feet of old-growth sawtimber in these stands represents almost half of such volume in Mendocino-Sonoma and two-thirds of the old-growth sawtimber in private ownership in these two counties. Considering industry's current preference for old-growth timber, this volume is of considerable importance for the near-term supply of raw material for Mendocino-Sonoma mills.

This ownership has essentially two conifer types—redwood and Douglas-fir. The redwood type, most abundant and important in this ownership, occurs on 171,000 acres. Sawtimber volume in this type totals 4.1 billion

board feet, 58 percent of the sawtimber volume in industry ownership. Douglas-fir is predominant on 98,000 acres of industry land, with a volume of 1.3 billion board feet, 18 percent of industry's sawtimber.

The hardwood type is the most prevalent type in industry ownership—as it is for Mendocino-Sonoma as a whole. Hardwoods dominate the stocking on 247,000 acres of industry's commercial forest area. Of the 1.7 billion board feet of sawtimber on these hardwood lands, well over 1 billion board feet is softwood species—mostly Douglas-fir. But the volume concentrations per acre in this type are low, as they are for hardwood stands of all ownerships (fig. 12).

Sawtimber growth on forest industry land totals 174 million board feet, about one-third of the sawtimber growth in Mendocino-Sonoma. Sawtimber growth in this ownership is concentrated in redwood (101 million board feet) and Douglas-fir (55 million board feet). Growth is about 2.5 percent of inventory for both species. This growth rate for redwood is substantially lower than the

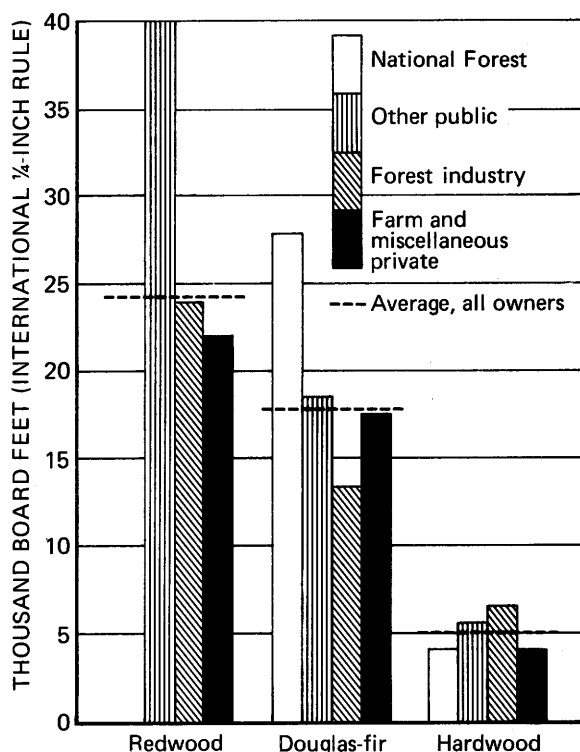


Figure 12.—Average sawtimber volume per acre by forest type and ownership.

3.1-percent rate that characterizes the species for all ownerships; it reflects the substantial balance of slowly growing old growth still existing in this ownership in both residual and uncut stands.

Mortality is negligible — averaging only 22 board feet per acre annually. The low mortality can be attributed to the nature of industry's holdings — predominately redwood. Almost all losses were in Douglas-fir.

#### **Farmer and miscellaneous private timberlands**

The farmer and miscellaneous private ownership category is a grouping of many types of owners in terms of intent of owner, type of use made of the timber resources, size of parcel, and many other criteria. This owner group includes ranches of many thousands of acres, tiny farms, and large and small tracts of land held by individuals and corporations — for speculation, development, or recreation. Many are absentee owners, and much of the area has changed hands several times in the last decade.

This potpourri of owners accounts for 829,000 acres of commercial forest land in Mendocino-Sonoma, 53 percent of timberland acreage in the two counties. Comparison with estimates for 1948 yields an apparent decrease of 127,000 acres over the 20-year period. This acreage loss has resulted primarily from acquisition of farm timberlands by industry. Successful conversion of timberlands to nonforest uses (mostly grazing) was evidently of minor consequence in timberland loss in the last 20 years.

The impacts of the extensive logging and unsuccessful timberland conversion in the last two or three decades are reflected by the timberlands in this conglomerate ownership. Five percent of the area is nonstocked; 28 percent is stocked with seedlings and saplings or pole-timber; and 58 percent is stocked with young sawtimber stands. Only 72,000 acres of old-growth sawtimber stands remain.

The timberlands contain 8.1 billion board feet of sawtimber, 6.9 billion board feet of which is in young-growth forests. Over half of all young sawtimber volume in Mendocino-Sonoma Counties is in this ownership.

Redwood forest type is the most extensive conifer type in this ownership; it covers 169,000 acres, about the same acreage as owned by industry. These predominantly young stands average 22,100 board feet per acre. Sawtimber volume totals 3.7 billion board feet, almost half of the volume in this ownership.

The Douglas-fir type accounts for 129,000 acres or 16 percent of the timberland controlled by farmers and miscellaneous private owners. These also are mostly young stands, many of which have been partially cut in recent years; they average 17,500 board feet per acre. Sawtimber totals about 2.3 billion board feet or 28 percent of the sawtimber volume in this owner group.

Hardwood types occur on 445,000 acres or 54 percent of all commercial forest land in this ownership. The extent of the hardwood types is due to several factors. The acreage of these owners lies generally to the east of the industry-owned lands, at higher elevation, and is of lower average productivity. These areas in their natural state had larger hardwood components than was true for industry lands. And hardwood succession after cutting presents a greater problem than is the case for the stands on better sites and at lower elevations. Land conversion attempts, which in recent years have been largely unsuccessful and resulted in hardwood succession, have been concentrated on farmer-owned lands. The sawtimber volume in the hardwood type averages only 4,000 board feet per acre, most occurring in conifer species within the hardwood stands.

The distribution of volume by species within this owner group is not what volume distribution by type would indicate. Both Douglas-fir and redwood, as species, account for more volume (about 20 percent) than do their respective types (fig. 13). For both redwood and Douglas-fir, most of the difference between species and forest type volumes is accounted for by the conifer component in the hardwood forest type.

The large acreage of young stands in farmer and miscellaneous private ownerships is reflected in the high net annual growth. Net sawtimber growth is 272 million board feet,

over 54 percent of all sawtimber growth in the two counties. Redwood accounts for 162 million board feet of growth, Douglas-fir growth is 29 million board feet, and hardwood growth is 24 million board feet. The redwood type accounts for 142 million feet of net growth. Growth in this type averages 840 board feet per acre; as a percentage of

redwood type inventory, it is an impressive 3.8 percent.

Mortality in the predominantly young stands of this ownership group is negligible, reflecting both the age structures of the stands and the concentration of volume in redwood.

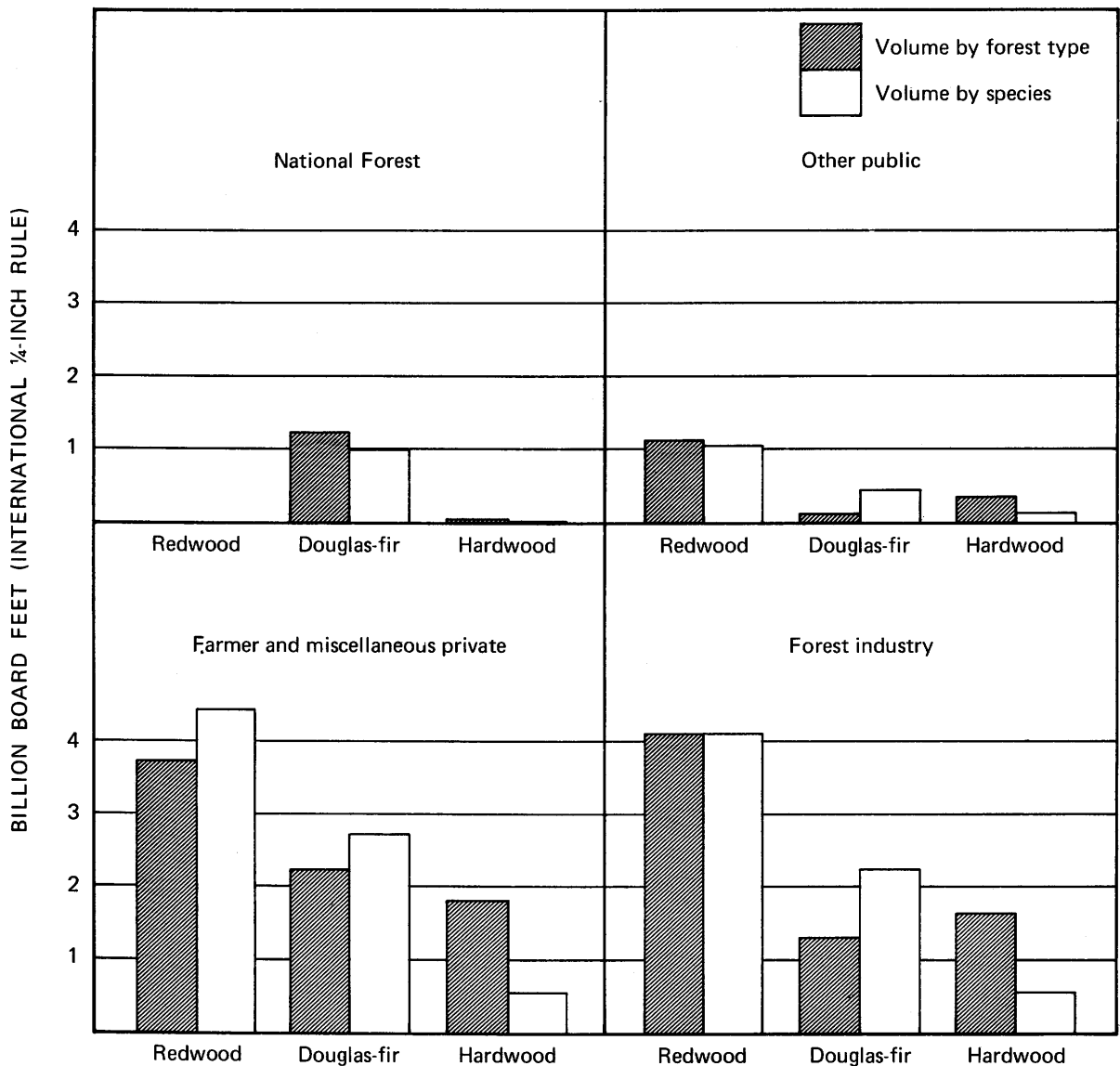


Figure 13. — Sawtimber volume by species, forest type, and ownership.

# THE COUNTIES AS RESOURCE UNITS

This report has dealt with Mendocino and Sonoma Counties as one resource unit—in part through necessity,<sup>3</sup> but primarily because the timber industries and the resources of the two counties should logically be grouped. The timber resources of northwestern Sonoma County are the southernmost extensions of the timberlands that extend the length of the northern coastal counties—Del Norte, Humboldt, Mendocino, and Sonoma. And the mills of the two counties exhibit interdependency for raw material. In 1968, almost 12 million board feet of logs moved from Mendocino forests to Sonoma mills for processing (Barrette, Gedney, and Oswald 1970), and chips for board manufacture moved from some of the Sonoma mills to the hardboard plant in Mendocino County.

Following is a brief discussion of some timber resource characteristics that are associated with the individual counties.

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<sup>3</sup>The sampling intensity used on the relatively small forest area of Sonoma County would result in unacceptably large sampling errors for some of the county statistics.

Recognizing that some users of Forest Survey data will need information for individual counties, we have included county data in the tables where possible. Included are county estimates of commercial forest area by ownership, forest type, and stand size; volume of growing stock and sawtimber by species, forest type, and ownership; net annual growth of sawtimber and growing stock by species and forest type; average annual mortality by species; and volume of salvable dead sawtimber by species. "Reliability of Current Inventory Data" should be consulted to ascertain the size of the sampling errors associated with these—and all other—estimates presented in this report.

## Mendocino County

Mendocino County's 2,245,000-acre area is mostly forested; 1,304,000 acres or 58 percent is unreserved commercial forest land. This amounts to 83 percent of the two-county commercial forest area total.

Not surprisingly, Mendocino also accounts for most of the sawtimber and growing-stock volume in the two-county area. The commercial forest lands in this county contain 15.9 billion board feet of sawtimber; growing-stock volume totals 3.6 billion cubic feet.

Mendocino's timber resources can be characterized as predominantly young sawtimber. Sawtimber stands occupy 931,000 acres, or 71 percent of Mendocino's commercial forest area. Over three-fourths of these stands are under 100 years of age, and sawtimber volumes are low; almost a million acres have less than 10,000 board feet per acre, and only 85,000 acres have 20,000 board feet or more.

Mendocino has a "hardwood problem," as do other counties in northern coastal California. Hardwood types dominate 671,000 acres, 51 percent of Mendocino's commercial forest area. Redwood, the major conifer, occurs as principal species on 295,000 acres; Douglas-fir type covers 227,000 acres.

The redwood species totals 7.4 billion board feet in inventory volume; second in importance is Douglas-fir, with 5.6 billion board feet. Redwood also accounts for most of Mendocino's 410 million board feet of sawtimber growth, with 226 million board feet or 55 percent. Douglas-fir growth totals 119 million board feet, or 29 percent of this total.

The commercial forests of Mendocino

County are distributed among both private and public ownerships. Mendocino County has essentially all the publicly owned commercial forest area and timber in the two-county area. The 205,000-acre area of public forests — 16 percent of Mendocino's commercial forest area — contains 3.9 billion board feet of sawtimber, 24 percent of Mendocino's total. Sawtimber growth on public lands — 53 million board feet — is only 13 percent of Mendocino's total. The high sawtimber inventory and low growth in the public ownerships reflect the substantial balance of old-growth timber on National Forest lands.

Forest industries make up the most important ownership group in Mendocino County. This group of wood-processing firms owns 469,000 acres of commercial forest land, 36 percent of the county's total. Because the industrial owners control most of the remaining old growth, they account for 6.7 billion board feet or 42 percent of all sawtimber in Mendocino County. Sawtimber growth totals 167 million board feet.

The acreage of industry-owned forest lands in Mendocino County has grown in recent years, primarily through acquisitions from farm owners. Other changes have also occurred within this owner group. Large integrated forest industrial corporations have acquired timber resources and processing facilities in Mendocino County. Since 1968, Georgia-Pacific has acquired timberlands and sawmills of several companies in this county. And in 1968, Boise Cascade acquired the extensive timber holdings and large processing facilities of Union Lumber Company, the oldest and largest redwood firm in the county and one of the largest in northern coastal California. Longview Fibre has also acquired timberlands in Mendocino. Boise Cascade is adding a particleboard plant to its sawmill and plywood facilities. Masonite Corporation was the first national forest products company to locate in Mendocino, shortly after World War II. These large corporations now control most of the timber resources in industrial ownership in Mendocino; the era of the large, locally controlled "redwood company" here has ended.

The farmer and miscellaneous private own-

ership group owns 630,000 acres or 48 percent of Mendocino's commercial forest land. Farmers own half of this, the largest owner group. The farmer and miscellaneous private timberlands, stocked predominantly with young stands and hardwood types, contain 5.3 billion board feet or one-third of Mendocino's sawtimber. This ownership group, as was mentioned earlier, is diverse in every respect. The many owners — residents and absentees, farmers, recreationists, and speculators — have diverse reasons for owning timberlands. The management and ownership objectives of this group, unlike those of the public and industry owner groups, cannot be clearly defined. The timing and magnitudes of timber yields from these lands cannot be foreseen with any degree of confidence (fig. 14). But this largest owner group is very important to Mendocino County, for the resource basic to timber production — the land — is concentrated within it. And the young-growth timber inventory and timber growth — ingredients of industry's future — are most abundant. Here seem to reside the problems and the potentials of Mendocino's future.

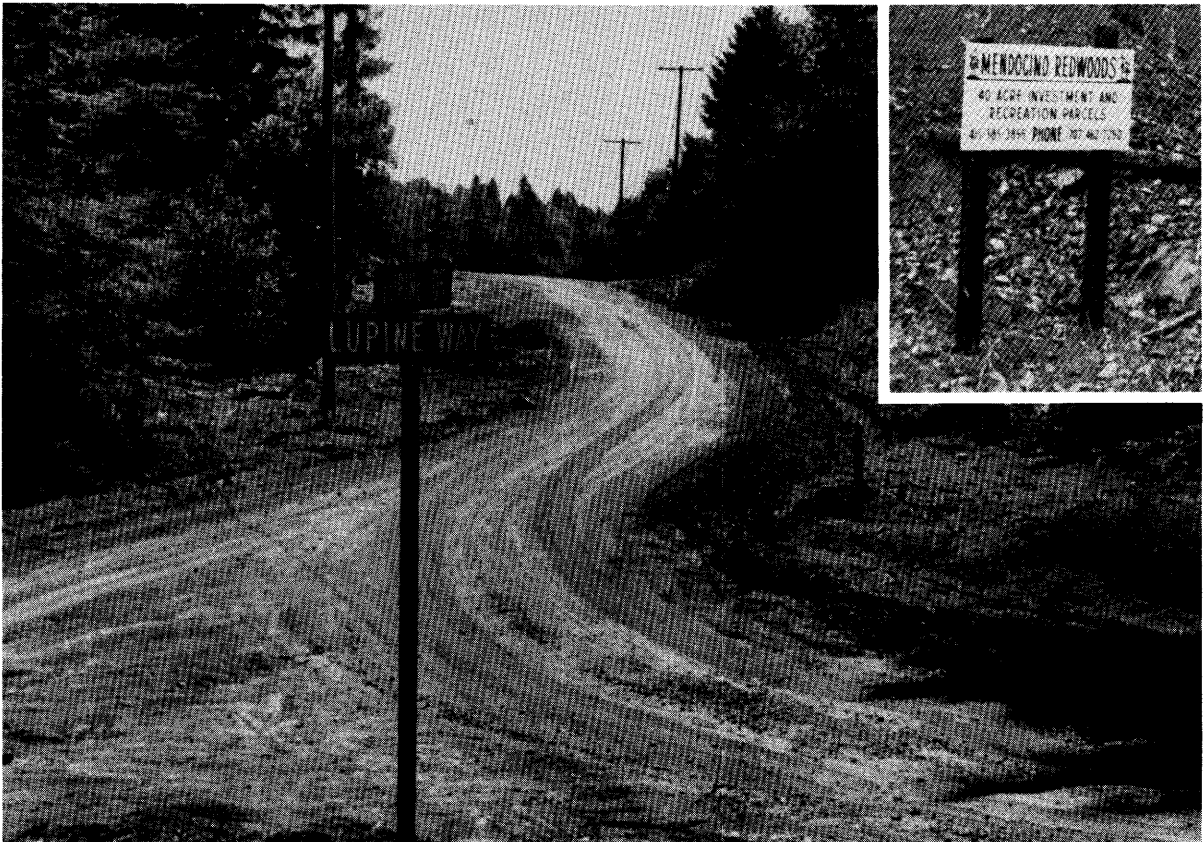
### Sonoma County

Sonoma County's land area is 1,010,000 acres. Commercial forest area totals 260,000 acres or 26 percent of the total land area. Sonoma's commercial forests contain over 3.2 billion board feet of sawtimber; growing stock totals 691 million cubic feet.

About 85 percent of Sonoma's forests are less than 100 years old. And these young forests account for over two-thirds of the county's sawtimber volume.

Half of Sonoma's timberlands are stocked with conifers; redwood type accounts for 73,000 acres and Douglas-fir, 53,000 acres. The hardwood type occurs on 97,000 acres, most of which is capable of supporting conifers. Nonstocked areas in this county total 32,000 acres or 13 percent of the commercial forest area.

Redwood is this county's most abundant timber species. Redwood sawtimber totals 2.2 billion board feet; growth in this species is 73 million board feet, 81 percent of Sonoma's 89 million board feet of sawtimber growth.



*Figure 14. — Mendocino County, though more distant from the San Francisco area than Sonoma County, has received considerable attention from developers in recent years. Recreational subdivisions remove land from the commercial forest land base, even if no homes are built. Small parcel sales (inset) fragment larger ownerships and — though the land remains in the commercial forest land base — future timber yields will likely be diminished.*

Douglas-fir sawtimber totals 893 million board feet; growth in this species is less than 13 million board feet or 14 percent of Sonoma's total. It is interesting to note that even though redwood dominates in inventory, growth, and area, in 1968 this species supplied only 37 percent of the logs consumed by resident industries.

The ownership pattern in Sonoma County is unlike that in Mendocino County. Public timberlands are practically nonexistent here, totaling less than 1,000 acres. The dominant ownership group is farmer and miscellaneous private with 199,000 acres or 77 percent of the commercial forest land; almost two-thirds of this is owned by farmers (fig. 15). The volume is heavily concentrated on the farmer and miscellaneous private lands, which contain 2.8 billion board feet or 88 percent of

Sonoma's sawtimber. Growth is also aggregated in this owner group, to an even greater degree than is area or volume; growth in this owner group totals 82 million board feet, 92 percent of Sonoma County's sawtimber growth.

It is apparent that Sonoma County's forest industries must look to farmer and miscellaneous private timber owners for their present as well as future log supplies. In 1968 over two-thirds of the logs consumed by Sonoma industries came from this owner group.

For this county, the future of the timber economy is uncertain. The current timberland ownership pattern gives few clues as to the intentions of owners regarding timber production. Some industry lands have been sold off in 40-acre parcels in recent years, further complicating the determination of owner's in-



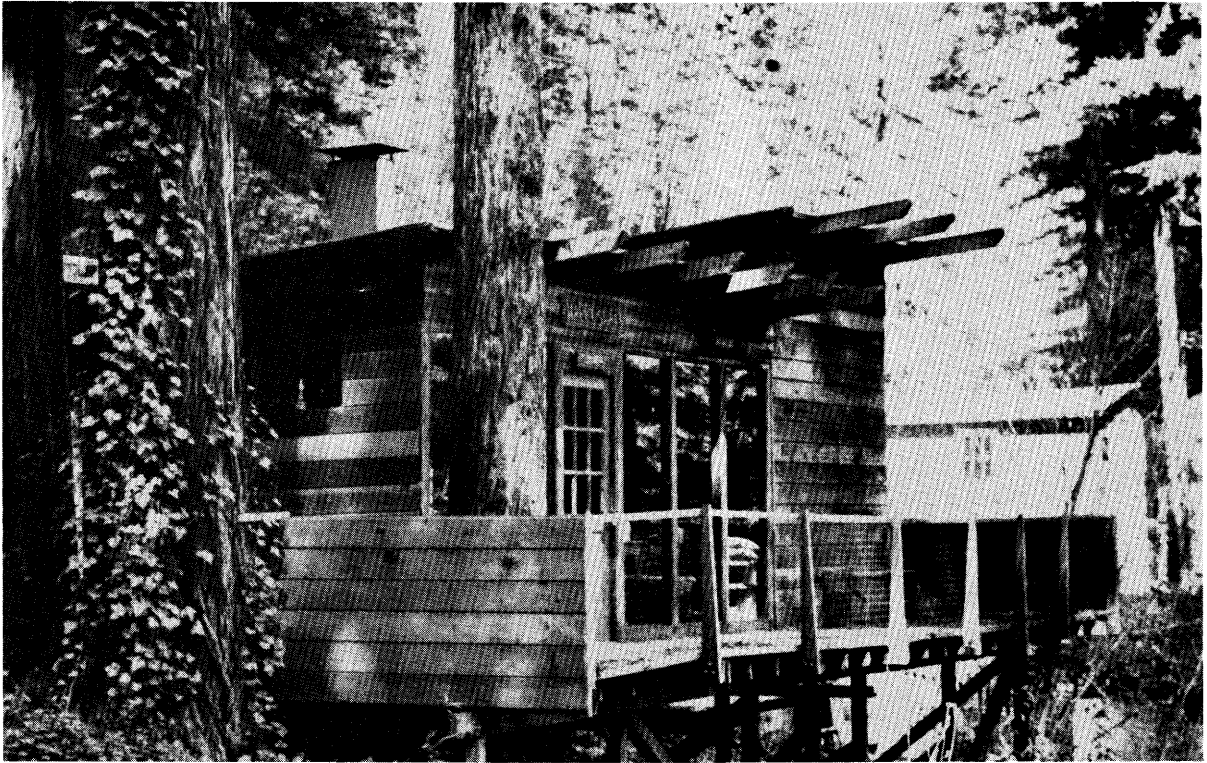
*Figure 15. — This mosaic of forests, range, and orchards is a familiar sight on the farm ownerships in Sonoma County. The future of Sonoma County's primary forest products industries depends on continued yields from the forest lands of small private owners.*

tentions. And Sonoma's timberlands are within a 1- to 2-hour drive of the 4.5 million people who reside around San Francisco Bay. The attractiveness of Sonoma's timberlands for recreation is apparent and is enhanced by the Russian River as well as the rugged Sonoma coast and Sonoma's redwoods.

Recreational subdivision of Sonoma's timberlands dates back at least to 1895, when Meeker (Bauer 1951) advertised his cutover timberlands south of the Russian River for summer home development (fig. 16). Today

almost all the timbered area adjoining the Russian River and its major tributaries are recreational properties (fig. 17). These developments have taken much of the most productive forest land out of production. And now, recreational second home developments are appearing on the county's north coast.

The ownership pattern in this county, its attractiveness for recreation, and its location near the Bay Area are strong indications that further trade of timber production for recreational use will be forthcoming.



*Figure 16. — Weekend retreat at Camp Meeker in Sonoma County. Land sales in this second home subdivision commenced in 1895 after lumberman Meeker had cut the old redwoods. These 75-year-old redwoods — and many more like them — are not likely to contribute raw material for Sonoma's forest industries.*



*Figure 17. — The Russian River is a major weekend and summer retreat for residents of the Bay Area. In addition to swimming and boating in the summer months, this stream provides winter recreation for many steelhead fishermen. Summer cabins, resorts, and homes of full-time residents are found throughout the young redwood forests along the river.*

# THE RESOURCE AND DEPENDENT INDUSTRIES

Mendocino-Sonoma had 33 operating sawmills in 1968 (Barrette, Gedney, and Oswald 1970). Their combined productive capacity per 8-hour shift was almost 2.5 million board feet. Over 20 percent of the sawmilling capacity was in medium- to large-sized mills — mills with capacity exceeding 80,000 board feet per 8-hour shift. Rounding out the primary processing facilities engaged in wood products manufacture in 1968 were two softwood plywood plants and a hardboard plant. The latter operates on residues from sawmills and plywood plants.

## Mendocino-Sonoma timber resource supplies resident industries

The log consumption by Mendocino-Sonoma sawmills and plywood plants totaled 633 million board feet in 1968, while timber harvested in the two counties totaled 619 million board feet.

Log shipments to and from these counties were not substantial. Movements from the counties were limited to: 10 million board feet of logs from Sonoma and Mendocino to Bay Area export docks, 4 million board feet of Mendocino logs to Humboldt County, and 10 million board feet of Mendocino logs to Glenn and Tehama Counties. Logs coming into the two counties included 31 million board feet from Humboldt County, 5 million board feet from Lake County, and 2 million from several other counties. Mendocino-Sonoma can certainly be characterized as self-sustaining in terms of resource supply for its forest industries.

## Cut is concentrated in old-growth timber

Though the forests in Mendocino-Sonoma are predominantly young growth, 61 percent of the logs consumed by forest industries in these two counties came from old-growth

trees. At first glance, this might seem to be an imbalance in resource use. However, it must be recognized that there still exists 5.8 billion board feet of timber in old-growth stands within the two counties. This old growth occurs in higher per-acre concentrations than younger timber, and industry is generally better equipped to process large old timber than small young timber. Industry owns 45 percent of the existing old-growth sawtimber, making such raw material readily available.

At 1968 harvest levels, the remaining privately owned old-growth softwood sawtimber could last 10 years, provided most of the old sawtimber residuals become economically available. Old-growth sawtimber from the Mendocino National Forest will be available — under current cutting trends — for many years to come.

## Cut-growth comparisons

Cut-growth comparisons cannot properly be used to evaluate cutting impacts in old stands that are realizing little or no net growth. Nor should they be used in evaluation of cutting activities in a combined resource of both old and young stands. In old-growth stands, timber harvest activities are often planned to remove the old timber reserves at a rate that will create a manageable second forest with desired age structure. For land managers who are also plant operators, the old-growth removal rate must provide adequate raw material to the plant operation for a period of time until the oldest young growth is merchantable.

The continued availability of young-growth sawtimber is often equated with growth. That is, a young forest can indefinitely support a cut equal to its annual growth. While this concept is generally applied to so-called fully regulated forests — forests that have the desired stand structure and age class distribution — it is also useful in

evaluating use of less than fully regulated forests, such as the composite of young forests in Mendocino-Sonoma. In such forests, comparison of cut and growth indicates whether inventories are increasing or decreasing.

#### **Growth exceeds cut in young sawtimber stands**

Mendocino-Sonoma industries depended on young growth for 247 million board feet or 39 percent of their logs in 1968. Softwood growth in young stands totaled about 410 million board feet in 1968, considerably more than was cut from these stands. The excess of growth over cut in the young stands — if this level of cutting continues — will allow the inventory in young stands to increase; growth will also increase.

However, one question that should be raised is: "How much of this growth will actually be available for harvest eventually?" Considerable growth accrues on lands owned by persons who might have no intention of selling timber. However, intent of ownership was not gaged in this survey, and in the past it has been a transitory factor, often changing with the owner. Considerable growth occurs on softwoods scattered throughout the hundreds of thousands of acres occupied by hardwoods. For the most part, this volume is not economically usable due to the low concentrations. How much might eventually become available is problematical. If one assumes that all this growth is unavailable, over 70 million board feet of growth should be discounted. Given this assumption, the "available" growth in young conifers is about 340 million board feet annually; this reduced growth still exceeds substantially the 1968 young-growth consumption by resident industries and would allow inventory and growth increases at 1968 cutting levels.

#### **Douglas-fir is still major species used by resident industries**

The shift in species use in Mendocino-Sonoma that occurred after World War II is still evident today. Prior to the war, 80 to 90 percent of the raw material used for wood products in the two counties was redwood; by 1946, redwood and Douglas-fir were equally cut. By 1956, Douglas-fir made up 55 percent

of the cut, compared with 41 percent for redwood; this difference was less by 1968 — 49 percent compared with 44 percent. In 1968, Mendocino-Sonoma industries used 311 million board feet of Douglas-fir and 275 million board feet of redwood. Forty-six million board feet of other softwoods and 1.5 million board feet of hardwoods rounded out the 1968 consumption.

#### **Decline in Douglas-fir harvest will continue**

Following its peak in the mid-1950's, Douglas-fir harvest in Mendocino-Sonoma declined to less than half by 1968. The following analysis indicates that further decline in the harvest of this species will occur in the near future. The harvest in 1968 was almost 5 percent of the standing inventory. And since the cut exceeded the 131-million-board-foot growth in this species by almost 140 percent, continued cutting at 1968 levels will continue to substantially reduce the Douglas-fir inventory. Since the Douglas-fir harvest is largely still dependent on old-growth timber, continued reduction of inventory is to be expected. However, at current cutting levels, old-growth Douglas-fir on private lands will be exhausted in less than a decade. When this happens, if the cut falls to the level of growth, it appears that substantial dislocations in Mendocino-Sonoma's Douglas-fir processing industries will be imminent. The questionable availability of much of the Douglas-fir growth occurring in hardwood stands does not brighten the prospects for future availability.

#### **Redwood harvest can be maintained**

Redwood harvest, like that of Douglas-fir, has declined substantially — to a little more than half of the 1956 level. But the 1968 harvest level for this species can be maintained — and likely increased — in the future. The cutting rate for redwood is less than 3 percent of the inventory — and slightly less than the growth rate. Although the current cut is still more than half old growth, a shift of all cutting to young growth could be maintained by the 270 million board feet of growth now occurring in young redwood stands. The cutting of old-growth redwood will likely continue

for another 10 to 15 years; if total redwood harvest remains stable at the 1968 level, inventory and annual growth in young stands will increase, and these stands will be able to sustain — on a cut equals growth basis — a larger cut than the total redwood harvest for 1968.

#### **Most logs came from industry lands**

In 1968, 55 percent of the logs used by resident industries in Mendocino-Sonoma came from industry lands. Farmer and miscellaneous private lands provided 30 percent, and the remainder were from public lands. Since industry owns only 37 percent of the sawtimber in the two counties, a first appraisal might be that the cut is disproportionately heavy. However, industry accounts for 45 percent of the old-growth sawtimber volume in the two counties — and over two-thirds of the privately held old growth. And since the cut is still concentrated in old growth, it follows that it would therefore concentrate in the ownership that accounts for such timber.

When the harvest shifts more to young growth in the near future, the percentage contribution of industry lands to total harvest may well decline. This is likely because industry currently accounts for only about one-third of the young-growth inventory and the sawtimber growth in Mendocino-Sonoma.

#### **Farmer and miscellaneous private lands should be increasingly important**

Farmer and miscellaneous private timberlands account for more area, inventory, and growth than any other owner group in Mendocino-Sonoma. In 1968, about 190 million board feet, or 30 percent of the total, was cut from these lands. This owner group is in a position — from the resource availability standpoint — to increase its future contribution to the Mendocino-Sonoma harvest. Almost all of this land has young stands and, as the harvest shifts to young growth, it will likely shift to this ownership, which currently accounts for over half of Mendocino-Sonoma's young sawtimber inventory and 54 percent of sawtimber growth. Currently, sawtimber growth exceeds cut on farmer and miscellane-

ous private lands by about 80 million board feet, and inventory and growth on these lands are increasing.

#### **The outlook for forest industries**

For Mendocino-Sonoma, much of the painful process of adjusting to declining harvest due to old-growth depletion has passed. It seems likely that soon — perhaps within 10 to 15 years — the timber harvest in Mendocino-Sonoma will have shifted from old-growth stands to young-growth stands; that redwood will once again become the largest component of timber harvest; and that the farmer and miscellaneous private ownerships will become more important suppliers of logs, as they were in the Douglas-fir boom of the 1950's.

What will Mendocino-Sonoma's future timber harvest level be? If it is assumed that the timber harvest will remain at current levels for the next decade, and if that cut is concentrated in old-growth timber, inventory and growth in young stands will increase to a level at which an annual cut of about 500 million board feet will be sustainable on the basis of conifer growth. This is about 80 percent of recent harvest levels.

However, given the reality of economically unavailable softwoods in hardwood stands and the prospect of conversion of timberland to other uses, a sustainable cut of 500 million board feet may be unobtainable.

Conversely, timber yields on Mendocino-Sonoma's timberlands can be increased through intensified timber management practices such as planting, precommercial and commercial thinning, and converting hardwood stands to conifer species. The characteristics of many of the individual owners in the farmer and miscellaneous private group — small parcels, short tenure, and nontimber-production goals — make investment in such practices very unlikely for much of the area in this largest ownership group. Consequently, a substantial part of Mendocino-Sonoma's timberlands cannot be counted on to produce timber at nearly their potential. Increased yields through intensified management practices, if they are to occur, will likely be on those public and forest industry lands for which timber production is the primary long-term goal.

Table 1. — Area by land class and county, Mendocino and Sonoma Counties, California, January 1, 1968

(In thousand acres)

| Land class              | All counties | Mendocino | Sonoma |
|-------------------------|--------------|-----------|--------|
| Forest:                 |              |           |        |
| Commercial              | 1,564        | 1,304     | 260    |
| Productive reserved     | 9            | 6         | 3      |
| Unproductive            | 714          | 469       | 245    |
| Total                   | 2,287        | 1,779     | 508    |
| Nonforest <sup>1</sup>  | 968          | 466       | 502    |
| Total area <sup>2</sup> | 3,255        | 2,245     | 1,010  |

<sup>1</sup> Includes swampland, cropland, pasture and range, industrial and urban areas, other nonforest land, and 25,000 acres classed as water by Forest Survey standards, but defined by the Bureau of the Census as land.

<sup>2</sup> Source: U.S. Bureau of the Census, Land and Water Area of the United States, 1960, revised 1965.

Table 2. — Area of commercial forest land, by ownership class and county, Mendocino and Sonoma Counties, California, January 1, 1968

(In thousand acres)

| Ownership class            | All counties | Mendocino | Sonoma           |
|----------------------------|--------------|-----------|------------------|
| National Forest            | 107          | 107       | ---              |
| Other public: <sup>1</sup> |              |           |                  |
| Bureau of Land Management  | 45           | 44        | 1                |
| Indian                     | 13           | 13        | ---              |
| State                      | 41           | 41        | ( <sup>2</sup> ) |
| Total other public         | 99           | 98        | 1                |
| Private:                   |              |           |                  |
| Forest industry            | 529          | 469       | 60               |
| Farmer-owned               | 438          | 314       | 124              |
| Miscellaneous private      | 391          | 316       | 75               |
| Total private              | 1,358        | 1,099     | 259              |
| All classes                | 1,564        | 1,304     | 260              |

<sup>1</sup> Estimates of commercial forest land in specific ownerships are derived by sampling methods. Consequently, they may not agree with the official estimates of the individual agencies.

<sup>2</sup> Less than 500 acres.

*Table 3. — Area of commercial forest land, by stand-size, age, and ownership classes, Mendocino and Sonoma Counties, California, January 1, 1968*

*(In thousand acres)*

| Stand-size class            | All<br>ownerships | National<br>Forest | Other<br>public | Forest<br>industry | Farmer and<br>miscellaneous<br>private |
|-----------------------------|-------------------|--------------------|-----------------|--------------------|----------------------------------------|
| Sawtimber stands:           |                   |                    |                 |                    |                                        |
| Old growth                  | 265               | 68                 | ---             | 125                | 72                                     |
| Young growth                | 853               | 28                 | 80              | 261                | 484                                    |
| Total                       | 1,118             | 96                 | 80              | 386                | 556                                    |
| Poletimber stands           | 56                | 4                  | 5               | 5                  | 42                                     |
| Sapling and seedling stands | 337               | 5                  | 14              | 129                | 189                                    |
| Nonstocked areas            | 53                | 2                  | ---             | 9                  | 42                                     |
| All classes                 | 1,564             | 107                | 99              | 529                | 829                                    |

Table 4. — Area of commercial forest land, by county, stand-size, age, and ownership classes, Mendocino and Sonoma Counties, California, January 1, 1968

(In thousand acres)

| Stand-size class            | All<br>ownerships | National<br>Forest | Other<br>public  | Forest<br>industry | Farmer and<br>miscellaneous<br>private |
|-----------------------------|-------------------|--------------------|------------------|--------------------|----------------------------------------|
| MENDOCINO                   |                   |                    |                  |                    |                                        |
| Sawtimber stands:           |                   |                    |                  |                    |                                        |
| Old growth                  | 229               | 68                 | ---              | 119                | 42                                     |
| Young growth                | 702               | 28                 | 79               | 231                | 364                                    |
| Total                       | 931               | 96                 | 79               | 350                | 406                                    |
| Poletimber stands           | 56                | 4                  | 5                | 5                  | 42                                     |
| Sapling and seedling stands | 296               | 5                  | 14               | 114                | 163                                    |
| Nonstocked areas            | 21                | 2                  | ---              | ---                | 19                                     |
| All classes                 | 1,304             | 107                | 98               | 469                | 630                                    |
| SONOMA                      |                   |                    |                  |                    |                                        |
| Sawtimber stands:           |                   |                    |                  |                    |                                        |
| Old growth                  | 36                | ---                | ---              | 6                  | 30                                     |
| Young growth                | 151               | ---                | 1                | 30                 | 120                                    |
| Total                       | 187               | ---                | 1                | 36                 | 150                                    |
| Poletimber stands           | ---               | ---                | ---              | ---                | ---                                    |
| Sapling and seedling stands | 41                | ---                | ( <sup>1</sup> ) | 15                 | 26                                     |
| Nonstocked areas            | 32                | ---                | ---              | 9                  | 23                                     |
| All classes                 | 260               | ---                | 1                | 60                 | 199                                    |

<sup>1</sup> Less than 500 acres.

Table 5. — Area of commercial forest land, by stand-size and ownership classes, Mendocino and Sonoma Counties, California, January 1, 1968

(In thousand acres)

| Stand-size class               | All<br>ownerships | National<br>Forest | Other<br>public | Forest<br>industry | Farmer and<br>miscellaneous<br>private |
|--------------------------------|-------------------|--------------------|-----------------|--------------------|----------------------------------------|
| Sawtimber stands: <sup>1</sup> |                   |                    |                 |                    |                                        |
| 21.0 inches and larger         | 654               | 66                 | 48              | 247                | 293                                    |
| 11.0-20.9 inches               | 464               | 30                 | 32              | 139                | 263                                    |
| Total                          | 1,118             | 96                 | 80              | 386                | 556                                    |
| Poletimber stands              | 56                | 4                  | 5               | 5                  | 42                                     |
| Sapling and seedling stands    | 337               | 5                  | 14              | 129                | 189                                    |
| Nonstocked areas               | 53                | 2                  | ---             | 9                  | 42                                     |
| All classes                    | 1,564             | 107                | 99              | 529                | 829                                    |

<sup>1</sup> Mean stand diameter.

Table 6. — Area of commercial forest land, by stand volume and ownership class, Mendocino and Sonoma Counties, California, January 1, 1968

(In thousand acres)

| Stand volume <sup>1</sup> | All<br>ownerships | National<br>Forest | Other<br>public | Forest<br>industry | Farmer and<br>miscellaneous<br>private |
|---------------------------|-------------------|--------------------|-----------------|--------------------|----------------------------------------|
| Less than 1,500           | 281               | 8                  | 11              | 65                 | 197                                    |
| 1,500 to 4,999            | 347               | 18                 | 10              | 107                | 212                                    |
| 5,000 to 9,999            | 355               | 14                 | 46              | 126                | 169                                    |
| 10,000 to 19,999          | 236               | 13                 | 5               | 104                | 114                                    |
| 20,000 to 29,999          | 166               | 19                 | 9               | 61                 | 77                                     |
| 30,000 to 39,999          | 78                | 16                 | ---             | 27                 | 35                                     |
| 40,000 to 49,999          | 46                | 11                 | ---             | 24                 | 11                                     |
| 50,000 or more            | 55                | 8                  | 18              | 15                 | 14                                     |
| All classes               | 1,564             | 107                | 99              | 529                | 829                                    |

<sup>1</sup> Net volume, board feet per acre, International 1/4-inch rule.

Table 7. — Area of commercial forest land, by cubic-foot site and ownership classes, Mendocino and Sonoma Counties, California, January 1, 1968

(In thousand acres)

| Site class <sup>1</sup><br>(cubic feet) | All<br>ownerships | National<br>Forest | Other<br>public | Forest<br>industry | Farmer and<br>miscellaneous<br>private |
|-----------------------------------------|-------------------|--------------------|-----------------|--------------------|----------------------------------------|
| 225 or more                             | 167               | 1                  | 13              | 66                 | 87                                     |
| 165 to 224                              | 183               | 5                  | 11              | 75                 | 92                                     |
| 120 to 164                              | 349               | 25                 | 23              | 135                | 166                                    |
| 85 to 119                               | 361               | 35                 | 9               | 123                | 194                                    |
| 50 to 84                                | 492               | 34                 | 43              | 130                | 285                                    |
| 20 to 49                                | 12                | 7                  | ---             | ---                | 5                                      |
| All classes                             | 1,564             | 107                | 99              | 529                | 829                                    |

<sup>1</sup> A classification in terms of capacity for cubic-foot annual growth per acre at culmination of mean annual growth in fully stocked stands.

Table 8. — Area of commercial forest land, by stocking class of growing-stock trees and by ownership group, Mendocino and Sonoma Counties, California, January 1, 1968

(In thousand acres)

| Stocking class                         | All ownerships | Public | Private |
|----------------------------------------|----------------|--------|---------|
| Overstocked<br>(133 percent or more)   | 61             | 9      | 52      |
| Fully stocked<br>(100 to 132 percent)  | 410            | 55     | 355     |
| Medium stocked<br>(60 to 99 percent)   | 501            | 100    | 401     |
| Poorly stocked<br>(16.7 to 59 percent) | 539            | 40     | 499     |
| Nonstocked<br>(less than 16.7 percent) | 53             | 2      | 51      |
| All classes                            | 1,564          | 206    | 1,358   |

Table 9. — Area of commercial forest land, by forest type and ownership class, Mendocino and Sonoma Counties, California, January 1, 1968

(In thousand acres)

| Forest type          | All<br>ownerships | National<br>Forest | Other<br>public | Forest<br>industry | Farmer and<br>miscellaneous<br>private |
|----------------------|-------------------|--------------------|-----------------|--------------------|----------------------------------------|
| Douglas-fir          | 281               | 45                 | 9               | 98                 | 129                                    |
| Redwood              | 368               | ---                | 28              | 171                | 169                                    |
| True firs            | 33                | 28                 | ---             | ---                | 5                                      |
| Ponderosa pine       | 27                | 18                 | ---             | 4                  | 5                                      |
| Bishop pine          | 24                | ---                | ---             | ---                | 24                                     |
| Lodgepole pine       | 5                 | ---                | ---             | ---                | 5                                      |
| Incense-cedar        | 5                 | ---                | ---             | ---                | 5                                      |
| Red alder            | 9                 | ---                | ---             | 5                  | 4                                      |
| California black oak | 63                | 10                 | 7               | ---                | 46                                     |
| Oregon white oak     | 61                | 1                  | ---             | 19                 | 41                                     |
| Pacific madrone      | 100               | ---                | 6               | 24                 | 70                                     |
| Tanoak               | 418               | ---                | 32              | 180                | 206                                    |
| Other hardwoods      | 117               | 3                  | 17              | 19                 | 78                                     |
| Nonstocked           | 53                | 2                  | ---             | 9                  | 42                                     |
| All types            | 1,564             | 107                | 99              | 529                | 829                                    |

Table 10. — Area of commercial forest land, by forest type and ownership class, Mendocino County, California, January 1, 1968

(In thousand acres)

| Forest type          | All<br>ownerships | National<br>Forest | Other<br>public | Forest<br>industry | Farmer and<br>miscellaneous<br>private |
|----------------------|-------------------|--------------------|-----------------|--------------------|----------------------------------------|
| Douglas-fir          | 228               | 45                 | 8               | 93                 | 82                                     |
| Redwood              | 295               | ---                | 28              | 160                | 107                                    |
| True firs            | 33                | 28                 | ---             | ---                | 5                                      |
| Ponderosa pine       | 27                | 18                 | ---             | 4                  | 5                                      |
| Bishop pine          | 19                | ---                | ---             | ---                | 19                                     |
| Lodgepole pine       | 5                 | ---                | ---             | ---                | 5                                      |
| Incense-cedar        | 5                 | ---                | ---             | ---                | 5                                      |
| Red alder            | 9                 | ---                | ---             | 5                  | 4                                      |
| California black oak | 58                | 10                 | 7               | ---                | 41                                     |
| Oregon white oak     | 50                | 1                  | ---             | 13                 | 36                                     |
| Pacific madrone      | 90                | ---                | 6               | 19                 | 65                                     |
| Tanoak               | 374               | ---                | 32              | 156                | 186                                    |
| Other hardwoods      | 90                | 3                  | 17              | 19                 | 51                                     |
| Nonstocked           | 21                | 2                  | ---             | ---                | 19                                     |
| All types            | 1,304             | 107                | 98              | 469                | 630                                    |

Table 11. — Area of commercial forest land, by forest type and ownership class, Sonoma County, California, January 1, 1968

(In thousand acres)

| Forest type          | All<br>ownerships | National<br>Forest | Other<br>public  | Forest<br>industry | Farmer and<br>miscellaneous<br>private |
|----------------------|-------------------|--------------------|------------------|--------------------|----------------------------------------|
| Douglas-fir          | 53                | ---                | 1                | 5                  | 47                                     |
| Redwood              | 73                | ---                | ( <sup>1</sup> ) | 11                 | 62                                     |
| True firs            | ---               | ---                | ---              | ---                | ---                                    |
| Ponderosa pine       | ---               | ---                | ---              | ---                | ---                                    |
| Bishop pine          | 5                 | ---                | ---              | ---                | 5                                      |
| Lodgepole pine       | ---               | ---                | ---              | ---                | ---                                    |
| Incense-cedar        | ---               | ---                | ---              | ---                | ---                                    |
| Red alder            | ---               | ---                | ---              | ---                | ---                                    |
| California black oak | 5                 | ---                | ---              | ---                | 5                                      |
| Oregon white oak     | 11                | ---                | ---              | 6                  | 5                                      |
| Pacific madrone      | 10                | ---                | ---              | 5                  | 5                                      |
| Tanoak               | 44                | ---                | ---              | 24                 | 20                                     |
| Other hardwoods      | 27                | ---                | ---              | ---                | 27                                     |
| Nonstocked           | 32                | ---                | ---              | 9                  | 23                                     |
| All types            | 260               | ---                | 1                | 60                 | 199                                    |

<sup>1</sup> Less than 500 acres.

Table 12. — Area of commercial forest land by forest type, stand-size class, and ownership, Mendocino and Sonoma Counties, California, January 1, 1968

(In thousand acres)

| Forest type and stand-size class | All ownerships | National Forest | Other public | Forest industry | Farmer and miscellaneous private |
|----------------------------------|----------------|-----------------|--------------|-----------------|----------------------------------|
| Douglas-fir:                     |                |                 |              |                 |                                  |
| Sawtimber                        | 244            | 45              | 9            | 66              | 124                              |
| Poletimber                       | ---            | ---             | ---          | ---             | ---                              |
| Seedling & sapling               | 37             | ---             | ---          | 32              | 5                                |
| Redwood:                         |                |                 |              |                 |                                  |
| Sawtimber                        | 330            | ---             | 28           | 147             | 155                              |
| Poletimber                       | ---            | ---             | ---          | ---             | ---                              |
| Seedling & sapling               | 38             | ---             | ---          | 24              | 14                               |
| True firs:                       |                |                 |              |                 |                                  |
| Sawtimber                        | 26             | 26              | ---          | ---             | ---                              |
| Poletimber                       | 7              | 2               | ---          | ---             | 5                                |
| Seedling & sapling               | ---            | ---             | ---          | ---             | ---                              |
| Ponderosa pine:                  |                |                 |              |                 |                                  |
| Sawtimber                        | 16             | 16              | ---          | ---             | ---                              |
| Poletimber                       | 2              | 2               | ---          | ---             | ---                              |
| Seedling & sapling               | 9              | ---             | ---          | 4               | 5                                |
| Bishop pine:                     |                |                 |              |                 |                                  |
| Sawtimber                        | 24             | ---             | ---          | ---             | 24                               |
| Poletimber                       | ---            | ---             | ---          | ---             | ---                              |
| Seedling & sapling               | ---            | ---             | ---          | ---             | ---                              |
| Lodgepole pine:                  |                |                 |              |                 |                                  |
| Sawtimber                        | 5              | ---             | ---          | ---             | 5                                |
| Poletimber                       | ---            | ---             | ---          | ---             | ---                              |
| Seedling & sapling               | ---            | ---             | ---          | ---             | ---                              |
| Incense-cedar:                   |                |                 |              |                 |                                  |
| Sawtimber                        | ---            | ---             | ---          | ---             | ---                              |
| Poletimber                       | ---            | ---             | ---          | ---             | ---                              |
| Seedling & sapling               | 5              | ---             | ---          | ---             | 5                                |
| Hardwoods:                       |                |                 |              |                 |                                  |
| Sawtimber                        | 473            | 9               | 43           | 174             | 247                              |
| Poletimber                       | 47             | ---             | 5            | 4               | 38                               |
| Seedling & sapling               | 248            | 5               | 14           | 69              | 160                              |
| Nonstocked                       | 53             | 2               | ---          | 9               | 42                               |
| All types:                       |                |                 |              |                 |                                  |
| Sawtimber                        | 1,118          | 96              | 80           | 387             | 555                              |
| Poletimber                       | 56             | 4               | 5            | 4               | 43                               |
| Seedling & sapling               | 337            | 5               | 14           | 129             | 189                              |
| Nonstocked                       | 53             | 2               | ---          | 9               | 42                               |
| Total                            | 1,564          | 107             | 99           | 529             | 829                              |

Table 13. — Area of commercial forest land and volume of growing stock and sawtimber<sup>1</sup> by stand age and ownership classes, Mendocino and Sonoma Counties, California, January 1, 1968

| Stand age class<br>(years)     | All ownerships    |                          |                          | National Forest   |                          |                          | Other public      |                          |                          | Forest industry   |                          |                          | Farmer and<br>miscellaneous private |                          |                          |
|--------------------------------|-------------------|--------------------------|--------------------------|-------------------|--------------------------|--------------------------|-------------------|--------------------------|--------------------------|-------------------|--------------------------|--------------------------|-------------------------------------|--------------------------|--------------------------|
|                                | Area              | Growing<br>stock         | Sawtimber                | Area              | Growing<br>stock         | Sawtimber                | Area              | Growing<br>stock         | Sawtimber                | Area              | Growing<br>stock         | Sawtimber                | Area                                | Growing<br>stock         | Sawtimber                |
|                                | Thousand<br>acres | Million<br>cubic<br>feet | Million<br>board<br>feet | Thousand<br>acres | Million<br>cubic<br>feet | Million<br>board<br>feet | Thousand<br>acres | Million<br>cubic<br>feet | Million<br>board<br>feet | Thousand<br>acres | Million<br>cubic<br>feet | Million<br>board<br>feet | Thousand<br>acres                   | Million<br>cubic<br>feet | Million<br>board<br>feet |
| Nonstocked                     | 53                | 7                        | 24                       | 2                 | ( <sup>2</sup> )         | ---                      | ---               | ---                      | ---                      | 9                 | 1                        | ---                      | 42                                  | 6                        | 24                       |
| 0 - 9                          | 210               | 151                      | 579                      | ---               | ---                      | ---                      | 15                | 21                       | 79                       | 78                | 66                       | 268                      | 117                                 | 64                       | 232                      |
| 10 - 19                        | 78                | 70                       | 257                      | ---               | ---                      | ---                      | 4                 | 2                        | 7                        | 37                | 50                       | 199                      | 37                                  | 18                       | 51                       |
| 20 - 29                        | 27                | 30                       | 94                       | ---               | ---                      | ---                      | ---               | ---                      | ---                      | 4                 | 7                        | 18                       | 23                                  | 23                       | 76                       |
| 30 - 39                        | 55                | 259                      | 1,080                    | ---               | ---                      | ---                      | 9                 | 103                      | 504                      | 18                | 72                       | 266                      | 28                                  | 84                       | 310                      |
| 40 - 49                        | 69                | 260                      | 1,132                    | 1                 | 1                        | 1                        | ---               | ---                      | ---                      | 20                | 89                       | 408                      | 48                                  | 170                      | 723                      |
| 50 - 59                        | 99                | 335                      | 1,374                    | 3                 | 1                        | 3                        | 5                 | 30                       | 135                      | 24                | 99                       | 377                      | 67                                  | 205                      | 859                      |
| 60 - 69                        | 81                | 369                      | 1,669                    | 3                 | 2                        | 8                        | ---               | ---                      | ---                      | 18                | 148                      | 690                      | 60                                  | 219                      | 971                      |
| 70 - 79                        | 65                | 278                      | 1,320                    | 3                 | 4                        | 13                       | 14                | 61                       | 305                      | 14                | 45                       | 192                      | 34                                  | 168                      | 810                      |
| 80 - 89                        | 35                | 119                      | 603                      | 1                 | 5                        | 22                       | 11                | 51                       | 263                      | ---               | ---                      | ---                      | 23                                  | 63                       | 318                      |
| 90 - 99                        | 16                | 23                       | 71                       | ---               | ---                      | ---                      | 11                | 19                       | 67                       | ---               | ---                      | ---                      | 5                                   | 4                        | 4                        |
| 100 - 119                      | 19                | 76                       | 375                      | ---               | ---                      | ---                      | ---               | ---                      | ---                      | 5                 | 21                       | 98                       | 14                                  | 55                       | 277                      |
| 120 - 139                      | 10                | 9                        | 47                       | ---               | ---                      | ---                      | ---               | ---                      | ---                      | ---               | ---                      | ---                      | 10                                  | 9                        | 47                       |
| 140 - 159                      | 5                 | 15                       | 60                       | ---               | ---                      | ---                      | ---               | ---                      | ---                      | 5                 | 15                       | 60                       | ---                                 | ---                      | ---                      |
| 160 - 179                      | 10                | 35                       | 154                      | ---               | ---                      | ---                      | ---               | ---                      | ---                      | 5                 | 26                       | 115                      | 5                                   | 9                        | 39                       |
| 180 - 199                      | ---               | ---                      | ---                      | ---               | ---                      | ---                      | ---               | ---                      | ---                      | ---               | ---                      | ---                      | ---                                 | ---                      | ---                      |
| 200 and over                   | 90                | 491                      | 2,637                    | 40                | 202                      | 1,227                    | ---               | ---                      | ---                      | 44                | 274                      | 1,319                    | 6                                   | 15                       | 91                       |
| Uneven-aged under<br>100 years | 507               | 1,234                    | 5,157                    | 26                | 67                       | 322                      | 30                | 73                       | 288                      | 178               | 491                      | 2,054                    | 273                                 | 603                      | 2,493                    |
| Uneven-aged over<br>100 years  | 135               | 525                      | 2,504                    | 28                | 119                      | 661                      | ---               | ---                      | ---                      | 70                | 229                      | 1,023                    | 37                                  | 177                      | 820                      |
| All classes                    | 1,564             | 4,286                    | 19,137                   | 107               | 401                      | 2,257                    | 99                | 360                      | 1,648                    | 529               | 1,633                    | 7,087                    | 829                                 | 1,892                    | 8,145                    |

<sup>1</sup> International 1/4-inch rule.

<sup>2</sup> Less than 500,000 cubic feet.

Table 14. — Area of noncommercial forest land, by forest type, Mendocino and Sonoma Counties, California, January 1, 1968

(In thousand acres)

| Forest type     | All noncommercial areas | Productive-reserved areas | Unproductive areas |
|-----------------|-------------------------|---------------------------|--------------------|
| Douglas-fir     | 17                      | 4                         | 13                 |
| Redwood         | 8                       | 3                         | 5                  |
| Pines           | 2                       | 1                         | 1                  |
| True firs       | 5                       | ---                       | 5                  |
| Oak-madrone     | 387                     | ---                       | 387                |
| Other hardwoods | 53                      | 1                         | 52                 |
| Chaparral       | 251                     | ---                       | 251                |
| All types       | 723                     | 9                         | 714                |

Table 15. — Number of growing-stock trees on commercial forest land, by diameter and ownership classes, Mendocino and Sonoma Counties, California, January 1, 1968

(Thousands of trees)

| Diameter class (inches at breast height) | All ownerships | National Forest | Other public | Forest industry | Farmer and miscellaneous private |
|------------------------------------------|----------------|-----------------|--------------|-----------------|----------------------------------|
| 5.0 - 6.9                                | 41,667         | 1,812           | 3,847        | 14,115          | 21,893                           |
| 7.0 - 8.9                                | 28,725         | 1,177           | 1,395        | 12,365          | 13,788                           |
| 9.0 - 10.9                               | 19,961         | 1,348           | 1,279        | 7,813           | 9,521                            |
| 11.0 - 12.9                              | 15,575         | 862             | 1,449        | 4,913           | 8,351                            |
| 13.0 - 14.9                              | 12,005         | 598             | 1,073        | 4,250           | 6,084                            |
| 15.0 - 16.9                              | 9,375          | 439             | 736          | 3,305           | 4,985                            |
| 17.0 - 18.9                              | 6,523          | 344             | 577          | 2,441           | 3,161                            |
| 19.0 - 20.9                              | 4,818          | 128             | 564          | 1,537           | 2,589                            |
| 21.0 - 28.9                              | 9,452          | 541             | 850          | 3,379           | 4,682                            |
| 29.0 - 38.9                              | 3,797          | 433             | 328          | 1,474           | 1,562                            |
| 39.0 and larger                          | 1,823          | 283             | 134          | 843             | 563                              |
| All classes                              | 153,721        | 7,965           | 12,232       | 56,435          | 77,089                           |

Table 16. — Number of growing-stock trees on commercial forest land, by species and diameter classes, Mendocino and Sonoma Counties, California, January 1, 1968

(In thousand trees)

| Species                  | Diameter class (inches at breast height) |         |         |          |           |           |           |           |           |           |           |                 |
|--------------------------|------------------------------------------|---------|---------|----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------------|
|                          | All classes                              | 5.0-6.9 | 7.0-8.9 | 9.0-10.9 | 11.0-12.9 | 13.0-14.9 | 15.0-16.9 | 17.0-18.9 | 19.0-20.9 | 21.0-28.9 | 29.0-38.9 | 39.0 and larger |
| <b>Softwoods:</b>        |                                          |         |         |          |           |           |           |           |           |           |           |                 |
| Douglas-fir              | 27,600                                   | 6,528   | 4,735   | 2,578    | 2,573     | 2,324     | 1,818     | 1,737     | 1,318     | 2,350     | 1,032     | 607             |
| Redwood                  | 46,485                                   | 8,266   | 6,648   | 5,111    | 5,456     | 4,175     | 3,972     | 2,665     | 2,191     | 4,870     | 2,122     | 1,009           |
| Grand fir                | 2,127                                    | 1,123   | 228     | 281      | 97        | 32        | 85        | 74        | 67        | 92        | 26        | 22              |
| Red fir                  | 83                                       | ---     | ---     | ---      | 6         | 13        | ---       | 7         | 4         | 26        | 10        | 17              |
| White fir                | 3,048                                    | 701     | 359     | 514      | 342       | 256       | 185       | 182       | 66        | 294       | 126       | 23              |
| Ponderosa pine           | 1,703                                    | 579     | 217     | 107      | 165       | 65        | 101       | 132       | 12        | 166       | 93        | 66              |
| Sugar pine               | 202                                      | ---     | ---     | ---      | 28        | 18        | 49        | 22        | ---       | 24        | 33        | 28              |
| Bishop pine <sup>1</sup> | 1,450                                    | ---     | ---     | 266      | 491       | 260       | 184       | 19        | 32        | 175       | 23        | ---             |
| Cedars <sup>2</sup>      | 594                                      | 33      | 160     | 203      | 57        | 23        | 26        | 6         | 20        | 17        | 40        | 9               |
| Western hemlock          | 348                                      | 158     | ---     | 154      | ---       | 36        | ---       | ---       | ---       | ---       | ---       | ---             |
| Total                    | 83,640                                   | 17,388  | 12,347  | 9,214    | 9,215     | 7,202     | 6,420     | 4,844     | 3,710     | 8,014     | 3,505     | 1,781           |
| <b>Hardwoods:</b>        |                                          |         |         |          |           |           |           |           |           |           |           |                 |
| Red alder                | 1,781                                    | 264     | 589     | 254      | 229       | 217       | 133       | 65        | 17        | 11        | 2         | ---             |
| Pacific madrone          | 7,885                                    | 3,130   | 1,448   | 1,231    | 728       | 540       | 236       | 254       | 118       | 162       | 26        | 12              |
| Tanoak                   | 42,283                                   | 15,058  | 10,999  | 6,155    | 3,512     | 2,455     | 1,715     | 918       | 526       | 793       | 136       | 16              |
| California black oak     | 3,385                                    | 475     | 642     | 345      | 782       | 557       | 115       | 147       | 99        | 156       | 60        | 7               |
| Canyon live oak          | 3,846                                    | 418     | 401     | 864      | 553       | 645       | 497       | 111       | 136       | 185       | 36        | ---             |
| Oregon white oak         | 4,135                                    | 1,643   | 980     | 828      | 301       | 74        | 85        | 45        | 120       | 59        | ---       | ---             |
| Other oaks               | 1,972                                    | 1,023   | 207     | 463      | 45        | 189       | ---       | 41        | 1         | ---       | ---       | 3               |
| California laurel        | 3,859                                    | 2,005   | 1,020   | 471      | 126       | 58        | 55        | 37        | 54        | 17        | 12        | 4               |
| Other hardwoods          | 935                                      | 263     | 92      | 136      | 84        | 68        | 119       | 61        | 37        | 55        | 20        | ---             |
| Total                    | 70,081                                   | 24,279  | 16,378  | 10,747   | 6,360     | 4,803     | 2,955     | 1,679     | 1,108     | 1,438     | 292       | 42              |
| All species              | 153,721                                  | 41,667  | 28,725  | 19,961   | 15,575    | 12,005    | 9,375     | 6,523     | 4,818     | 9,452     | 3,797     | 1,823           |

<sup>1</sup> Includes lodgepole pine.

<sup>2</sup> Primarily incense-cedar.

Table 17. — Volume of growing stock and sawtimber on commercial forest land, by ownership class and by softwoods and hardwoods, Mendocino and Sonoma Counties, California, January 1, 1968

| Ownership class                                  | Volume<br>per acre | Total volume |           |           |
|--------------------------------------------------|--------------------|--------------|-----------|-----------|
|                                                  |                    | All species  | Softwoods | Hardwoods |
| <i>Cubic feet ----- Million cubic feet -----</i> |                    |              |           |           |
| Growing stock:                                   |                    |              |           |           |
| National Forest                                  | 3,748              | 401          | 397       | 4         |
| Other public                                     | 3,636              | 360          | 289       | 71        |
| Forest industry                                  | 3,087              | 1,633        | 1,354     | 279       |
| Farmer and<br>miscellaneous private              | 2,282              | 1,892        | 1,585     | 307       |
| All ownerships                                   | 2,740              | 4,286        | 3,625     | 661       |
| <i>Board feet ----- Million board feet -----</i> |                    |              |           |           |
| Sawtimber (International<br>1/4-inch rule):      |                    |              |           |           |
| National Forest                                  | 21,093             | 2,257        | 2,246     | 11        |
| Other public                                     | 16,646             | 1,648        | 1,497     | 151       |
| Forest industry                                  | 13,397             | 7,087        | 6,553     | 534       |
| Farmer and<br>miscellaneous private              | 9,825              | 8,145        | 7,553     | 592       |
| All ownerships                                   | 12,236             | 19,137       | 17,849    | 1,288     |
| Sawtimber (Scribner rule):                       |                    |              |           |           |
| National Forest                                  | 19,813             | 2,120        | 2,109     | 11        |
| Other public                                     | 15,556             | 1,540        | 1,392     | 148       |
| Forest industry                                  | 12,499             | 6,612        | 6,090     | 522       |
| Farmer and<br>miscellaneous private              | 9,125              | 7,565        | 6,990     | 575       |
| All ownerships                                   | 11,405             | 17,837       | 16,581    | 1,256     |

Table 18. — Volume of growing stock and sawtimber on commercial forest land, by stand-size class and by softwoods and hardwoods, Mendocino and Sonoma Counties, California, January 1, 1968

| Stand-size class                                | Volume<br>per acre | Total volume |           |           |
|-------------------------------------------------|--------------------|--------------|-----------|-----------|
|                                                 |                    | All species  | Softwoods | Hardwoods |
| <i>Cubic feet----- Million cubic feet -----</i> |                    |              |           |           |
| Growing stock:                                  |                    |              |           |           |
| Sawtimber stands                                | 3,549              | 3,968        | 3,413     | 555       |
| Poletimber stands                               | 1,268              | 71           | 41        | 30        |
| Sapling and seedling stands                     | 712                | 240          | 167       | 73        |
| Nonstocked areas                                | 132                | 7            | 4         | 3         |
| All classes                                     | 2,740              | 4,286        | 3,625     | 661       |
| <i>Board feet----- Million board feet -----</i> |                    |              |           |           |
| Sawtimber (International<br>1/4-inch rule):     |                    |              |           |           |
| Sawtimber stands                                | 16,127             | 18,030       | 16,929    | 1,101     |
| Poletimber stands                               | 3,125              | 175          | 143       | 32        |
| Sapling and seedling stands                     | 2,694              | 908          | 763       | 145       |
| Nonstocked areas                                | 453                | 24           | 14        | 10        |
| All classes                                     | 12,236             | 19,137       | 17,849    | 1,288     |

*Table 19. — Volume of timber on commercial forest land, by class of timber and by softwoods and hardwoods, Mendocino and Sonoma Counties, California, January 1, 1968*  
(In million cubic feet)

| Class of timber               | All species | Softwoods | Hardwoods |
|-------------------------------|-------------|-----------|-----------|
| Sawtimber trees:              |             |           |           |
| Saw-log portion               | 3,668       | 3,307     | 361       |
| Upper-stem portion            | 262         | 142       | 120       |
| Total                         | 3,930       | 3,449     | 481       |
| Poletimber trees              | 356         | 176       | 180       |
| All growing-stock             | 4,286       | 3,625     | 661       |
| Sound cull trees              | 127         | 21        | 106       |
| Rotten cull trees             | 261         | 148       | 113       |
| Salvable dead sawtimber trees | 22          | 20        | 2         |
| Total, all timber             | 4,696       | 3,814     | 882       |

Table 20. — Volume of growing stock and sawtimber on commercial forest land, by county and ownership class, Mendocino and Sonoma Counties, California, January 1, 1968

| County                                      | All<br>ownerships | National<br>Forest | Other<br>public | Forest<br>industry | Farmer and<br>miscellaneous<br>private |
|---------------------------------------------|-------------------|--------------------|-----------------|--------------------|----------------------------------------|
| ----- Million cubic feet -----              |                   |                    |                 |                    |                                        |
| Growing stock:                              |                   |                    |                 |                    |                                        |
| Mendocino                                   | 3,595             | 401                | 358             | 1,543              | 1,293                                  |
| Sonoma                                      | 691               | ---                | 2               | 90                 | 599                                    |
| Total                                       | 4,286             | 401                | 360             | 1,633              | 1,892                                  |
| ----- Million board feet -----              |                   |                    |                 |                    |                                        |
| Sawtimber (International<br>1/4-inch rule): |                   |                    |                 |                    |                                        |
| Mendocino                                   | 15,907            | 2,257              | 1,638           | 6,695              | 5,317                                  |
| Sonoma                                      | 3,230             | ---                | 10              | 392                | 2,828                                  |
| Total                                       | 19,137            | 2,257              | 1,648           | 7,087              | 8,145                                  |
| Sawtimber<br>(Scribner rule):               |                   |                    |                 |                    |                                        |
| Mendocino                                   | 14,821            | 2,120              | 1,530           | 6,249              | 4,922                                  |
| Sonoma                                      | 3,016             | ---                | 10              | 363                | 2,643                                  |
| Total                                       | 17,837            | 2,120              | 1,540           | 6,612              | 7,565                                  |

Table 21. — Volume of growing stock on commercial forest land by species and ownership class, Mendocino and Sonoma Counties, California, January 1, 1968

(In million cubic feet)

| Species                  | All<br>ownerships | National<br>Forest | Other<br>public | Forest<br>industry | Farmer and<br>miscellaneous<br>private |
|--------------------------|-------------------|--------------------|-----------------|--------------------|----------------------------------------|
| <b>Softwoods:</b>        |                   |                    |                 |                    |                                        |
| Douglas-fir              | 1,273             | 173                | 80              | 442                | 578                                    |
| Redwood                  | 2,008             | ---                | 207             | 878                | 923                                    |
| Grand fir                | 46                | ---                | ---             | 19                 | 27                                     |
| White fir                | 105               | 104                | ---             | 1                  | ---                                    |
| Red fir                  | 13                | 13                 | ---             | ---                | ---                                    |
| Ponderosa pine           | 101               | 69                 | 2               | 12                 | 18                                     |
| Sugar pine               | 29                | 28                 | ---             | 1                  | ---                                    |
| Bishop pine <sup>1</sup> | 37                | ---                | ---             | ---                | 37                                     |
| Cedars <sup>2</sup>      | 11                | 10                 | ---             | ---                | 1                                      |
| Western hemlock          | 2                 | ---                | ---             | 1                  | 1                                      |
| Total                    | 3,625             | 397                | 289             | 1,354              | 1,585                                  |
| <b>Hardwoods:</b>        |                   |                    |                 |                    |                                        |
| Red alder                | 20                | ( <sup>3</sup> )   | 1               | 14                 | 5                                      |
| Pacific madrone          | 99                | ---                | 13              | 44                 | 42                                     |
| Tanoak                   | 354               | ---                | 34              | 179                | 141                                    |
| California<br>black oak  | 58                | 3                  | 2               | 9                  | 44                                     |
| Canyon live oak          | 52                | 1                  | 18              | 15                 | 18                                     |
| Oregon white oak         | 26                | ---                | ---             | 8                  | 18                                     |
| Other oaks               | 12                | ---                | 1               | ---                | 11                                     |
| California laurel        | 17                | ---                | 1               | 3                  | 13                                     |
| Other hardwoods          | 23                | ---                | 1               | 7                  | 15                                     |
| Total                    | 661               | 4                  | 71              | 279                | 307                                    |
| All species              | 4,286             | 401                | 360             | 1,633              | 1,892                                  |

<sup>1</sup> Includes 7 million cubic feet of lodgepole pine.

<sup>2</sup> Primarily incense-cedar.

<sup>3</sup> Less than 500,000 cubic feet.

Table 22. — Volume of growing stock on commercial forest land by species and county, Mendocino and Sonoma Counties, California, January 1, 1968

(In million cubic feet)

| Species                  | All counties | Mendocino County | Sonoma County |
|--------------------------|--------------|------------------|---------------|
| <b>Softwoods:</b>        |              |                  |               |
| Douglas-fir              | 1,273        | 1,072            | 201           |
| Redwood                  | 2,008        | 1,572            | 436           |
| Grand fir                | 46           | 43               | 3             |
| White fir                | 105          | 105              | ---           |
| Red fir                  | 13           | 13               | ---           |
| Ponderosa pine           | 101          | 101              | ---           |
| Sugar pine               | 29           | 28               | 1             |
| Bishop pine <sup>1</sup> | 37           | 35               | 2             |
| Cedars <sup>2</sup>      | 11           | 11               | ---           |
| Western hemlock          | 2            | 2                | ---           |
| Total                    | 3,625        | 2,982            | 643           |
| <b>Hardwoods:</b>        |              |                  |               |
| Red alder                | 20           | 19               | 1             |
| Pacific madrone          | 99           | 97               | 2             |
| Tanoak                   | 354          | 334              | 20            |
| California black oak     | 58           | 55               | 3             |
| Canyon live oak          | 52           | 51               | 1             |
| Oregon white oak         | 26           | 23               | 3             |
| Other oaks               | 12           | 11               | 1             |
| California laurel        | 17           | 10               | 7             |
| Other hardwoods          | 23           | 13               | 10            |
| Total                    | 661          | 613              | 48            |
| All species              | 4,286        | 3,595            | 691           |

<sup>1</sup> Includes 7 million cubic feet of lodgepole pine.

<sup>2</sup> Primarily incense-cedar.

Table 23. — Volume of sawtimber on commercial forest land by species and ownership class, Mendocino and Sonoma Counties, California, January 1, 1968 (International 1/4-inch rule)  
(In million board feet)

| Species                  | All<br>ownerships | National<br>Forest | Other<br>public | Forest<br>industry | Farmer and<br>miscellaneous<br>private |
|--------------------------|-------------------|--------------------|-----------------|--------------------|----------------------------------------|
| <b>Softwoods:</b>        |                   |                    |                 |                    |                                        |
| Douglas-fir              | 6,458             | 995                | 460             | 2,277              | 2,726                                  |
| Redwood                  | 9,573             | ---                | 1,026           | 4,114              | 4,433                                  |
| Grand fir                | 202               | ---                | ---             | 84                 | 118                                    |
| White fir                | 524               | 518                | ---             | 6                  | ---                                    |
| Red fir                  | 67                | 67                 | ---             | ---                | ---                                    |
| Ponderosa pine           | 620               | 439                | 11              | 65                 | 105                                    |
| Sugar pine               | 184               | 180                | ---             | 4                  | ---                                    |
| Bishop pine <sup>1</sup> | 168               | ---                | ---             | ---                | 168                                    |
| Cedars <sup>2</sup>      | 50                | 47                 | ---             | ---                | 3                                      |
| Western hemlock          | 3                 | ---                | ---             | 3                  | ---                                    |
| Total                    | 17,849            | 2,246              | 1,497           | 6,553              | 7,553                                  |
| <b>Hardwoods:</b>        |                   |                    |                 |                    |                                        |
| Red alder                | 52                | 2                  | 3               | 30                 | 17                                     |
| Pacific madrone          | 165               | ---                | 17              | 78                 | 70                                     |
| Tanoak                   | 631               | ---                | 73              | 330                | 228                                    |
| California black oak     | 144               | 8                  | 3               | 26                 | 107                                    |
| Canyon live oak          | 136               | 1                  | 51              | 39                 | 45                                     |
| Oregon white oak         | 39                | ---                | ---             | 11                 | 28                                     |
| Other oaks               | 15                | ---                | 1               | ---                | 14                                     |
| California laurel        | 23                | ---                | ---             | 1                  | 22                                     |
| Other hardwoods          | 83                | ---                | 3               | 19                 | 61                                     |
| Total                    | 1,288             | 11                 | 151             | 534                | 592                                    |
| All species              | 19,137            | 2,257              | 1,648           | 7,087              | 8,145                                  |

<sup>1</sup> Includes 30 million board feet of lodgepole pine.

<sup>2</sup> Primarily incense-cedar.

Table 24. — Volume of sawtimber on commercial forest land by species and ownership class, Mendocino and Sonoma Counties, California, January 1, 1968 (Scribner rule)

(In million board feet)

| Species                  | All<br>ownerships | National<br>Forest | Other<br>public | Forest<br>industry | Farmer and<br>miscellaneous<br>private |
|--------------------------|-------------------|--------------------|-----------------|--------------------|----------------------------------------|
| Softwoods:               |                   |                    |                 |                    |                                        |
| Douglas-fir              | 6,013             | 941                | 431             | 2,121              | 2,520                                  |
| Redwood                  | 8,878             | ---                | 951             | 3,818              | 4,109                                  |
| Grand fir                | 188               | ---                | ---             | 79                 | 109                                    |
| White fir                | 479               | 474                | ---             | 5                  | ---                                    |
| Red fir                  | 63                | 63                 | ---             | ---                | ---                                    |
| Ponderosa pine           | 584               | 416                | 10              | 60                 | 98                                     |
| Sugar pine               | 175               | 171                | ---             | 4                  | ---                                    |
| Bishop pine <sup>1</sup> | 151               | ---                | ---             | ---                | 151                                    |
| Cedars <sup>2</sup>      | 47                | 44                 | ---             | ---                | 3                                      |
| Western hemlock          | 3                 | ---                | ---             | 3                  | ---                                    |
| Total                    | 16,581            | 2,109              | 1,392           | 6,090              | 6,990                                  |
| Hardwoods:               |                   |                    |                 |                    |                                        |
| Red alder                | 51                | 2                  | 3               | 29                 | 17                                     |
| Pacific madrone          | 161               | ---                | 16              | 76                 | 69                                     |
| Tanoak                   | 616               | ---                | 72              | 322                | 222                                    |
| California black oak     | 142               | 8                  | 4               | 25                 | 105                                    |
| Canyon live oak          | 133               | 1                  | 49              | 38                 | 45                                     |
| Oregon white oak         | 39                | ---                | ---             | 11                 | 28                                     |
| Other oaks               | 14                | ---                | 1               | ---                | 13                                     |
| California laurel        | 22                | ---                | ---             | 2                  | 20                                     |
| Other hardwoods          | 78                | ---                | 3               | 19                 | 56                                     |
| Total                    | 1,256             | 11                 | 148             | 522                | 575                                    |
| All species              | 17,837            | 2,120              | 1,540           | 6,612              | 7,565                                  |

<sup>1</sup> Includes 27 million board feet of lodgepole pine.

<sup>2</sup> Primarily incense-cedar.

Table 25. — Volume of sawtimber on commercial forest land, by species and county, Mendocino and Sonoma Counties, California, January 1, 1968 (International ¼-inch rule)  
(In million board feet)

| Species                  | All counties | Mendocino County | Sonoma County |
|--------------------------|--------------|------------------|---------------|
| Softwoods:               |              |                  |               |
| Douglas-fir              | 6,458        | 5,565            | 893           |
| Redwood                  | 9,573        | 7,370            | 2,203         |
| Grand fir                | 202          | 196              | 6             |
| White fir                | 524          | 524              | ---           |
| Red fir                  | 67           | 67               | ---           |
| Ponderosa pine           | 620          | 620              | ---           |
| Sugar pine               | 184          | 180              | 4             |
| Bishop pine <sup>1</sup> | 168          | 161              | 7             |
| Cedars <sup>2</sup>      | 50           | 50               | ---           |
| Western hemlock          | 3            | 3                | ---           |
| Total                    | 17,849       | 14,736           | 3,113         |
| Hardwoods:               |              |                  |               |
| Red alder                | 52           | 45               | 7             |
| Pacific madrone          | 165          | 160              | 5             |
| Tanoak                   | 631          | 602              | 29            |
| California black oak     | 144          | 135              | 9             |
| Canyon live oak          | 136          | 133              | 3             |
| Oregon white oak         | 39           | 36               | 3             |
| Other oaks               | 15           | 14               | 1             |
| California laurel        | 23           | 12               | 11            |
| Other hardwoods          | 83           | 34               | 49            |
| Total                    | 1,288        | 1,171            | 117           |
| All species              | 19,137       | 15,907           | 3,230         |

<sup>1</sup>Includes 30 million board feet of lodgepole pine.

<sup>2</sup>Primarily incense-cedar.

Table 26. — Volume of growing stock on commercial forest land, by forest type and ownership class, Mendocino and Sonoma Counties, California, January 1, 1968

(In million cubic feet)

| Forest type                   | All<br>ownerships | National<br>Forest | Other<br>public | Forest<br>industry | Farmer and<br>miscellaneous<br>private |
|-------------------------------|-------------------|--------------------|-----------------|--------------------|----------------------------------------|
| Douglas-fir                   | 1,019             | 208                | 36              | 303                | 472                                    |
| Redwood                       | 1,918             | ---                | 222             | 896                | 800                                    |
| True firs                     | 141               | 134                | ---             | ---                | 7                                      |
| Ponderosa pine                | 55                | 47                 | ---             | 3                  | 5                                      |
| Bishop pine                   | 65                | ---                | ---             | ---                | 65                                     |
| Lodgepole pine                | 7                 | ---                | ---             | ---                | 7                                      |
| Incense-cedar                 | 1                 | ---                | ---             | ---                | 1                                      |
| Red alder                     | 13                | 1                  | ---             | 7                  | 5                                      |
| California black oak          | 53                | 7                  | 5               | ---                | 41                                     |
| Oregon white oak              | 50                | ---                | ---             | 19                 | 31                                     |
| Pacific madrone               | 104               | ---                | 2               | 42                 | 60                                     |
| Tanoak                        | 719               | ---                | 71              | 333                | 315                                    |
| Other commercial<br>hardwoods | 134               | 4                  | 24              | 29                 | 77                                     |
| Commercial nonstocked         | 7                 | ---                | ---             | 1                  | 6                                      |
| All types                     | 4,286             | 401                | 360             | 1,633              | 1,892                                  |

Table 27. — Volume of sawtimber on commercial forest land by forest type and ownership class, Mendocino and Sonoma Counties, California, January 1, 1968 (International 1/4-inch rule)

(In million board feet)

| Forest type                   | All<br>ownerships | National<br>Forest | Other<br>public | Forest<br>industry | Farmer and<br>miscellaneous<br>private |
|-------------------------------|-------------------|--------------------|-----------------|--------------------|----------------------------------------|
| Douglas-fir                   | 4,984             | 1,254              | 167             | 1,304              | 2,259                                  |
| Redwood                       | 8,969             | ---                | 1,121           | 4,113              | 3,735                                  |
| True firs                     | 721               | 697                | ---             | ---                | 24                                     |
| Ponderosa pine                | 281               | 249                | ---             | 18                 | 14                                     |
| Bishop pine                   | 270               | ---                | ---             | ---                | 270                                    |
| Lodgepole pine                | 30                | ---                | ---             | ---                | 30                                     |
| Incense-cedar                 | 8                 | ---                | ---             | ---                | 8                                      |
| Red alder                     | 52                | 13                 | ---             | 27                 | 12                                     |
| California black oak          | 189               | 38                 | 21              | ---                | 130                                    |
| Oregon white oak              | 150               | ---                | ---             | 44                 | 106                                    |
| Pacific madrone               | 348               | ---                | 9               | 138                | 201                                    |
| Tanoak                        | 2,631             | ---                | 247             | 1,321              | 1,063                                  |
| Other commercial<br>hardwoods | 480               | 6                  | 83              | 122                | 269                                    |
| Commercial nonstocked         | 24                | ---                | ---             | ---                | 24                                     |
| All types                     | 19,137            | 2,257              | 1,648           | 7,087              | 8,145                                  |

Table 28. — Volume of growing stock and sawtimber on commercial forest land, by forest type and county, Mendocino and Sonoma Counties, California, January 1, 1968

| Forest type                   | Growing stock                |                  |               | Sawtimber                                          |                  |               |
|-------------------------------|------------------------------|------------------|---------------|----------------------------------------------------|------------------|---------------|
|                               | All counties                 | Mendocino County | Sonoma County | All counties                                       | Mendocino County | Sonoma County |
|                               | ---- Million cubic feet ---- |                  |               | Million board feet,<br>International 1/4-inch rule |                  |               |
| Douglas-fir                   | 1,019                        | 788              | 231           | 4,984                                              | 3,893            | 1,091         |
| Redwood                       | 1,918                        | 1,552            | 366           | 8,969                                              | 7,223            | 1,746         |
| True firs                     | 141                          | 141              | ---           | 721                                                | 721              | ---           |
| Ponderosa pine                | 55                           | 55               | ---           | 281                                                | 281              | ---           |
| Bishop pine                   | 65                           | 62               | 3             | 270                                                | 255              | 15            |
| Lodgepole pine                | 7                            | 7                | ---           | 30                                                 | 30               | ---           |
| Incense-cedar                 | 1                            | 1                | ---           | 8                                                  | 8                | ---           |
| Red alder                     | 13                           | 13               | ---           | 52                                                 | 52               | ---           |
| California black oak          | 53                           | 50               | 3             | 189                                                | 181              | 8             |
| Oregon white oak              | 50                           | 41               | 9             | 150                                                | 117              | 33            |
| Pacific madrone               | 104                          | 94               | 10            | 348                                                | 316              | 32            |
| Tanoak                        | 719                          | 675              | 44            | 2,631                                              | 2,431            | 200           |
| Other commercial<br>hardwoods | 134                          | 115              | 19            | 480                                                | 391              | 89            |
| Commercial nonstocked         | 7                            | 1                | 6             | 24                                                 | 8                | 16            |
| All types                     | 4,286                        | 3,595            | 691           | 19,137                                             | 15,907           | 3,230         |

Table 29. — Volume of growing stock on commercial forest land, by species and diameter class, Mendocino and Sonoma Counties, California, January 1, 1968

(In million cubic feet)

| Species                  | Diameter class (inches at breast height) |         |         |          |           |           |           |           |           |           |           |                 |
|--------------------------|------------------------------------------|---------|---------|----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------------|
|                          | All classes                              | 5.0-6.9 | 7.0-8.9 | 9.0-10.9 | 11.0-12.9 | 13.0-14.9 | 15.0-16.9 | 17.0-18.9 | 19.0-20.9 | 21.0-28.9 | 29.0-38.9 | 39.0 and larger |
| <b>Softwoods:</b>        |                                          |         |         |          |           |           |           |           |           |           |           |                 |
| Douglas-fir              | 1,273                                    | 14      | 33      | 35       | 54        | 74        | 78        | 95        | 94        | 255       | 237       | 304             |
| Redwood                  | 2,008                                    | 12      | 24      | 36       | 67        | 83        | 125       | 120       | 134       | 486       | 416       | 505             |
| Grand fir                | 46                                       | 2       | 1       | 3        | 1         | 1         | 3         | 4         | 4         | 10        | 5         | 12              |
| Red fir                  | 13                                       | ---     | ---     | ---      | ---       | ---       | ---       | ---       | ---       | 4         | 2         | 7               |
| White fir                | 105                                      | 1       | 2       | 4        | 5         | 6         | 6         | 8         | 7         | 30        | 29        | 7               |
| Ponderosa pine           | 101                                      | ---     | 1       | 1        | 2         | 1         | 3         | 7         | 1         | 18        | 26        | 41              |
| Sugar pine               | 29                                       | ---     | ---     | ---      | ---       | ---       | 2         | 1         | ---       | 3         | 9         | 14              |
| Bishop pine <sup>1</sup> | 37                                       | ---     | ---     | 2        | 6         | 5         | 4         | 1         | 1         | 14        | 4         | ---             |
| Cedars <sup>2</sup>      | 11                                       | ---     | 1       | 1        | 1         | ---       | ---       | ---       | 1         | 1         | 4         | 2               |
| Western hemlock          | 2                                        | ---     | ---     | 1        | ---       | 1         | ---       | ---       | ---       | ---       | ---       | ---             |
| Total                    | 3,625                                    | 29      | 62      | 83       | 136       | 171       | 221       | 236       | 242       | 821       | 732       | 892             |
| <b>Hardwoods:</b>        |                                          |         |         |          |           |           |           |           |           |           |           |                 |
| Red alder                | 20                                       | 1       | 3       | 2        | 2         | 3         | 4         | 3         | 1         | 1         | ---       | ---             |
| Pacific madrone          | 99                                       | 8       | 8       | 11       | 11        | 12        | 8         | 11        | 6         | 15        | 5         | 4               |
| Tanoak                   | 354                                      | 23      | 39      | 40       | 37        | 41        | 42        | 30        | 22        | 56        | 20        | 4               |
| California black oak     | 58                                       | 1       | 3       | 3        | 10        | 10        | 3         | 5         | 4         | 11        | 6         | 2               |
| Canyon live oak          | 52                                       | 1       | 2       | 6        | 6         | 10        | 9         | 3         | 4         | 7         | 4         | ---             |
| Oregon white oak         | 26                                       | 2       | 3       | 5        | 3         | 1         | 2         | 1         | 5         | 4         | ---       | ---             |
| Other oaks               | 12                                       | 2       | 1       | 3        | 1         | 3         | ---       | 1         | ---       | ---       | ---       | 1               |
| California laurel        | 17                                       | 3       | 4       | 3        | 1         | 1         | 1         | 1         | 1         | 1         | 1         | ---             |
| Other hardwoods          | 23                                       | ---     | 1       | 1        | 3         | 4         | 3         | 2         | 2         | 5         | 2         | ---             |
| Total                    | 661                                      | 41      | 64      | 74       | 74        | 85        | 72        | 57        | 45        | 100       | 38        | 11              |
| All species              | 4,286                                    | 70      | 126     | 157      | 210       | 256       | 293       | 293       | 287       | 921       | 770       | 903             |

<sup>1</sup> Includes 7 million cubic feet of lodgepole pine.

<sup>2</sup> Primarily incense-cedar.

Table 30. — Volume of sawtimber on commercial forest land, by species and diameter class, Mendocino and Sonoma Counties, California, January 1, 1968 (International 1/4-inch rule)

(In million board feet)

| Species                  | Diameter class (inches at breast height) |           |           |           |           |           |           |           |                 |
|--------------------------|------------------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------------|
|                          | All classes                              | 11.0-12.9 | 13.0-14.9 | 15.0-16.9 | 17.0-18.9 | 19.0-20.9 | 21.0-28.9 | 29.0-38.9 | 39.0 and larger |
| Softwoods:               |                                          |           |           |           |           |           |           |           |                 |
| Douglas-fir              | 6,458                                    | 136       | 237       | 295       | 407       | 459       | 1,416     | 1,464     | 2,044           |
| Redwood                  | 9,573                                    | 142       | 326       | 573       | 570       | 664       | 2,506     | 2,136     | 2,656           |
| Grand fir                | 202                                      | 5         | 3         | 5         | 18        | 20        | 49        | 31        | 71              |
| White fir                | 524                                      | 20        | 25        | 28        | 37        | 40        | 165       | 170       | 39              |
| Red fir                  | 67                                       | ---       | 2         | ---       | 2         | 1         | 19        | 9         | 34              |
| Ponderosa pine           | 620                                      | 6         | 5         | 11        | 27        | 6         | 104       | 167       | 294             |
| Sugar pine               | 184                                      | 1         | 1         | 7         | 5         | ---       | 19        | 60        | 91              |
| Bishop pine <sup>1</sup> | 168                                      | 16        | 19        | 20        | 5         | 7         | 78        | 23        | ---             |
| Cedars <sup>2</sup>      | 50                                       | 3         | 1         | 2         | 1         | 4         | 4         | 21        | 14              |
| Western hemlock          | 3                                        | ---       | 3         | ---       | ---       | ---       | ---       | ---       | ---             |
| Total                    | 17,848                                   | 329       | 622       | 941       | 1,072     | 1,201     | 4,360     | 4,081     | 5,243           |
| Hardwoods:               |                                          |           |           |           |           |           |           |           |                 |
| Red alder                | 52                                       | 6         | 9         | 14        | 10        | 4         | 7         | 2         | ---             |
| Pacific madrone          | 165                                      | 22        | 26        | 18        | 25        | 16        | 39        | 12        | 7               |
| Tanoak                   | 631                                      | 66        | 92        | 106       | 81        | 61        | 157       | 57        | 11              |
| California black oak     | 144                                      | 20        | 22        | 7         | 12        | 12        | 34        | 29        | 8               |
| Canyon live oak          | 136                                      | 13        | 25        | 27        | 9         | 15        | 30        | 17        | ---             |
| Oregon white oak         | 39                                       | 8         | 2         | 4         | 3         | 12        | 10        | ---       | ---             |
| Other oaks               | 15                                       | 1         | 6         | ---       | 4         | ---       | ---       | ---       | 4               |
| California laurel        | 23                                       | 3         | 2         | 2         | 2         | 4         | 2         | 6         | 2               |
| Other hardwoods          | 83                                       | 6         | 15        | 11        | 6         | 14        | 21        | 10        | ---             |
| Total                    | 1,288                                    | 145       | 199       | 189       | 152       | 138       | 300       | 133       | 32              |
| All species              | 19,137                                   | 474       | 821       | 1,130     | 1,224     | 1,339     | 4,660     | 4,214     | 5,275           |

<sup>1</sup> Includes 30 million board feet of lodgepole pine.

<sup>2</sup> Primarily incense-cedar.

Table 31. — Net annual growth of growing stock and sawtimber on commercial forest land, by ownership class and softwoods and hardwoods, Mendocino and Sonoma Counties, California, 1967

| Timber and ownership class             | All species | Softwoods | Hardwoods |
|----------------------------------------|-------------|-----------|-----------|
| ----- Thousand cubic feet -----        |             |           |           |
| Growing stock:                         |             |           |           |
| National Forest                        | 640         | 490       | 150       |
| Other public                           | 9,600       | 7,700     | 1,900     |
| Forest industry                        | 41,320      | 31,990    | 9,330     |
| Farmer and miscellaneous private       | 55,470      | 44,870    | 10,600    |
| All ownerships                         | 107,030     | 85,050    | 21,980    |
| ----- Thousand board feet -----        |             |           |           |
| Sawtimber (International ¼-inch rule): |             |           |           |
| National Forest                        | 2,810       | 2,440     | 370       |
| Other public                           | 50,080      | 45,020    | 5,060     |
| Forest industry                        | 174,350     | 161,130   | 13,220    |
| Farmer and miscellaneous private       | 271,680     | 247,280   | 24,400    |
| All ownerships                         | 498,920     | 455,870   | 43,050    |
| Sawtimber (Scribner rule):             |             |           |           |
| National Forest                        | 2,590       | 2,220     | 370       |
| Other public                           | 47,040      | 42,100    | 4,940     |
| Forest industry                        | 162,490     | 149,500   | 12,990    |
| Farmer and miscellaneous private       | 253,480     | 229,790   | 23,690    |
| All ownerships                         | 465,600     | 423,610   | 41,990    |

Table 32. — Net annual growth of growing stock on commercial forest land, by species and ownership class, Mendocino and Sonoma Counties, California, 1967

(In thousand cubic feet)

| Species                  | All<br>ownerships | National<br>Forest | Other<br>public | Forest<br>industry | Farmer and<br>miscellaneous<br>private |
|--------------------------|-------------------|--------------------|-----------------|--------------------|----------------------------------------|
| <b>Softwoods:</b>        |                   |                    |                 |                    |                                        |
| Douglas-fir              | 26,450            | <sup>1</sup> -430  | 1,630           | 11,730             | 13,520                                 |
| Redwood                  | 54,130            | ---                | 6,010           | 19,200             | 28,920                                 |
| Grand fir                | 1,520             | ---                | ---             | 560                | 960                                    |
| White fir                | 530               | 500                | ---             | 30                 | ---                                    |
| Red fir                  | 60                | 60                 | ---             | ---                | ---                                    |
| Ponderosa pine           | 1,180             | 230                | 60              | 330                | 560                                    |
| Sugar pine               | 10                | 10                 | ---             | ( <sup>2</sup> )   | ---                                    |
| Bishop pine <sup>3</sup> | 860               | ---                | ---             | ---                | 860                                    |
| Cedars <sup>4</sup>      | 130               | 120                | ---             | ---                | 10                                     |
| Western hemlock          | 180               | ---                | ---             | 140                | 40                                     |
| Total                    | 85,050            | 490                | 7,700           | 31,990             | 44,870                                 |
| <b>Hardwoods:</b>        |                   |                    |                 |                    |                                        |
| Red alder                | 540               | 20                 | 20              | 460                | 40                                     |
| Pacific madrone          | 3,250             | ---                | 420             | 1,140              | 1,690                                  |
| Tanoak                   | 13,760            | ---                | 1,130           | 6,670              | 5,960                                  |
| California black oak     | 830               | 100                | 60              | 130                | 540                                    |
| Canyon live oak          | 720               | 30                 | 230             | 210                | 250                                    |
| Oregon white oak         | 930               | ---                | ---             | 290                | 640                                    |
| Other oaks               | 560               | ---                | 10              | ---                | 550                                    |
| California laurel        | 640               | ---                | 10              | 80                 | 550                                    |
| Other hardwoods          | 750               | ---                | 20              | 350                | 380                                    |
| Total                    | 21,980            | 150                | 1,900           | 9,330              | 10,600                                 |
| All species              | 107,030           | 640                | 9,600           | 41,320             | 55,470                                 |

<sup>1</sup> Negative growth is the result of mortality exceeding gross annual growth.

<sup>2</sup> Less than 5,000 cubic feet.

<sup>3</sup> Includes lodgepole pine.

<sup>4</sup> Primarily incense-cedar.

Table 33. — Net annual growth of sawtimber on commercial forest land, by species and ownership class, Mendocino and Sonoma Counties, California, 1967 (International 1/4-inch rule)

(In thousand board feet)

| Species                  | All<br>ownerships | National<br>Forest  | Other<br>public | Forest<br>industry | Farmer and<br>miscellaneous<br>private |
|--------------------------|-------------------|---------------------|-----------------|--------------------|----------------------------------------|
| <b>Softwoods:</b>        |                   |                     |                 |                    |                                        |
| Douglas-fir              | 131,340           | <sup>1</sup> -2,480 | 9,700           | 54,740             | 69,380                                 |
| Redwood                  | 298,300           | ---                 | 34,900          | 101,570            | 161,830                                |
| Grand fir                | 6,100             | ---                 | ---             | 2,290              | 3,810                                  |
| White fir                | 2,730             | 2,490               | ---             | 240                | ---                                    |
| Red fir                  | 320               | 320                 | ---             | ---                | ---                                    |
| Ponderosa pine           | 7,260             | 1,490               | 420             | 2,110              | 3,240                                  |
| Sugar pine               | 90                | 70                  | ---             | 20                 | ---                                    |
| Bishop pine <sup>2</sup> | 8,930             | ---                 | ---             | ---                | 8,930                                  |
| Cedars <sup>3</sup>      | 640               | 550                 | ---             | ---                | 90                                     |
| Western hemlock          | 160               | ---                 | ---             | 160                | ---                                    |
| Total                    | 455,870           | 2,440               | 45,020          | 161,130            | 247,280                                |
| <b>Hardwoods:</b>        |                   |                     |                 |                    |                                        |
| Red alder                | 1,670             | 70                  | 100             | 1,030              | 470                                    |
| Pacific madrone          | 10,170            | ---                 | 1,570           | 1,440              | 7,160                                  |
| Tanoak                   | 21,060            | ---                 | 2,220           | 9,370              | 9,470                                  |
| California black oak     | 2,920             | 270                 | 100             | 270                | 2,280                                  |
| Canyon live oak          | 2,430             | 30                  | 930             | 710                | 760                                    |
| Oregon white oak         | 2,050             | ---                 | ---             | 230                | 1,820                                  |
| Other oaks               | 280               | ---                 | 40              | ---                | 240                                    |
| California laurel        | 380               | ---                 | ---             | 30                 | 350                                    |
| Other hardwoods          | 2,090             | ---                 | 100             | 140                | 1,850                                  |
| Total                    | 43,050            | 370                 | 5,060           | 13,220             | 24,400                                 |
| All species              | 498,920           | 2,810               | 50,080          | 174,350            | 271,680                                |

<sup>1</sup> Negative growth is the result of mortality exceeding gross annual growth.

<sup>2</sup> Includes lodgepole pine.

<sup>3</sup> Primarily incense-cedar.

Table 34. — Net annual growth of sawtimber on commercial forest land, by species and ownership class, Mendocino and Sonoma Counties, California, 1967 (Scribner rule)  
(In thousand board feet)

| Species                  | All<br>ownerships | National<br>Forest  | Other<br>public | Forest<br>industry | Farmer and<br>miscellaneous<br>private |
|--------------------------|-------------------|---------------------|-----------------|--------------------|----------------------------------------|
| Softwoods:               |                   |                     |                 |                    |                                        |
| Douglas-fir              | 121,600           | <sup>1</sup> -2,350 | 9,180           | 50,410             | 64,360                                 |
| Redwood                  | 278,130           | ---                 | 32,520          | 94,550             | 151,060                                |
| Grand fir                | 5,670             | ---                 | ---             | 2,160              | 3,510                                  |
| White fir                | 2,500             | 2,280               | ---             | 220                | ---                                    |
| Red fir                  | 300               | 300                 | ---             | ---                | ---                                    |
| Ponderosa pine           | 6,830             | 1,410               | 400             | 1,990              | 3,030                                  |
| Sugar pine               | 90                | 70                  | ---             | 20                 | ---                                    |
| Bishop pine <sup>2</sup> | 7,750             | ---                 | ---             | ---                | 7,750                                  |
| Cedars <sup>3</sup>      | 590               | 510                 | ---             | ---                | 80                                     |
| Western hemlock          | 150               | ---                 | ---             | 150                | ---                                    |
| Total                    | 423,610           | 2,220               | 42,100          | 149,500            | 229,790                                |
| Hardwoods:               |                   |                     |                 |                    |                                        |
| Red alder                | 1,640             | 70                  | 100             | 1,000              | 470                                    |
| Pacific madrone          | 9,880             | ---                 | 1,520           | 1,420              | 6,940                                  |
| Tanoak                   | 20,550            | ---                 | 2,170           | 9,200              | 9,180                                  |
| California black oak     | 2,870             | 270                 | 100             | 270                | 2,230                                  |
| Canyon live oak          | 2,400             | 30                  | 910             | 700                | 760                                    |
| Oregon white oak         | 1,990             | ---                 | ---             | 230                | 1,760                                  |
| Other oaks               | 280               | ---                 | 40              | ---                | 240                                    |
| California laurel        | 370               | ---                 | ---             | 30                 | 340                                    |
| Other hardwoods          | 2,010             | ---                 | 100             | 140                | 1,770                                  |
| Total                    | 41,990            | 370                 | 4,940           | 12,990             | 23,690                                 |
| All species              | 465,600           | 2,590               | 47,040          | 162,490            | 253,480                                |

<sup>1</sup> Negative growth is the result of mortality exceeding gross annual growth.

<sup>2</sup> Includes lodgepole pine.

<sup>3</sup> Primarily incense-cedar.

Table 35. — Net annual growth of growing stock and sawtimber on commercial forest land, by species and county, Mendocino and Sonoma Counties, California, 1967

| Species                         | Growing stock |                  |                                                     | Sawtimber    |                  |                   |
|---------------------------------|---------------|------------------|-----------------------------------------------------|--------------|------------------|-------------------|
|                                 | All counties  | Mendocino County | Sonoma County                                       | All counties | Mendocino County | Sonoma County     |
| ----- Thousand cubic feet ----- |               |                  | Thousand board feet,<br>International 1/4-inch rule |              |                  |                   |
| Softwoods:                      |               |                  |                                                     |              |                  |                   |
| Douglas-fir                     | 26,450        | 23,140           | 3,310                                               | 131,340      | 118,720          | 12,620            |
| Redwood                         | 54,130        | 42,000           | 12,130                                              | 298,300      | 225,680          | 72,620            |
| Grand fir                       | 1,520         | 1,410            | 110                                                 | 6,100        | 5,860            | 240               |
| White fir                       | 530           | 530              | ---                                                 | 2,730        | 2,730            | ---               |
| Red fir                         | 60            | 60               | ---                                                 | 320          | 320              | ---               |
| Ponderosa pine                  | 1,180         | 1,180            | ---                                                 | 7,260        | 7,260            | ---               |
| Sugar pine                      | 10            | 10               | ( <sup>3</sup> )                                    | 90           | 70               | 20                |
| Bishop pine <sup>1</sup>        | 860           | 770              | 90                                                  | 8,930        | 7,170            | 1,760             |
| Cedars <sup>2</sup>             | 130           | 130              | ---                                                 | 640          | 640              | ---               |
| Western hemlock                 | 180           | 180              | ---                                                 | 160          | 160              | ---               |
| Total                           | 85,050        | 69,410           | 15,640                                              | 455,870      | 368,610          | 87,260            |
| Hardwoods:                      |               |                  |                                                     |              |                  |                   |
| Red alder                       | 540           | 510              | 30                                                  | 1,670        | 1,490            | 180               |
| Pacific madrone                 | 3,250         | 3,210            | 40                                                  | 10,170       | 10,080           | 90                |
| Tanoak                          | 13,760        | 13,070           | 690                                                 | 21,060       | 20,600           | 460               |
| California black oak            | 830           | 980              | <sup>4</sup> -150                                   | 2,920        | 3,250            | <sup>4</sup> -330 |
| Canyon live oak                 | 720           | 710              | 10                                                  | 2,430        | 2,370            | 60                |
| Oregon white oak                | 930           | 860              | 70                                                  | 2,050        | 2,000            | 50                |
| Other oaks                      | 560           | 680              | <sup>4</sup> -120                                   | 280          | 250              | 30                |
| California laurel               | 640           | 180              | 460                                                 | 380          | 130              | 250               |
| Other hardwoods                 | 750           | 550              | 200                                                 | 2,090        | 780              | 1,310             |
| Total                           | 21,980        | 20,750           | 1,230                                               | 43,050       | 40,950           | 2,100             |
| All species                     | 107,030       | 90,160           | 16,870                                              | 498,920      | 409,560          | 89,360            |

<sup>1</sup> Includes lodgepole pine.

<sup>2</sup> Primarily incense-cedar.

<sup>3</sup> Less than 5,000 cubic feet.

<sup>4</sup> Negative growth is the result of mortality exceeding gross annual growth.

Table 36. — Net annual growth of growing stock and sawtimber on commercial forest land, by forest type and county, Mendocino and Sonoma Counties, California, 1967

| Forest type                | Growing stock                 |                  |                   | Sawtimber                                           |                  |                     |
|----------------------------|-------------------------------|------------------|-------------------|-----------------------------------------------------|------------------|---------------------|
|                            | All counties                  | Mendocino County | Sonoma County     | All counties                                        | Mendocino County | Sonoma County       |
|                            | ---- Thousand cubic feet ---- |                  |                   | Thousand board feet,<br>International 1/4-inch rule |                  |                     |
| Douglas-fir                | 20,810                        | 17,040           | 3,770             | 93,490                                              | 76,140           | 17,350              |
| Redwood                    | 52,560                        | 41,460           | 11,100            | 280,270                                             | 217,120          | 63,150              |
| True firs                  | 870                           | 870              | ---               | 3,370                                               | 3,370            | ---                 |
| Ponderosa pine             | 710                           | 710              | ---               | 3,740                                               | 3,740            | ---                 |
| Bishop pine                | 1,780                         | 1,650            | 130               | 10,970                                              | 9,980            | 990                 |
| Lodgepole pine             | 280                           | 280              | ---               | 2,980                                               | 2,980            | ---                 |
| Incense-cedar              | 30                            | 30               | ---               | 250                                                 | 250              | ---                 |
| Red alder                  | 320                           | 320              | ---               | 1,440                                               | 1,440            | ---                 |
| California black oak       | 1,200                         | 870              | 330               | 4,190                                               | 4,070            | 120                 |
| Oregon white oak           | 830                           | 1,330            | <sup>1</sup> -500 | 3,410                                               | 6,420            | <sup>1</sup> -3,010 |
| Pacific madrone            | 3,850                         | 3,590            | 260               | 12,820                                              | 11,580           | 1,240               |
| Tanoak                     | 20,740                        | 19,710           | 1,030             | 71,690                                              | 65,520           | 6,170               |
| Other commercial hardwoods | 2,780                         | 2,260            | 520               | 9,650                                               | 6,690            | 2,960               |
| Commercial nonstocked      | 270                           | 40               | 230               | 650                                                 | 260              | 390                 |
| All types                  | 107,030                       | 90,160           | 16,870            | 498,920                                             | 409,560          | 89,360              |

<sup>1</sup> Negative growth is the result of mortality exceeding gross annual growth.

Table 37. — Net annual growth of growing stock and sawtimber on commercial forest land, by stand age and by softwoods and hardwoods, Mendocino and Sonoma Counties, California, 1967<sup>1</sup>

| Stand age (years)           | Growing stock                 |           |           | Sawtimber                                           |           |           |
|-----------------------------|-------------------------------|-----------|-----------|-----------------------------------------------------|-----------|-----------|
|                             | All species                   | Softwoods | Hardwoods | All species                                         | Softwoods | Hardwoods |
|                             | ---- Thousand cubic feet ---- |           |           | Thousand board feet,<br>International 1/4-inch rule |           |           |
| Nonstocked                  | 270                           | 180       | 90        | 650                                                 | 430       | 220       |
| 0 - 9                       | 5,070                         | 3,160     | 1,910     | 16,190                                              | 13,770    | 2,420     |
| 10 - 19                     | 3,840                         | 2,540     | 1,300     | 10,720                                              | 10,330    | 390       |
| 20 - 29                     | 1,560                         | 1,490     | 70        | 5,520                                               | 5,400     | 120       |
| 30 - 39                     | 9,190                         | 7,900     | 1,290     | 45,700                                              | 42,050    | 3,650     |
| 40 - 49                     | 10,300                        | 8,970     | 1,330     | 60,250                                              | 56,400    | 3,850     |
| 50 - 59                     | 13,320                        | 11,840    | 1,480     | 63,330                                              | 58,000    | 5,330     |
| 60 - 69                     | 11,600                        | 10,060    | 1,540     | 66,650                                              | 61,870    | 4,780     |
| 70 - 79                     | 5,940                         | 5,390     | 550       | 31,490                                              | 30,540    | 950       |
| 80 - 89                     | 2,350                         | 2,090     | 260       | 14,030                                              | 13,330    | 700       |
| 90 - 99                     | 770                           | 70        | 700       | 1,460                                               | 470       | 990       |
| 100 - 119                   | 1,300                         | 1,020     | 280       | 6,840                                               | 6,010     | 830       |
| 120 - 139                   | 190                           | 180       | 10        | 1,200                                               | 1,140     | 60        |
| 140 - 159                   | 320                           | 210       | 110       | 1,510                                               | 1,300     | 210       |
| 160 - 179                   | 630                           | 320       | 310       | 2,560                                               | 1,700     | 860       |
| 180 - 199                   | ---                           | ---       | ---       | ---                                                 | ---       | ---       |
| 200 and over                | 2,410                         | 1,770     | 640       | 9,100                                               | 8,620     | 480       |
| Uneven-aged under 100 years | 31,390                        | 22,790    | 8,600     | 134,690                                             | 120,270   | 14,420    |
| Uneven-aged over 100 years  | 5,940                         | 4,580     | 1,360     | 24,220                                              | 21,800    | 2,420     |
| All ages                    | 106,390                       | 84,560    | 21,830    | 496,110                                             | 453,430   | 42,680    |

<sup>1</sup> Due to lack of data, this table excludes growth on National Forest land.

Table 38. — Average annual mortality of growing stock and sawtimber on commercial forest land, by softwoods and hardwoods and by cause of death, Mendocino and Sonoma Counties, California, 1963-67

| Timber class                                                 | Cause of death |       |         |         |                    |                           |
|--------------------------------------------------------------|----------------|-------|---------|---------|--------------------|---------------------------|
|                                                              | All causes     | Fire  | Insects | Disease | Other <sup>1</sup> | Miscellaneous and unknown |
| ----- Thousand cubic feet -----                              |                |       |         |         |                    |                           |
| Growing stock:                                               |                |       |         |         |                    |                           |
| Softwoods                                                    | 8,970          | 320   | 910     | 1,890   | 2,050              | 3,800                     |
| Hardwoods                                                    | 1,040          | 290   | ---     | 190     | 430                | 130                       |
| Total                                                        | 10,010         | 610   | 910     | 2,080   | 2,480              | 3,930                     |
| ----- Thousand board feet, International 1/4-inch rule ----- |                |       |         |         |                    |                           |
| Sawtimber:                                                   |                |       |         |         |                    |                           |
| Softwoods                                                    | 47,680         | 1,230 | 6,840   | 10,830  | 9,130              | 19,650                    |
| Hardwoods                                                    | 1,690          | 460   | ---     | 470     | 760                | ---                       |
| Total                                                        | 49,370         | 1,690 | 6,840   | 11,300  | 9,890              | 19,650                    |
| ----- Thousand board feet, Scribner rule -----               |                |       |         |         |                    |                           |
| Sawtimber:                                                   |                |       |         |         |                    |                           |
| Softwoods                                                    | 44,710         | 1,170 | 6,430   | 9,960   | 8,740              | 18,410                    |
| Hardwoods                                                    | 1,650          | 450   | ---     | 470     | 730                | ---                       |
| Total                                                        | 46,360         | 1,620 | 6,430   | 10,430  | 9,470              | 18,410                    |

<sup>1</sup> Largely weather killed, some of which had been predisposed to windthrow or windbreak by root rot and heart rot.

Table 39. — Average annual mortality of growing stock on commercial forest land, by species and ownership class, Mendocino and Sonoma Counties, California, 1963-67

(In thousand cubic feet)

| Species              | All<br>ownerships | National<br>Forest | Other<br>public | Forest<br>industry | Farmer and<br>miscellaneous<br>private |
|----------------------|-------------------|--------------------|-----------------|--------------------|----------------------------------------|
| <b>Softwoods:</b>    |                   |                    |                 |                    |                                        |
| Douglas-fir          | 6,270             | 2,280              | 60              | 1,760              | 2,170                                  |
| Redwood              | 620               | ---                | ---             | 260                | 360                                    |
| True firs            | 1,490             | 1,490              | ---             | ---                | ---                                    |
| Ponderosa pine       | 220               | 220                | ---             | ---                | ---                                    |
| Sugar pine           | 230               | 230                | ---             | ---                | ---                                    |
| Other softwoods      | 140               | 10                 | ---             | ---                | 130                                    |
| Total                | 8,970             | 4,230              | 60              | 2,020              | 2,660                                  |
| <b>Hardwoods:</b>    |                   |                    |                 |                    |                                        |
| Red alder            | 130               | ---                | ---             | ---                | 130                                    |
| Tanoak               | 470               | ---                | ---             | 320                | 150                                    |
| California black oak | 190               | ( <sup>1</sup> )   | ---             | ---                | 190                                    |
| Other hardwoods      | 250               | ---                | ---             | 110                | 140                                    |
| Total                | 1,040             | ---                | ---             | 430                | 610                                    |
| All species          | 10,010            | 4,230              | 60              | 2,450              | 3,270                                  |

<sup>1</sup> Less than 5,000 cubic feet.

Table 40. — Average annual mortality of sawtimber on commercial forest land, by species and ownership class, Mendocino and Sonoma Counties, California, 1963-67 (International 1/4-inch rule)

(In thousand board feet)

| Species              | All<br>ownerships | National<br>Forest | Other<br>public | Forest<br>industry | Farmer and<br>miscellaneous<br>private |
|----------------------|-------------------|--------------------|-----------------|--------------------|----------------------------------------|
| Softwoods:           |                   |                    |                 |                    |                                        |
| Douglas-fir          | 35,310            | 12,840             | 420             | 9,840              | 12,210                                 |
| Redwood              | 950               | ---                | ---             | 950                | ---                                    |
| True firs            | 8,360             | 8,360              | ---             | ---                | ---                                    |
| Ponderosa pine       | 1,270             | 1,270              | ---             | ---                | ---                                    |
| Sugar pine           | 1,300             | 1,300              | ---             | ---                | ---                                    |
| Other softwoods      | 490               | 60                 | ---             | ---                | 430                                    |
| Total                | 47,680            | 23,830             | 420             | 10,790             | 12,640                                 |
| Hardwoods:           |                   |                    |                 |                    |                                        |
| Red alder            | ---               | ---                | ---             | ---                | ---                                    |
| Tanoak               | 890               | ---                | ---             | 440                | 450                                    |
| California black oak | 490               | 20                 | ---             | ---                | 470                                    |
| Other hardwoods      | 310               | ---                | ---             | 310                | ---                                    |
| Total                | 1,690             | 20                 | ---             | 750                | 920                                    |
| All species          | 49,370            | 23,850             | 420             | 11,540             | 13,560                                 |

Table 41. — Average annual mortality of growing stock on commercial forest land, by forest type and ownership class, Mendocino and Sonoma Counties, California, 1963-67  
(In thousand cubic feet)

| Forest type     | All<br>ownerships | National<br>Forest | Other<br>public | Forest<br>industry | Farmer and<br>miscellaneous<br>private |
|-----------------|-------------------|--------------------|-----------------|--------------------|----------------------------------------|
| Douglas-fir     | 4,180             | 2,280              | 60              | 610                | 1,230                                  |
| Redwood         | 1,050             | ---                | ---             | 580                | 470                                    |
| True firs       | 1,480             | 1,480              | ---             | ---                | ---                                    |
| Pines           | 600               | 470                | ---             | ---                | 130                                    |
| Other softwoods | ---               | ---                | ---             | ---                | ---                                    |
| Hardwoods       | 2,700             | ( <sup>1</sup> )   | ---             | 1,260              | 1,440                                  |
| Nonstocked      | ---               | ---                | ---             | ---                | ---                                    |
| All types       | 10,010            | 4,230              | 60              | 2,450              | 3,270                                  |

<sup>1</sup> Less than 5,000 cubic feet.

Table 42. — Average annual mortality of sawtimber on commercial forest land, by forest type and ownership class, Mendocino and Sonoma Counties, California, 1963-67 (International 1/4-inch rule)  
(In thousand board feet)

| Forest type     | All<br>ownerships | National<br>Forest | Other<br>public | Forest<br>industry | Farmer and<br>miscellaneous<br>private |
|-----------------|-------------------|--------------------|-----------------|--------------------|----------------------------------------|
| Douglas-fir     | 20,270            | 12,830             | 420             | 1,770              | 5,250                                  |
| Redwood         | 3,330             | ---                | ---             | 2,880              | 450                                    |
| True firs       | 8,360             | 8,360              | ---             | ---                | ---                                    |
| Pines           | 3,060             | 2,640              | ---             | ---                | 420                                    |
| Other softwoods | ---               | ---                | ---             | ---                | ---                                    |
| Hardwoods       | 14,350            | 20                 | ---             | 6,890              | 7,440                                  |
| Nonstocked      | ---               | ---                | ---             | ---                | ---                                    |
| All types       | 49,370            | 23,850             | 420             | 11,540             | 13,560                                 |

Table 43. — Average annual mortality of growing stock and sawtimber on commercial forest land by species and county, Mendocino and Sonoma Counties, California, 1963-67

| Species              | Growing stock               |                  |               | Sawtimber                                           |                  |               |
|----------------------|-----------------------------|------------------|---------------|-----------------------------------------------------|------------------|---------------|
|                      | All counties                | Mendocino County | Sonoma County | All counties                                        | Mendocino County | Sonoma County |
|                      | --- Thousand cubic feet --- |                  |               | Thousand board feet,<br>International 1/4-inch rule |                  |               |
| Softwoods:           |                             |                  |               |                                                     |                  |               |
| Douglas-fir          | 6,270                       | 4,800            | 1,470         | 35,310                                              | 26,410           | 8,900         |
| Redwood              | 620                         | 420              | 200           | 950                                                 | 950              | ---           |
| True firs            | 1,490                       | 1,490            | ---           | 8,360                                               | 8,360            | ---           |
| Ponderosa pine       | 220                         | 220              | ---           | 1,270                                               | 1,270            | ---           |
| Sugar pine           | 230                         | 230              | ---           | 1,300                                               | 1,300            | ---           |
| Other softwoods      | 140                         | 140              | ---           | 490                                                 | 490              | ---           |
| Total                | 8,970                       | 7,300            | 1,670         | 47,680                                              | 38,780           | 8,900         |
| Hardwoods:           |                             |                  |               |                                                     |                  |               |
| Red alder            | 130                         | 130              | ---           | ---                                                 | ---              | ---           |
| Tanoak               | 470                         | 150              | 320           | 890                                                 | 450              | 440           |
| California black oak | 190                         | ( <sup>1</sup> ) | 190           | 490                                                 | 20               | 470           |
| Other hardwoods      | 250                         | 110              | 140           | 310                                                 | 310              | ---           |
| Total                | 1,040                       | 390              | 650           | 1,690                                               | 780              | 910           |
| All species          | 10,010                      | 7,690            | 2,320         | 49,370                                              | 39,560           | 9,810         |

<sup>1</sup> Less than 5,000 cubic feet.

Table 44. — Net volume of salvable dead sawtimber on commercial forest land, by species and county, Mendocino and Sonoma Counties, California, January 1, 1968

| Species         | Growing stock                   |                  |               | Sawtimber                                           |                  |               |
|-----------------|---------------------------------|------------------|---------------|-----------------------------------------------------|------------------|---------------|
|                 | All counties                    | Mendocino County | Sonoma County | All counties                                        | Mendocino County | Sonoma County |
|                 | ----- Thousand cubic feet ----- |                  |               | Thousand board feet,<br>International 1/4-inch rule |                  |               |
| Douglas-fir     | 15,970                          | 11,040           | 4,930         | 108,600                                             | 74,900           | 33,700        |
| Redwood         | 2,580                           | 1,730            | 850           | 12,310                                              | 7,600            | 4,710         |
| Ponderosa pine  | 1,000                           | 1,000            | ---           | 6,350                                               | 6,350            | ---           |
| Bishop pine     | 630                             | 630              | ---           | 1,860                                               | 1,860            | ---           |
| Tanoak          | 1,000                           | 1,000            | ---           | 2,460                                               | 2,460            | ---           |
| Other hardwoods | 720                             | 720              | ---           | 2,070                                               | 2,070            | ---           |
| All species     | 21,900                          | 16,120           | 5,780         | 133,650                                             | 95,240           | 38,410        |

Table 45. — Net volume of salvable dead sawtimber on commercial forest land, by volume-per-acre class and by county, Mendocino and Sonoma Counties, California, January 1, 1968

| Volume-per-acre class | All counties                                                 | Mendocino County | Sonoma County |
|-----------------------|--------------------------------------------------------------|------------------|---------------|
|                       | ----- Thousand cubic feet -----                              |                  |               |
| Cubic feet:           |                                                              |                  |               |
| 1 - 199               | 2,350                                                        | 2,350            | ---           |
| 200 - 499             | 13,230                                                       | 8,740            | 4,490         |
| 500 - 999             | 5,070                                                        | 3,780            | 1,290         |
| 1,000 - 1,999         | 1,250                                                        | 1,250            | ---           |
| 2,000 or more         | ---                                                          | ---              | ---           |
| All classes           | 21,900                                                       | 16,120           | 5,780         |
|                       | ----- Thousand board feet, International 1/4-inch rule ----- |                  |               |
| Board feet:           |                                                              |                  |               |
| 1 - 499               | 6,400                                                        | 6,400            | ---           |
| 500 - 999             | ---                                                          | ---              | ---           |
| 1,000 - 2,499         | 83,890                                                       | 53,310           | 30,580        |
| 2,500 - 4,999         | 24,580                                                       | 19,870           | 4,710         |
| 5,000 - 9,999         | 18,780                                                       | 15,660           | 3,120         |
| 10,000 or more        | ---                                                          | ---              | ---           |
| All classes           | 133,650                                                      | 95,240           | 38,410        |

Table 46. — Reported timber production, Mendocino and Sonoma Counties, California, 1947-69

(Million board feet)<sup>1</sup>

| Year | Total | Mendocino<br>County | Sonoma<br>County |
|------|-------|---------------------|------------------|
| 1947 | 232   | 211                 | 21               |
| 1948 | 356   | 316                 | 40               |
| 1949 | 413   | 365                 | 48               |
| 1950 | 575   | 520                 | 55               |
| 1951 | 830   | 753                 | 77               |
| 1952 | 881   | 805                 | 76               |
| 1953 | 1,011 | 927                 | 84               |
| 1954 | 1,128 | 994                 | 134              |
| 1955 | 1,243 | 1,030               | 213              |
| 1956 | 1,202 | 990                 | 212              |
| 1957 | 1,000 | 792                 | 208              |
| 1958 | 985   | 796                 | 189              |
| 1959 | 880   | 623                 | 257              |
| 1960 | 841   | 635                 | 206              |
| 1961 | 824   | 683                 | 141              |
| 1962 | 884   | 727                 | 157              |
| 1963 | 785   | 634                 | 151              |
| 1964 | 730   | 611                 | 119              |
| 1965 | 657   | 540                 | 117              |
| 1966 | 568   | 487                 | 81               |
| 1967 | 552   | 493                 | 59               |
| 1968 | 638   | 561                 | 77               |
| 1969 | 603   | 525                 | 78               |

Source: California Division of Forestry (1948-71).

<sup>1</sup>Log rule unspecified.

# RELIABILITY OF CURRENT INVENTORY DATA

## Forest Land Area and Timber Volume

The estimates of forest land area and timber volume in Mendocino and Sonoma Counties were derived by sampling and consequently have sampling errors. Sampling errors have been computed for the estimates of commercial forest land area, noncommercial forest land area, net cubic-foot volume of growing stock, and net board-foot volume (International 1/4-inch rule) of sawtimber. These are presented in table 47 as a percent of the

estimated total at the 68-percent and 95-percent probability levels. They may be interpreted as meaning that the odds are two out of three for 68-percent probability or 19 out of 20 for 95-percent probability, that the ranges shown include the true value (i.e., the results of a 100-percent inventory). For example, if the statement is made that the total sawtimber volume which would result from a 100-percent cruise lies somewhere between 17,300 million board feet and 20,974 million board feet, the statement has 19 chances in 20 of being correct.

*Table 47. — Sampling errors of estimates of forest area and timber volume*

| Item                                    | Estimated total           | Sampling error in percent |                        |
|-----------------------------------------|---------------------------|---------------------------|------------------------|
|                                         |                           | 68-percent probability    | 95-percent probability |
| Commercial forest land                  | 1,564,000 acres           | ± 1.9                     | ± 3.7                  |
| Noncommercial forest land               | 723,000 acres             | ± 4.3                     | ± 8.4                  |
| Volume:                                 |                           |                           |                        |
| Growing stock                           | 4,286 million cubic feet  | ± 4.4                     | ± 8.6                  |
| Sawtimber (International 1/4-inch rule) | 19,137 million board feet | ± 4.9                     | ± 9.6                  |

In addition to measurable sampling errors, there may be other, nonsampling errors due to mistakes in judgment, measurement, and compilation. The magnitude of errors from these sources cannot be determined. However, such errors are kept to a minimum through training, supervision, field checking, and complete editing and machine verification in compiling the data.

The sampling error of any breakdown of these totals will be substantially greater than for the total. The smaller the breakdown, the larger the sampling error. An approximation of the increasing sampling error can be obtained from table 48, which shows the sampling error associated with smaller estimates.

Table 48. — Approximate sampling error by size of estimate

| Commercial forest land |                             | Growing stock             |                             | Sawtimber                                              |                             |
|------------------------|-----------------------------|---------------------------|-----------------------------|--------------------------------------------------------|-----------------------------|
| Area                   | Sampling error <sup>1</sup> | Volume                    | Sampling error <sup>1</sup> | Volume                                                 | Sampling error <sup>1</sup> |
| <i>Thousand acres</i>  | <i>Percent</i>              | <i>Million cubic feet</i> | <i>Percent</i>              | <i>Million board feet, International 1/4-inch rule</i> | <i>Percent</i>              |
| 1,564                  | 1.9                         | 4,286                     | 4.4                         | 19,137                                                 | 4.9                         |
| 1,412                  | 2.0                         | 3,319                     | 5.0                         | 18,381                                                 | 5.0                         |
| 627                    | 3.0                         | 830                       | 10.0                        | 4,592                                                  | 10.0                        |
| 352                    | 4.0                         | 369                       | 15.0                        | 2,042                                                  | 15.0                        |
| 226                    | 5.0                         | 207                       | 20.0                        | 1,149                                                  | 20.0                        |
| 56                     | 10.0                        | 133                       | 25.0                        | 735                                                    | 25.0                        |
| 25                     | 15.0                        | 92                        | 30.0                        | 510                                                    | 30.0                        |
| 14                     | 20.0                        | 52                        | 40.0                        | 287                                                    | 40.0                        |
| 9                      | 25.0                        | 33                        | 50.0                        | 184                                                    | 50.0                        |
| 6                      | 30.0                        | 23                        | 60.0                        | 128                                                    | 60.0                        |
| 5                      | 35.0                        | 8                         | 100.0                       | 45                                                     | 100.0                       |
| 4                      | 40.0                        |                           |                             |                                                        |                             |
| 3                      | 45.0                        |                           |                             |                                                        |                             |
| 2                      | 50.0                        |                           |                             |                                                        |                             |

<sup>1</sup> By random sampling formula; 68-percent probability.

# FOREST SURVEY PROCEDURES

The data presented in this report are from three sources. The estimates for Mendocino National Forest within Mendocino County are based on a compilation — made by this Station — of plot data supplied by the Division of Timber Management, Region 5, of the U. S. Forest Service. These plot data were collected in the summers of 1962, 1963, and 1964 by Mendocino National Forest personnel. The field data for Sonoma County were collected in the summer of 1965 by the Forest Survey project of the Pacific Southwest Forest and Range Experiment Station. The field data for Mendocino County, other than National Forest, were collected in the summer of 1967 by the Forest Survey project, Pacific Northwest Forest and Range Experiment Station. A date of January 1, 1968, was selected to accommodate the largest and most dynamic segment of the inventory unit, Mendocino County. Although this date is given for all inventory data presented in this report, no updating was done to bring all data forward to this common date. However, the areas with older data — Sonoma County and National Forest lands in Mendocino County — likely experienced only nominal changes in their timber resources between time of data collection and January 1, 1968.

The same general standards and definitions were used for all the inventory projects for which data are brought together in this report. The same sampling design was used for all three projects.

A systematic grid of photo points was printed on a set of aerial photographs covering the entire survey unit. Each photo point was classified by major land use — commercial forest land, noncommercial forest land, and nonforest land — and ownership. The commercial forest land photo points were further classified into stand volume classes.

A stratified random sample of field plots, proportional to stratum area, was then selected from the photo points. This sample of photo points was visited in the field, and the accuracy of the photo classification of land use and ownership was checked. At each location falling on commercial forest land, an inventory plot was established.

The combined inventories for all owners in Mendocino and Sonoma Counties required classification of 11,726 photo points, establishment of 394 permanent plots on commercial forest land, and field checking on 377 sample locations on noncommercial and non-forest land.

## National Forest Lands

The inventory plots established on National Forest land were 2/5-acre circular plots. Information on timber volume and forest conditions on these plots, expanded first to per-acre levels, then to stratum area levels, was the basis for estimates of live and dead timber volume, and the condition and characteristics of the forested area of Mendocino National Forest within Mendocino County. Growth and mortality estimates for this area were derived by applying growth and mortality rates, by species, to the timber volume estimates. These rates, supplied by Region 5 of the Forest Service, were derived from remeasurement of permanent growth and mortality plots on the west side of the Mendocino National Forest.

## Lands Outside National Forests

On lands other than National Forests, each of the inventory plots consisted of 10 sample points distributed systematically over an acre. The variable-radius plot sampling principle was used at each sample point to select trees

to be tallied. The summation of the 10-point tally expressed the resources and conditions for the acre. Expansion of the acre samples to stratum area levels provided the inventory estimates of timber volume and forest conditions and characteristics.

These plots also provided data on growth and mortality. Increment cores were taken from trees on the field plots to determine radial growth; these increment data were used to develop multiple regression equations of diameter growth. The regression estimators

were used to estimate the diameter of all trees tallied in the inventory 1 year prior to the base date of the inventory. Gross growth — for the year 1967 — is the difference between the net volumes computed for “past” and “present” diameters.

Annual mortality estimates were based on “postdating,” or estimating the time of death of dead trees found on the plots. Former growing-stock trees estimated to have died within the 5 years preceding the date of inventory were tallied as “mortality.”

# DEFINITION OF TERMS

## Land Area

### Total Land Area

Includes dry land and land temporarily or partially covered by water, such as marshes, swamps, and river flood plains; streams, sloughs, and canals less than one-eighth mile wide; and lakes, reservoirs, and ponds less than 40 acres in area.

### Forest Land Area

Land at least 16.7 percent stocked by trees of any size, or formerly having such tree cover, and not currently developed for non-forest use. Minimum area of forest land recognized is 1 acre.

### Nonforest Land Area

Land that has never supported forests and land formerly forested where use for timber management is precluded by development for other uses. Included are areas used for agricultural crops, improved pasture, residential areas, city parks, improved roads of any width and right-of-way clearings, powerline clearings of any width, and 1 to 40 acres of water classified by the Bureau of the Census as land. If intermingled in forest areas, unimproved roads and other nonforest strips must be more than 120 feet wide, and clearings, etc., more than 1 acre in size, to qualify as nonforest land.

## Forest Land Classes

### Commercial Forest Land Area

Forest land which is producing or capable of producing industrial wood and not withdrawn from timber utilization.

### Noncommercial Forest Land Area

Unproductive forest land incapable of yielding crops of industrial wood because of adverse site conditions, and productive public forest land withdrawn from commercial timber use through statute or administrative regulation.

*Productive reserved.* — Public forest land withdrawn from timber utilization through statute, ordinance, or administrative order, but which otherwise qualifies as commercial forest land.

*Unproductive.* — Forest land incapable of yielding crops of industrial wood products (usually sawtimber) because of adverse site conditions, such as sterile soil, poor drainage, high elevation, steepness, and rockiness.

## Forest Types

Forest types are determined on the basis of species plurality of all live trees that contribute to stocking, considering both size and spacing.

## Tree Classes

### Growing-stock Trees

Sawtimber trees, poletimber trees, saplings and seedlings; that is, all live trees except cull trees.

*Sawtimber trees (11.0-inch d.b.h. and larger).* — Live trees of commercial species that contain at least one 12-foot softwood saw log with a top diameter not less than 6 inches inside bark, or one 8-foot hardwood saw log with a top diameter not less than 8 inches inside bark. At least 25 percent of the

board-foot volume in the sawtimber trees must be free of defect.

*Poletimber trees (5.0- to 10.9-inch d.b.h.).* — Live trees of commercial species not less than 50 percent sound on a cubic-foot basis and with no disease, defects, or deformities which are likely to prevent them from becoming growing-stock sawtimber trees.

*Sapling and seedling trees (less than 5.0-inch d.b.h.).* — Live trees of commercial species with no disease, defects, or deformities which are likely to prevent them from becoming growing-stock poletimber trees.

### **Nongrowing-stock Trees**

*Cull trees.* — Trees of noncommercial species and trees of commercial species which are too defective or which are unlikely to become growing-stock trees due to deformity, disease, low vigor, etc.

*Sound cull trees.* — Trees of noncommercial species, or with excessive defect due to form, roughness, etc.

*Rotten cull trees.* — Trees with excessive defect due primarily to rot.

*Mortality trees.* — Trees of commercial species which died from natural causes and which were not cull trees at the time of death.

*Salvable dead trees.* — Standing or down dead trees of commercial species 11.0 inches or more in diameter that contain 25 percent or more of sound volume and at least one merchantable 16-foot softwood or 8-foot hardwood saw log.

### **Stand-size Classes**

#### **Sawtimber Stand**

Stand at least 16.7 percent stocked with growing-stock trees, with half or more of this stocking in sawtimber and poletimber trees, and with sawtimber stocking equal to or greater than poletimber stocking.

*Large sawtimber stand.* — Stand in which the majority of the sawtimber stocking is in trees 21.0-inch d.b.h. and larger.

*Small sawtimber stand.* — Stand in which the majority of the sawtimber stocking is in trees from 11.0 to 20.9-inch d.b.h.

#### **Poletimber Stand**

Stand at least 16.7 percent stocked with growing-stock trees, with half or more of this stocking in sawtimber and poletimber trees, and with poletimber stocking exceeding sawtimber stocking.

#### **Sapling and Seedling Stand**

Stand at least 16.7 percent stocked with growing-stock trees, with more than half of this stocking in saplings and/or seedlings.

#### **Nonstocked Area**

An area of commercial forest land less than 16.7 percent stocked with growing-stock trees.

### **Stocking**

Stocking is a means of expressing the extent to which growing space is effectively utilized by present or potential growing-stock trees of commercial species. "Percent of stocking" is synonymous with "percentage of growing space occupied" and means the ratio of actual stocking to full stocking for comparable sites and stands. Basal area is used as a basis for measuring stocking.

"Stocking percentages" express current area occupancy in relation to specified standards for full stocking based on number, size, and spacing of trees considered necessary to fully utilize the forest land.

Full utilization of the site is assumed to occur over a range of basal area. As an interim guide, 60 percent of the normal yield table values has been used to establish the lower limit of this range which represents full site occupancy. This is called 100-percent stocking. The upper limit to full stocking has been set at 132 percent. Sites with less than 100-percent stocking represent understocking with less than full site occupancy. Overstocking is characterized by sites that have over 132-percent stocking.

### **Age**

#### **Stand Age**

Stand age is based upon growing-stock

stocking. In order for a stand to be even-aged, a majority of the growing-stock stocking must be in two adjacent age classes. Stands that do not meet this criterion are classified as uneven-aged.

#### **Old-growth Sawtimber Stand**

Sawtimber stand in which 50 percent or more of the growing-stock stocking is in trees at least 100 years old.

#### **Young-growth Sawtimber Stand**

Sawtimber stand in which more than 50 percent of the growing-stock stocking is in trees less than 100 years old.

### **Timber Volume**

#### **Live Sawtimber Volume**

Net volume in board feet of live sawtimber trees of commercial species. Net volume equals gross volume less deduction for rot, sweep, crook, and other defects that affect use for lumber.

*Scribner rule.* — The common board-foot log rule used in determining volume of sawtimber in California. Scribner volume in Mendocino and Sonoma Counties was measured in terms of 16-foot logs.

*International 1/4-inch rule.* — The standard board-foot log rule adopted nationally by the Forest Service for the presentation of Forest Survey volume statistics.

*Saw-log portion.* — That part of the bole of sawtimber trees between the stump and the saw-log top.

*Upper stem portion.* — That part of the bole of sawtimber trees above the saw-log top to a minimum top diameter of 4 inches outside bark or to the point where the central stem breaks into limbs.

#### **Growing-stock Volume**

Net volume in cubic feet of live sawtimber trees and live poletimber trees from stump to a minimum 4.0-inch top (of central stem) outside bark. Net volume equals gross volume less deduction for rot and missing bole sections.

#### **All Timber Volume**

Net volume in cubic feet of live and salvageable dead sawtimber trees and poletimber trees of commercial species, and cull trees of all species, from stump to a minimum 4.0-inch top outside bark.

#### **Industrial Wood**

All roundwood products, except fuelwood.

### **Net Annual Growth**

The increase in volume of a specified size class for a specific year. (Components of net annual growth include the increment in net volume of trees at the beginning of the specific year surviving to the year's end, plus volume of trees reaching the size class during the year, minus the volume of trees that died during the year, minus the net volume of trees that became culls during the year.)

### **Ownership Classes**

#### **National Forest Lands**

Federal lands which have been designated by Executive order or statute as National Forests or purchase units, and other lands under the administration of the Forest Service, including experimental areas and Bankhead-Jones title III lands.

#### **Other Public Lands**

Federal lands other than National Forests, including lands administered by the Bureau of Land Management, Bureau of Indian Affairs, and miscellaneous Federal agencies; and lands owned by States, counties, and local public agencies, including lands leased by these governmental units for more than 50 years.

#### **Forest Industry Lands**

Lands owned by companies or individuals operating wood-using plants.

#### **Farmer-owned Lands**

Lands owned by operators of farms.

#### **Miscellaneous Private Lands**

Privately owned lands other than forest industry or farmer-owned lands.

# TREE SPECIES

Principal tree species found on the commercial forest land in Mendocino and Sonoma Counties include:

## Softwoods:

California red fir (*Abies magnifica* var. *magnifica*)  
Douglas-fir (*Pseudotsuga menziesii*)  
Grand fir (*Abies grandis*)  
Incense-cedar (*Libocedrus decurrens*)  
Jeffrey pine (*Pinus jeffreyi*)  
Knobcone pine (*Pinus attenuata*)  
Ponderosa pine (*Pinus ponderosa*)  
Lodgepole pine (*Pinus contorta*)  
Bishop pine (*Pinus muricata*)  
Redwood (*Sequoia sempervirens*)  
Sitka spruce (*Picea sitchensis*)  
Sugar pine (*Pinus lambertiana*)  
Western hemlock (*Tsuga heterophylla*)  
Western redcedar (*Thuja plicata*)  
White fir (*Abies concolor*)

## Hardwoods:

Bigleaf maple (*Acer macrophyllum*)  
California black oak (*Quercus kelloggii*)  
California-laurel (*Umbellularia californica*)  
California live oak (*Quercus agrifolia*)  
California white oak (*Quercus lobata*)  
Canyon live oak (*Quercus chrysolepis*)  
Eucalyptus (*Eucalyptus* spp.)  
Golden chinkapin (*Castanopsis chrysophylla*)  
Interior live oak (*Quercus wislizenii*)  
Oregon white oak (*Quercus garryana*)  
Pacific madrone (*Arbutus menziesii*)  
Red alder (*Alnus rubra*)  
Tanoak (*Lithocarpus densiflorus*)  
White alder (*Alnus rhombifolia*)

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This report presents the findings of the first complete inventory of the timber resources of Mendocino and Sonoma Counties, California. Accompanying the tables of detailed forest area, volume, growth, and mortality statistics is an analysis of the present timber resource, with emphasis on conditions that affect present and future timber production.

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# SELECTED FOREST SURVEY PUBLICATIONS

## Resource Bulletins:

|        |                                                           |      |
|--------|-----------------------------------------------------------|------|
| PNW-38 | 1970 Oregon Timber Harvest                                | 1971 |
| PNW-37 | 1970 Washington Timber Harvest                            | 1971 |
| PNW-36 | Timber Resources of the Puget Sound Area, Washington      | 1971 |
| PNW-35 | California's Forest Industries — Prospects for the Future | 1970 |
| PNW-34 | 1969 Washington Timber Harvest                            | 1970 |
| PNW-33 | 1969 Oregon Timber Harvest                                | 1970 |
| PNW-32 | Forest Resources of the Susitna Valley, Alaska            | 1970 |
| PNW-31 | The Timber Resources of the Olympic Peninsula, Washington | 1969 |
| PNW-30 | 1968 Oregon Timber Harvest                                | 1969 |
| PNW-29 | 1968 Oregon Timber Harvest                                | 1969 |
| PNW-26 | The Timber Resources of Humboldt County, California       | 1968 |
| PNW-24 | Timber Resource Statistics for Central Oregon             | 1968 |
| PNW-19 | Alaska's Forest Resource                                  | 1967 |
| PNW-17 | Forest Industries of Eastern Washington                   | 1966 |
| PNW-15 | Timber Resource Statistics for Southwest Washington       | 1965 |
| PNW-12 | The Timber Situation and Outlook for Northwest Oregon     | 1965 |
| PNW-11 | Hardwood Timber Resources of the Douglas-fir Subregion    | 1965 |
| PNW-10 | Forest Statistics for West-central Oregon                 | 1965 |
| PNW-9  | Timber Resource Statistics for the Pacific Northwest      | 1965 |
| PNW-8  | Forest Statistics for Southwest Oregon                    | 1964 |
| PNW-7  | Forest Statistics for Northwest Oregon                    | 1964 |
| PNW-3  | Toward Complete Use of Eastern Oregon's Forest Resources  | 1963 |

## Research Paper:

|        |                                                                                      |      |
|--------|--------------------------------------------------------------------------------------|------|
| PNW-84 | Projected Developments of the Timber Economy of the<br>Columbia-North Pacific Region | 1969 |
|--------|--------------------------------------------------------------------------------------|------|

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The FOREST SERVICE of the U.S. Department of Agriculture is dedicated to the principle of multiple use management of the Nation's forest resources for sustained yields of wood, water, forage, wildlife, and recreation. Through forestry research, cooperation with the States and private forest owners, and management of the National Forests and National Grasslands, it strives — as directed by Congress — to provide increasingly greater service to a growing Nation.

