

CANDIDATE OLD-GROWTH ON NATIONAL FOREST
SYSTEM ADMINISTERED LANDS IN CALIFORNIA
SINCE THE INITIATION OF NATIONAL FOREST MANAGEMENT

by
William F. Laudenslayer, Jr.

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Fisheries and Wildlife Management Staff, USDA Forest Service,
Pacific Southwest Region, San Francisco, Calif.

SUMMARY

The following is a report on the status of Candidate Old-growth (hereafter identified as COG) on National Forest System administered lands in California in the past, at present, and in the immediate future. These results are based on information that may be speculative and contain inconsistencies, and therefore must be treated with caution. COG on these lands has declined substantially since 1900 or about the time the National Forest System was established. Estimated declines are from about 4 million acres in 1900 to about 2 million acres at present--a decline of about 50 percent.

Currently, most (70%) of the COG is reported from lands considered to be capable, available, and suitable (i.e., CAS) for timber production, however, this value may have changed substantially as a result of passage of the California Wilderness Bill. Spotted Owl Management Areas include about 0.5 million acres of "suitable" habitat; much of this acreage is comprised of COG.

In the immediate future (i.e., within the next five decades), acreage of COG will continue to decline under most of the forest plan alternatives examined but at a much slower rate than in the past. By 2035, the amount of COG remaining on California National Forests would range between 2 and 1.3 million acres under the wilderness and commodity production alternatives respectively.

INTRODUCTION

Perpetuation of old-growth forests on National Forest System administered lands has become a difficult management issue. Old-growth conditions may be necessary for the continued survival of spotted owl populations, at least those of the northern subspecies (Heinrichs 1983) and, perhaps other species (e.g., Del Norte salamander, winter wren, hermit warbler, western red-backed vole, fisher--M. Raphael, pers. com.). Conversely, old-growth forests are sources of large amounts of timber products--"about half of the nations' timber supply is in forests on public lands in the west that are commonly called "old-growth"" (Society of American Foresters Task Force 1983:1) and, if current rates of harvest continue, "most remaining old-growth forests on commercial timberland will have been put into 60- to 80-year rotations by the year 2020" (Heinrichs 1983:212).

Although old-growth forests are declining in extent, implications of these declines are poorly known. Information about the relationships of plants and animals to old-growth forests, in most cases, is lacking and cause and effect information is virtually non-existent. To meet this critical information need, the Old-Growth Forest Wildlife Habitat Research and Development Program was established. Objectives of this program are to plan, initiate, coordinate, and provide leadership for research in old-growth forest ecosystems, principally "west-side" Douglas-fir forests (Forest Service 1982). Some of the questions that this program will address are "1. Do old-growth forest stands represent a unique coniferous forest ecosystem? 2. If unique, what is the character of those stands and how can their contribution to coniferous forest ecosystems be perpetuated? 3. Do these old-growth stands contain a distinct faunal association and do certain animal groups or species depend on old-growth for optimum habitat? 4. If some species are dependent, how much old-growth is needed, how should it be distributed, connected, and otherwise arranged to ensure the continued viability of these dependent species?" (Forest Service 1982).

Perhaps the most basic question to be answered by the old-growth research program is simply "what are the characteristics of an old-growth forest?" Attempts have been made to describe old-growth Douglas-fir (Franklin et al. 1981, Society of American Foresters Task Force 1983, Old-growth Definition Task Group 1985) and Sierra Nevada mixed-conifer (Old-growth Definition Task Group 1985). However, old-growth conditions have not been described for other vegetation types, and perhaps more importantly, the descriptions mentioned above are not necessarily linked to current National Forest inventory procedures.

In addition to information on old-growth forest ecology and characteristics, forest managers need to know the amount of old-growth that exists at present, existed in the past, and will exist in the future. This report provides a first approximation of the quantities of old-growth existing currently, in the past about the time of the establishment of the National Forest System, and projected into the future, over the next 5 decades. It also presents quantities of old-growth by timber types and management areas (e.g., CAS lands, wilderness, Spotted Owl Management Areas) as well as the amount of old-growth that is well distributed in contrast to concentrated. This report, however, does not speculate about the causes of the decline of old-growth in California. Declines resulting from factors such as wildfire, timber harvest, beetle kills, and development of transportation systems (e.g., roads, power lines, aqueducts and reservoirs) are largely unknown and, thus, it was not possible to assign declines of old-growth acreages to specific causative factors.

METHODS

Information on acreages of different timber type strata can be extracted from forest land management planning data bases, however, as noted above, this information set does not include data on the extent of old-growth per se because, in general, old-growth has not been defined for the majority of timber types. Therefore, it was necessary to identify timber type strata that would approximate old-growth; J. Levitan, P. Aune, G.L. Benson, G.E. Hartman, and I identified those timber strata which most closely approximated old-growth conditions for Douglas-fir, eastside pine, lodgepole pine, mixed conifer, ponderosa pine, red fir, and redwood (see glossary for timber strata criteria used to identify potential old-growth). These timber type strata are designated "Candidate Old-Growth" (hereafter referred to as COG) to clearly indicate that the estimates are approximations of old-growth.

Information on COG was solicited from the 18 National Forest System units (i.e., 17 National Forests and Lake Tahoe Basin Management Unit) administered by the Pacific Southwest Region in California; all units were supplied standard survey forms with instructions for compiling the information requested. Information on acreages of COG was requested for past years (i.e., 1900, 1960), the present by timber types and areas of management treatment (e.g., amount of COG on capable, available, and suitable lands for timber production), and for the future (i.e., in 3 and 5 decades) by four alternatives (i.e., high wilderness, current direction, preferred, and high commodity). Information on the distribution of COG (i.e., concentrated or well distributed) also was requested for the present and in future years. Information on acreages of Spotted Owl Management Areas was supplied by the Threatened and Endangered Species Group Leader of the Pacific Southwest Region Office.

COG information submitted by National Forest System units varied in reliability by time period. COG estimates for past years (i.e., 1900, 1960) were based on what little data are available and best professional judgements. COG estimates for present and future years were based on forest land management planning data bases and projections from draft forest plans with accuracies dependent on the assumptions and errors inherent in the data sets. Most forests submitted completed survey forms by 1 January 1985; therefore those projections of COG into the future contained in this report may differ from those of the forest plans when implemented.

As noted above, information on COG was acquired from each of 18 National Forest units in California under the jurisdiction of the Pacific Southwest Region. To reduce this information to a manageable set, I summarized the data set for each of four zones and all of California. Forests were grouped into four zones (Table 1) as follows: Western Sierra included those units which generally occupy the western slope of the Sierra Nevada; North Coast Cascades included those units which generally occupy the northwestern portion of California including the coast ranges; Southern California included those units generally found in the southern coast and transverse ranges; and Northeast Interior included those units in the northeastern part of the state. Although these divisions are somewhat arbitrary, forests in each zone generally are under similar climatic regimes, support similar vegetation assemblages, and have similar past, present, and future management situations.

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TABLE 1

National Forest System Units Grouped into Four
Zones for Candidate Old-growth Analysis

<u>ZONES</u>			
<u>Western Sierra</u>	<u>North Coast Cascades</u>	<u>Southern California</u>	<u>Northeast Interior</u>
Plumas	Six Rivers	Los Padres	Modoc
Tahoe	Klamath	Angeles	Lassen
Eldorado	Shasta-Trinity	San Bernardino	Lake Tahoe
Stanislaus	Mendocino	Cleveland	Basin Mgmt.
Sierra			Unit
Sequoia			Inyo

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Analysis of the COG information was restricted to totals and means for the four zones and state-wide data sets. I decided to avoid subjecting the information to more sophisticated analysis because (1) the data sets were, in large part, based on gross estimates, (2) not all forests completed the entire data form, thus there are gaps in the data set, and (3) each forest summarized their raw data for the entire forest so submissions were already in the form of means and totals.

RESULTS

COG--PAST, PRESENT, FUTURE

The amount of COG remaining on National Forests in California has declined since the initiation of Forest Service management shortly after 1900 (Fig. 1) however, the rate of decline varied by zone. The rate of decline of COG in the Western Sierra zone was greater than that of any other zone whereas COG in the Southern California zone declined only slightly.

Future trends of the amount of COG remaining under the alternatives most likely to be implemented (i.e., the "preferred alternatives") generally show (Fig. 1) a leveling off in the rate of decline. In fact, COG in the Western Sierra and Northeast Interior zones is predicted to increase by the year 2035.

EXISTING COG

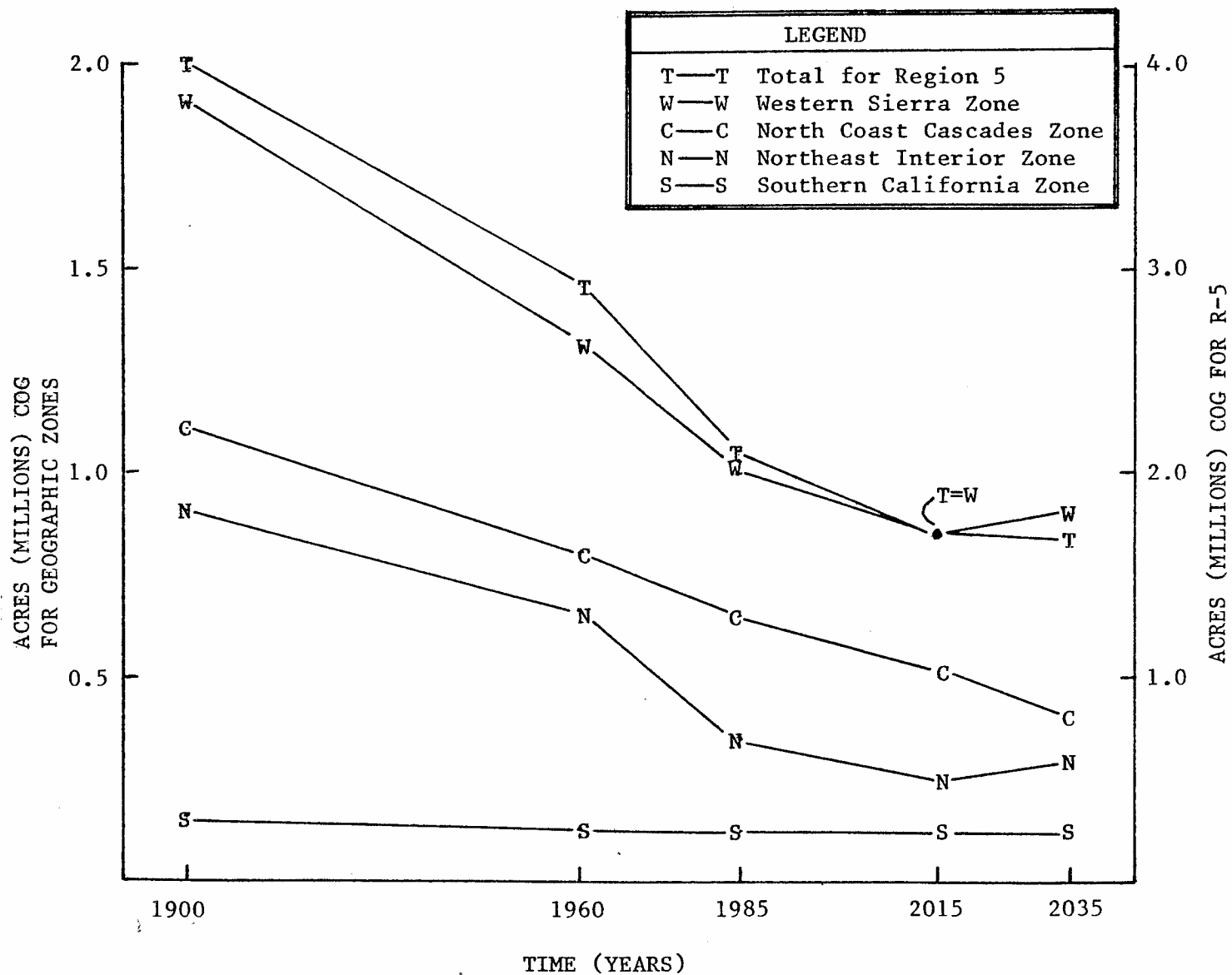
By Timber Type

The largest quantities of COG currently are found in the mixed conifer timber type (Fig. 2). Approximately half of the COG within the Region and Western Sierra and North Coast Cascades zones is comprised of the mixed conifer timber type. Other large acreages of COG are found in Douglas-fir (North Coast Cascades zone), red fir (Western Sierra and Northeast Interior zones), and lodgepole pine (Western Sierra and Northeast Interior zones).

By Type of Management Area

COG remaining today largely falls on lands considered to be capable, available, and suitable (CAS) for timber production (Fig. 3), however, the proportion of COG on CAS lands varies among the four zones. The majority (81%) of the Western Sierra COG is on CAS lands whereas a smaller proportion of COG (37-65%) falls on CAS lands in the other zones.

FIGURE 1. Acreage of Candidate Old Growth (COG)--1900-2035 ^{a/}



^{a/} Future acres are predicted from "preferred" alternatives

FIGURE 2. Existing Acreage of Candidate Old Growth (COG) by Timber Type

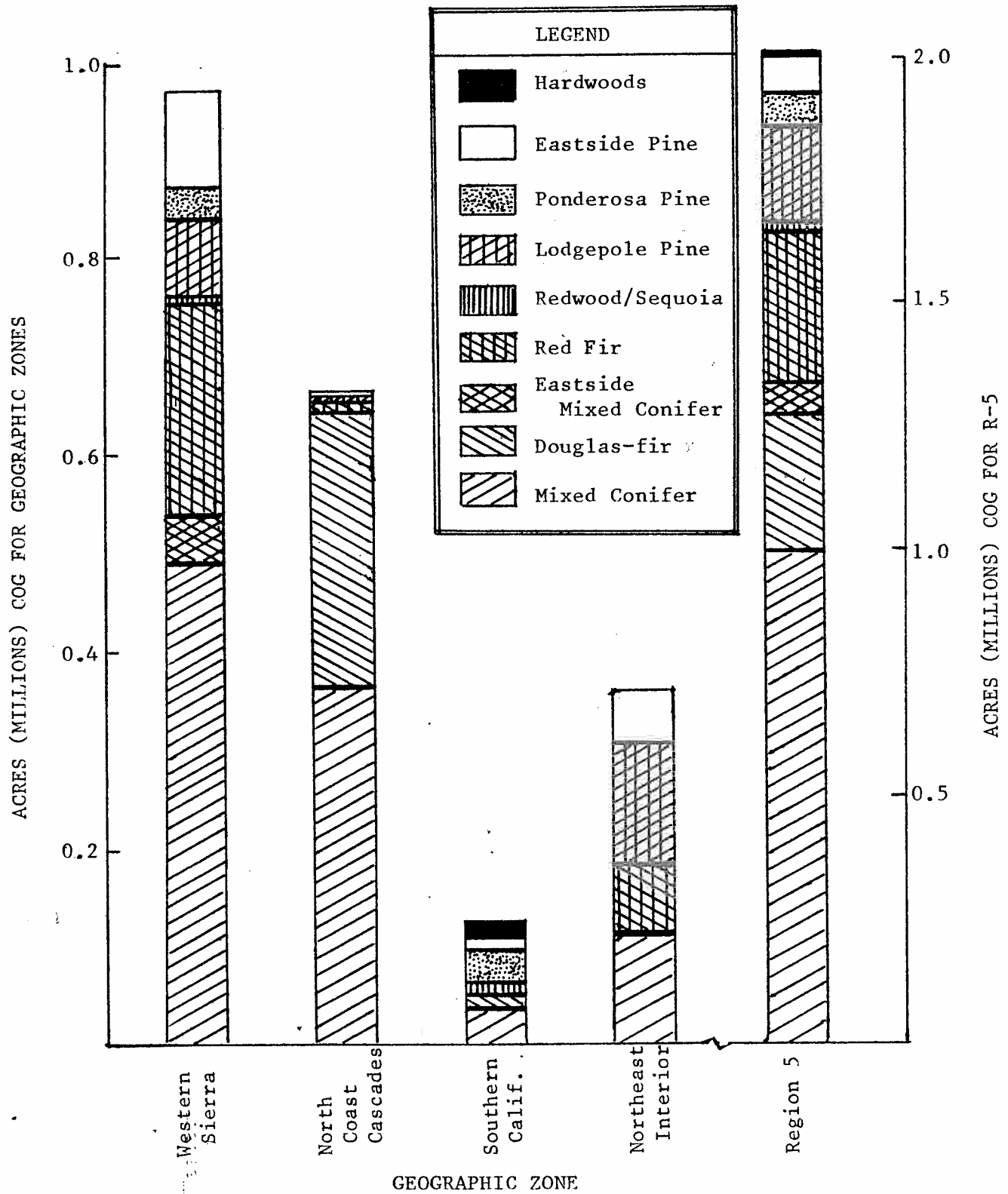
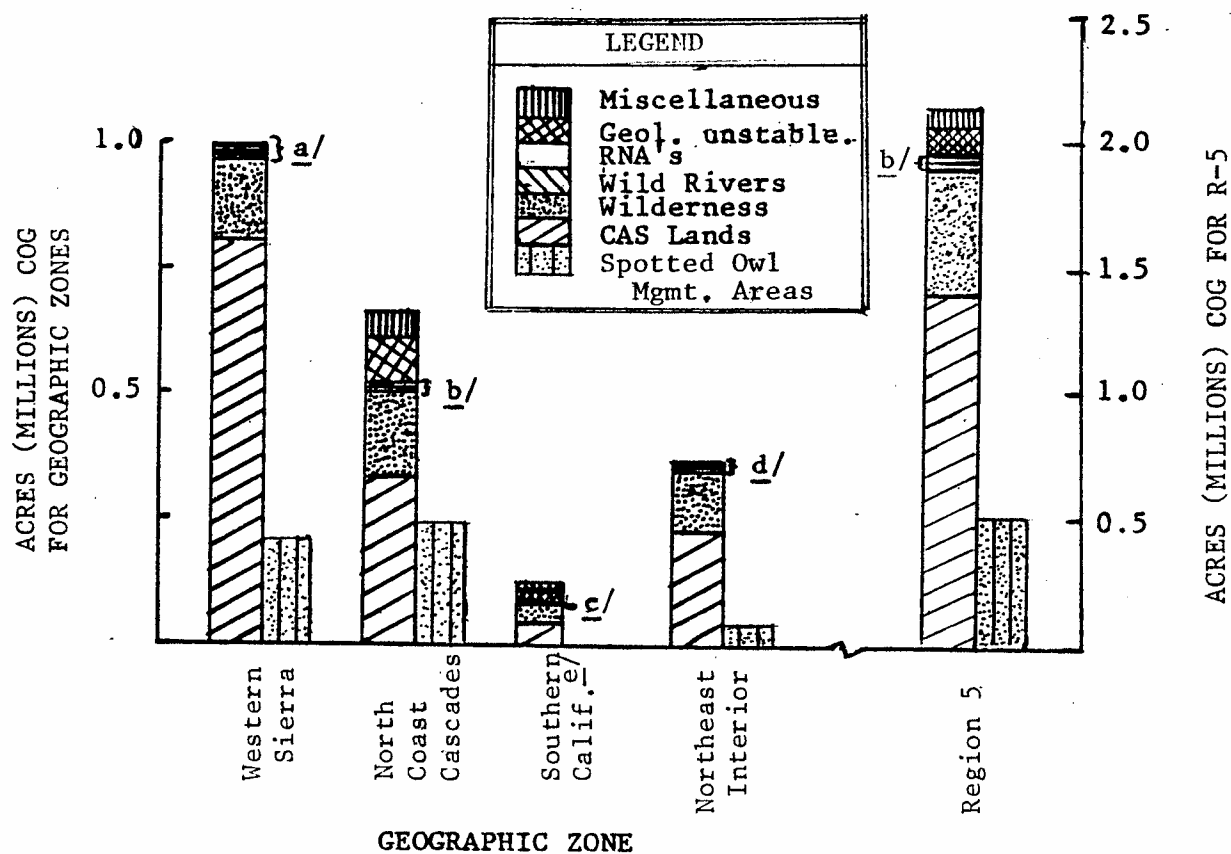


FIGURE 3. Current Acreage of Candidate Old Growth (COG) by Management Category



a/ includes small acreages of wild rivers, RNA's, geologically unstable lands, and miscellaneous lands.

b/ includes small acreages of wild rivers and RNA's

c/ includes small acreages of RNA's

d/ includes small acreages of RNA's and miscellaneous lands

e/ Spotted Owl Management Area acreages are not known; direction is to protect all spotted owls

Spotted Owl Management Areas

Region-wide, about 502,000 acres of habitat suitable for Spotted Owls (a Management Indicator Species for Region 5) is included in Spotted Owl Management Areas (Fig. 3) which are also known as SOMAs. Suitable Spotted Owl habitat closely approximates COG for timber types such as mixed conifer and Douglas-fir, thus much of the 502,000 acres in SOMAs could be classified as COG. Approximately 70% of the SOMA acreage occupies lands considered to be CAS for timber production (J. Harn, pers. comm.).

Size of COG Patches

The mean area of a COG patch varies by timber type and zone (Table 2).

In general, eastside mixed conifer has the smallest mean patch size (about 30 ac) whereas eastside pine COG patches are, on the average, the largest (about 52 ac). Patch size varies by zone with Southern California having the largest mean patch size (about 54 ac) and North Coast Cascades having the smallest mean patch size (about 34 ac).

Distribution of COG Patches

Distribution of COG patches (Fig. 4) varies by zone. At present, much (57%) of the Western Sierra COG is concentrated in contrast to Southern California where only 17 percent of COG is concentrated. The distribution of COG in the other two zones--North Coast Cascades and Northeast Interior--falls in between those extremes.

Future distribution of COG (Fig. 4) throughout California tends to be slightly more concentrated (44% in 2035) in contrast to 42 percent at present. Percentage of concentrated COG declines by year 2035 in the Western Sierra and Southern California zones whereas it increases in the North Coast Cascades zone. In the Northeast Interior, percent of COG concentrated declines by the year 2015 but increases to nearly 1985 levels by year 2035.

FUTURE QUANTITIES OF COG

Potential acreage of COG in future years depends on forest land management plan alternatives selected. Figure 5 portrays acreages of COG for each zone under aggregations of four forest plan alternatives: current direction, high wilderness, preferred; and high commodity. In general, high wilderness alternatives retain the greatest quantities of COG whereas high commodity alternatives retain the smallest amounts of COG. However, in several zones, especially Southern California, current direction and preferred alternatives are quite similar to the high wilderness alternatives.

FIGURE 4. Distribution of Candidate Old Growth (COG)—"Well Distributed" and "Concentrated"

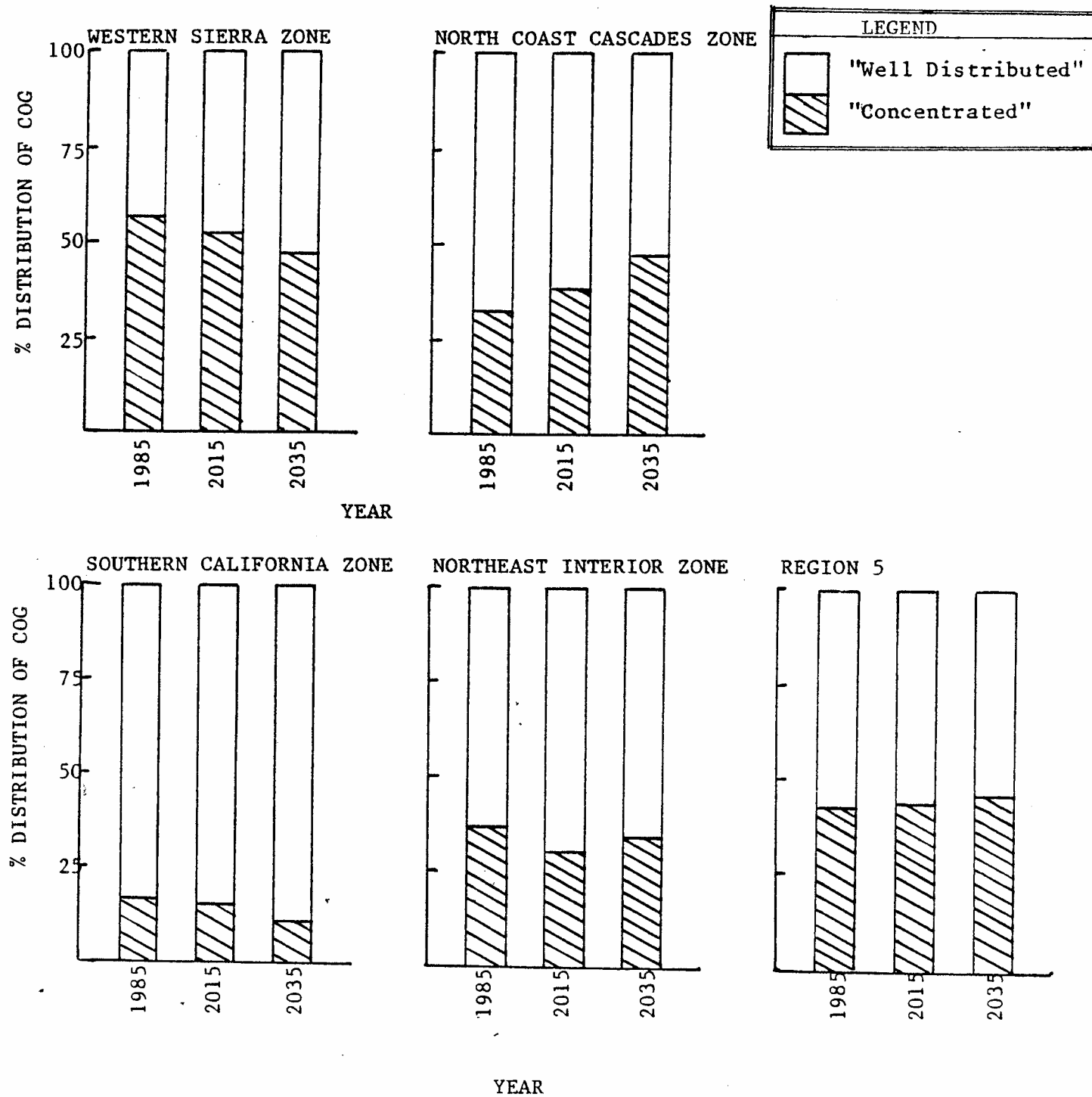


FIGURE 5. Acreage if Candidate Old Growth (COG) in the Future

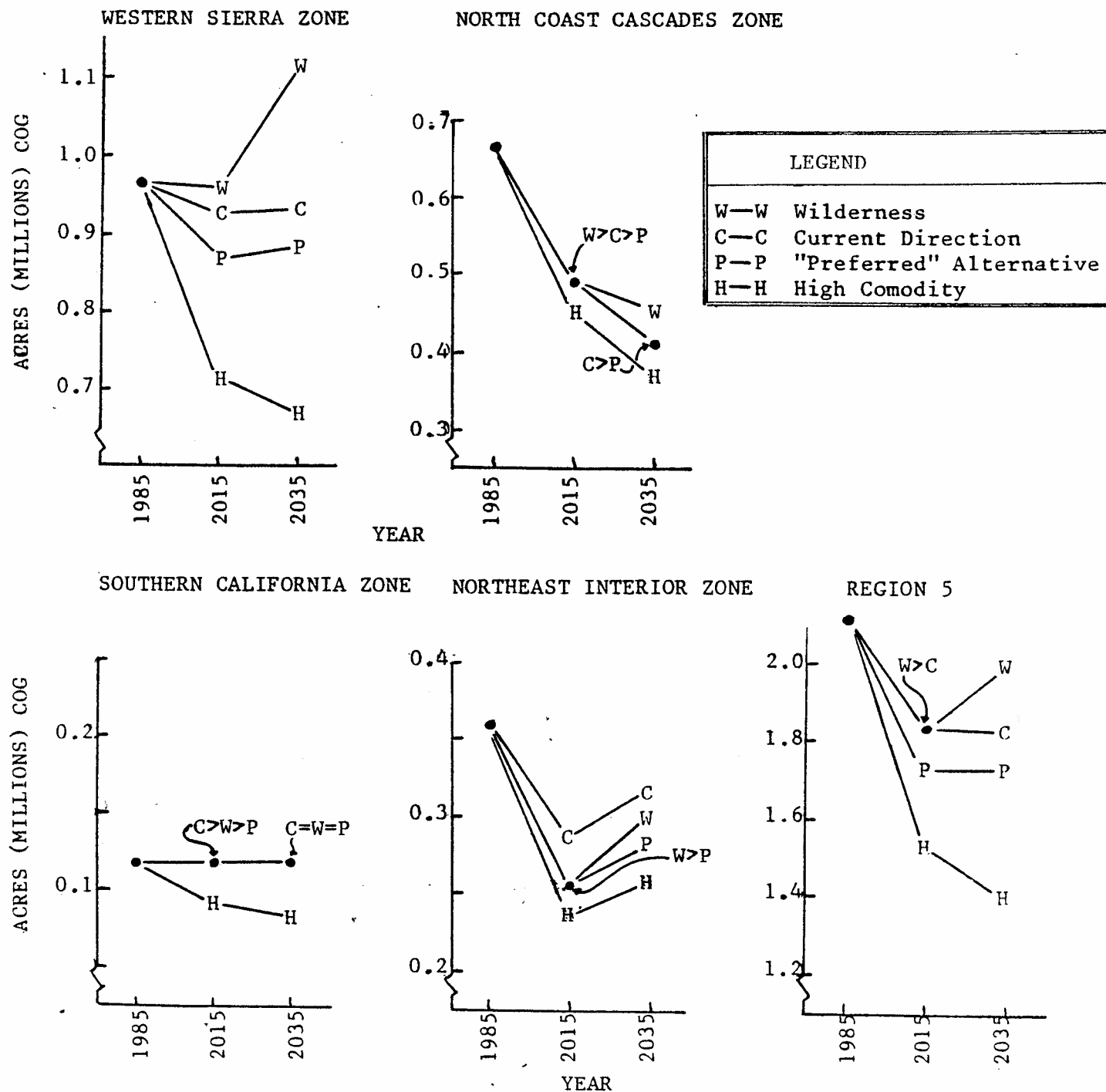


TABLE 2

Average Area and Size Range (acres) of
Candidate Old Growth (COG) Patches by Timber Type

ZONES

Timber Types	Western Sierra	North Coast Cascades	Southern California	Northeast Interior	Region 5
Douglas- fir		53 a/ 44 b/ 27 c/	-- 80 --		80 44 27
Eastside Pine	61 58 34	-- 20 --	No Info.	92 41 31	92 52 31
Lodgepole Pine	56 38 11	-- 27 --		41 39 33	56 38 27
Mixed Conifer	55 43 39	53 34 27	-- 30 --	60 40 36	60 39 27
Ponderosa Pine	42 40 34		-- 40 --		42 40 34
Red Fir	57 49 33	47 17 10		76 35 28	76 43 10
Redwood/ Sequoia	-- 45 --		No Info.		-- 45 --
Hard- woods			No Info.		No Info.
Eastside Mixed Conifer	-- 30 --				-- 30 --
Summary	51 44 42	53 34 27	-- 54 --	76 41 36	76 40 27

a/ mean from high forest b/ mean of forests in zone c/ mean from low forest

Throughout California, COG is predicted to continue to decline in area until about year 2015 when the decline begins to level off under the preferred and current direction alternatives, and is reversed under the high wilderness alternatives. Zones show different patterns of COG changes in the future. For example, in the Western Sierra zone, all alternatives show at least a slight decline in COG (Fig. 5) acreage by year 2015. After year 2015, only the high commodity alternatives show continued declines whereas the high wilderness alternatives show a sharp increase in COG acreage. In contrast, three Southern California alternatives (i.e., high wilderness, preferred, current direction) project nearly the same acreage of COG as is present in 1985. The high commodity alternatives, however, show continued declines with the rate of decline slowing between years 2015 and 2035.

CONCLUSIONS

When interpreting the results contained within this report, the reader must recognize the limitations of the data set and the intent of the report. First, COG acreages do not necessarily reflect the extent of "real" old-growth. As noted in the introduction, currently there is no accepted definition for old-growth nor even interim definitions for the majority of timber types or plant associations. Even if interim definitions for all timber types did exist, there still could be problems when attempting to quantify acreages if those definitions are not keyed to existing inventories.

In addition, the report does not speculate about causes for the declines in COG especially in the past. Many factors--including fire, its control and suppression, timber harvest, losses from insects and disease, development of transportation systems such as roads, power transmission lines, and water storage and transportation facilities, and development of recreational and residential facilities--have influenced the quantities of COG through time.

Because of the problems in the data set, it is difficult to discuss the results and patterns of change in COG to any great extent or draw any strong conclusions. The results really show one clear pattern, that is, COG has declined in the past and will continue to decline, but at lesser rates until year 2015 or so when, under certain alternatives, COG declines should level off or increase to some degree.

Future projections of COG, depending on the alternative selected, suggest that declines of COG will be arrested and, in some cases, in particular the Western Sierra, will be reversed. At this point in time, it is not known if those acreages will be adequate for other resources (e.g., wildlife). Forest planning standards and guidelines--which are reflected by the quantities of COG predicted for the future-- were based on the best information available at the time. These standards and guidelines were designed to ensure that the acreages of "old-growth" remaining would be adequate for wildlife, however the risk of being in error is relatively high. The effectiveness of these standards and guidelines will not be known until after implementation of the forest plans with concomitant monitoring and the completion of the old-growth research program.

Concerns over the adequacy of old-growth acreages will persist into the immediate future. Because approximately 66 percent of the COG remaining and 70 percent of the SOMA acreage is on lands considered to be capable, available, and suitable for timber production, there will probably be continued, and most likely intensified, demand for the use of COG acreages by various activities (e.g., timber harvest, wildlife habitat, recreation). Continued monitoring of COG acreages will assist decision-makers by giving them up-to-date information on the status of COG.

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GLOSSARY

Alternative: various options for land management proposed during the forest land management planning process. Alternatives considered in this report are:

Comodity or High Comodity: alternatives which maximize production of obviously economic products (e.g., timber products, beef)

Current Direction: alternatives which continue current management practices into the future

Preferred: alternatives, at the time of information tabulation, that most likely would be selected for implementation

Wilderness or High Wilderness: alternatives which maximize wilderness and other non-comodity values

Candidate Old Growth: definition of "old-growth" for this paper. Defined by strata for timber types as follows:

Douglas-fir: timber strata 4N, 4G, 5N, 5G, and 6

Eastside Pine: timber strata 3N, 3G, 4N, 4G, 5N, 5G, and 6

Lodgepole Pine: timber strata 3N, 3G, 4N, 4G, 5N, 5G, and 6

Mixed Conifer: timber strata 4N, 4G, 5N, 5G, and 6

Ponderosa Pine: timber strata 4N, 4G, 5N, 5G, and 6

Red Fir: timber strata 4N, 4G, 5N, 5G, and 6

Redwood: timber strata 4, 5, and 6

Capable, available, and suitable lands for timber production: those lands which are capable of supporting roads and other facilities related to timber production, are legally available for timber production, and are physically and economically suitable for timber production

Old-growth: generally an undefined qualitative concept that appears to be based on a combination of characteristics exhibited by older forest stands--e.g., presence of large (average dbh greater than 24") trees, stand age in excess of 250 years, multiple-storied stands, presence of much decadent material, virgin stands--attempts have been made to quantitatively define old-growth--see paper introduction--however these definitions have not been widely accepted

Timber Strata: structural subclassifications of timber types that are based on tree diameters and stocking levels of a stand

Timber Type: an arbitrary classification of forest types composed of one species or an aggregate of tree species that are found growing together

Spotted Owl Management Area or SOMA: land allocated to emphasize management of Spotted Owls. Each SOMA will include one or more Spotted Owl territories. Each territory will include 1000 acres of habitat suitable for Spotted Owls. Suitable habitat is composed of mature timber stands having multi-layered canopies, a canopy closure of at least 70%, and obvious decadence. Specific habitat requirements are found in the minimum management requirements for Spotted Owls.