

University of Colorado Law School

Colorado Law Scholarly Commons

The Past, Present, and Future of Our Public
Lands: Celebrating the 40th Anniversary of the
Public Land Law Review Commission's Report,
One Third of the Nation's Land (Martz Summer
Conference, June 2-4)

2010

6-3-2010

The Mexican Spotted Owl Controversy: An Example of the ESA's Dominant Role in Federal Land Use Planning

Norman D. James

Follow this and additional works at: <https://scholar.law.colorado.edu/celebrating-40th-anniversary-of-public-land-law-review-commission-report>



Part of the [Administrative Law Commons](#), [Environmental Policy Commons](#), [Forest Management Commons](#), [Land Use Law Commons](#), [Natural Resource Economics Commons](#), [Natural Resources and Conservation Commons](#), [Natural Resources Law Commons](#), [Natural Resources Management and Policy Commons](#), and the [Recreation, Parks and Tourism Administration Commons](#)

Citation Information

James, Norman D., "The Mexican Spotted Owl Controversy: An Example of the ESA's Dominant Role in Federal Land Use Planning" (2010). *The Past, Present, and Future of Our Public Lands: Celebrating the 40th Anniversary of the Public Land Law Review Commission's Report, One Third of the Nation's Land (Martz Summer Conference, June 2-4)*.

<https://scholar.law.colorado.edu/celebrating-40th-anniversary-of-public-land-law-review-commission-report/6>

Reproduced with permission of the Getches-Wilkinson Center for Natural Resources, Energy, and the Environment (formerly the Natural Resources Law Center) at the University of Colorado Law School.



Norman D. James, *The Mexican Spotted Owl Controversy: An Example of the ESA's Dominant Role in Federal Land Use Planning, in THE PAST, PRESENT, AND FUTURE OF OUR PUBLIC LANDS: CELEBRATING THE 40TH ANNIVERSARY OF THE PUBLIC LAND LAW REVIEW COMMISSION'S REPORT—ONE THIRD OF THE NATION'S LANDS* (Natural Res. Law Ctr., Univ. of Colo. Law Sch. 2010).

Reproduced with permission of the Getches-Wilkinson Center for Natural Resources, Energy, and the Environment (formerly the Natural Resources Law Center) at the University of Colorado Law School.

The Mexican Spotted Owl Controversy
An Example of the ESA's Dominant Role in Federal Land Use Planning

Norman D. James
Fennemore Craig, P.C.
Phoenix, Arizona

May 12, 2010

*"We're crazy to sit in trees when there's this incredible law
where we can make people do whatever we want"*

Comment by Robin Silver,
Co-founder of the Center for Biological Diversity¹

Introduction

The Endangered Species Act ("ESA"), 16 U.S.C. §§ 1531-1544, was enacted in 1973 to provide a program for the conservation of endangered and threatened species and to comply with certain treaties and conventions concerning wildlife and plants. *See* 16 U.S.C. § 1531. Since its enactment, it has evolved into one of the nation's most demanding environmental laws. As one commentator recently stated, "The ESA is not the single most important federal environmental statute, but – whether one applauds or deplores this turn of events – the law is now a primary obstacle to land development and related activities in America." George Cameron Coggins, "A Premature Evaluation of American Endangered Species Law," in *Endangered Species Act: Law, Policy, and Perspective* (Donald C. Baur and Wm. Robert Irvin eds., 2002) at 1. One consequence of this evolution is that land use planning by the Forest Service and Bureau of Land Management is often dominated by the ESA-related concerns. In extreme cases, public land is being managed for the benefit of a single species of wildlife.

The Public Land Law Review Commission did not anticipate that individual wildlife species would dominate the management of the public lands when it issued its seminal report, *One Third of the Nation's Lands*, in 1970. For example, the Commission stated in the second chapter of its report:

¹ Nicholas Lemann, "No People Allowed: A radical environmental group attempts to return the Southwest to the wild," *The New Yorker* (Nov. 22, 1999) at 106.

We believe that it is in the public interest to encourage the highest and best use of the public lands to the end that they contribute the most in social and economic values. As national resources, they have little value unless their values are made available for the use of our people, either in Federal or non-Federal ownership.

Public Land Law Review Commission, *One Third of the Nation's Lands: A Report to the President and to the Congress*, 38 (1970).

The Commission emphasized the need for land use planning by the two principle Federal land management agencies, the Forest Service and the Bureau of Land Management. *See id.* at 41-52 (Chapter 3, Planning Future Public Land Use). The Commission envisioned a planning system analogous to zoning, under which the highest and best uses of particular areas would be established as the dominant use, with compatible secondary uses being allowed. *Id.* at 48-52. Authorized uses would be prescribed and adjusted as needed by means of a dynamic planning process, based on criteria specified by Congress and set forth in state-wide or regional land use plans adopted by the agencies with input from affected communities and resource users.²

The Commission envisioned that portions of the public lands would be managed for the benefit of fish and wildlife, particularly species valuable for recreational purposes, including hunting and fishing. *See id.* at 157-69. It explained, "Greater emphasis needs to be given fish and wildlife values in allocating public lands to various uses in order to assure that fish and wildlife resources receive equal consideration in public land administration." *Id.* at 157. The Commission recommended that Congress establish objectives for the management of wildlife on public land as well as statutory guidelines to minimize conflicts between fish and wildlife and other public land uses. *Id.* at 160, 164-65. Nevertheless, nothing in the report suggests that wildlife preservation should override and control all other public land uses and values.

An example of the ESA's impact on public land use is the role played by the Mexican spotted owl ("MSO") in determining how the 11 National Forests in Arizona and New Mexico have been managed. As discussed below, current forest management in the southwest has been driven by the MSO for the past 20 years. The result has been the promotion of unhealthy and unsustainable forest conditions that will worsen without aggressive management to reduce tree density and open the region's forests. Unfortunately, there is no longer a forest products industry in Arizona and New Mexico to work with the Forest Service to address these conditions.

² The land planning process envisioned by the Commission was enacted by Congress in the Forest and Rangeland Renewable Resources Act of 1974 and the National Forest Management Act of 1976, codified at 16 U.S.C. §§ 1600-1614, with respect to the National Forest System, and the Federal Land Policy and Management Act of 1976, codified at 16 U.S.C. §§ 1701-1787, with respect to the public lands administered by the Interior Secretary

The National Forests in Arizona and New Mexico Circa 1990

Forest Service Region 3 (also called the Southwestern Region) includes 11 National Forests in Arizona and New Mexico. The National Forests in Arizona are the Apache-Sitgreaves, Coconino, Kaibab, Prescott and Tonto National Forests. They contain about 11.2 million acres. The National Forests in New Mexico are the Carson, Cibola, Gila, Lincoln and Santa Fe National Forests. They contain about 9.1 million acres. A map depicting Region 3 is attached to this paper.

Ecosystems containing timberland, woodland and chaparral comprise over 16 million acres, or about 75 percent of National Forest lands in Region 3. It is widely acknowledged that fire exclusion and other factors associated with European settlement have greatly altered the condition of these forested lands, resulting in increased susceptibility to drought, insects and disease, and intense, stand-destroying wildfires. See W. W. Covington and M. M. Moore, "Postsettlement Changes in Natural Fire Regimes and Forest Structure: Ecological Restoration of Old-Growth Ponderosa Pine Forests," in *Assessing Forest Ecosystem Health in the Inland West* (R. Neil Sampson and David L. Adams eds., The Haworth Press 1994) at 153.

In all forest types, tree stands are much denser than was reported in the late 1800s. Inventories of Arizona and New Mexico forests showed that the total acreage of all forested land increased by 573,000 acres, or 5 percent, from 1962 to 1986, when the region's initial Forest Plans were being developed. Moreover, the total volume of growing stock increased by 13 percent on all forested land and by 21 percent on National Forest land, despite average annual timber sales of approximately 300 million board feet ("mmbf"). Total net growth (gross growth minus mortality and defect) in Region 3 forests was estimated to be about 700 mmbf per year.

At the same time, the composition of the region's forests shifted, with mixed conifer increasing by over a million acres (81 percent) and aspen declining by 222,000 acres (46 percent). Forest openings also decreased or disappeared, as mixed conifer filled in meadows and reduced grasses and forbs. The Forest Service stated in a 1993 paper:

Today's forests have more volume, more trees in nearly every diameter class, and more canopy layers than ever before. ... Dense stands are difficult to maintain in a healthy condition and ... are susceptible to catastrophic crown fires and pest/beetle epidemics when they are not properly managed.

Forest Service, U.S. Dep't of Agriculture, *Changing Conditions in Southwestern Forests and Implications on Land Stewardship* (1993) at 3 (copy attached).

The Mexican Spotted Owl: Background and Listing

The MSO is one of three spotted owl subspecies recognized by the American Ornithologists' Union, along with the northern and California spotted owls. *Final Rule to List the Mexican Spotted Owl as Threatened Species*, 58 Fed. Reg. 14248 (March 16,

1993). The MSO's range extends from the southern Rocky Mountains in Colorado and the Colorado Plateau in southern Utah through Arizona and New Mexico to the southern end of the Mexican Plateau in central Mexico. In the northern portion of its range, the owl is found within steep canyons and rocky cliffs with little or no vegetation. In central and eastern Arizona and in New Mexico, owls are found in forested mountains containing dense, uneven-aged tree stands, with a multi-storied structure, moderate to high canopy closure and accumulations of fallen trees and other debris.

Information on the historic population level and distribution of the MSO is sparse, and it is not known whether the species' population is declining, increasing or stable. In the recovery plan for the MSO, the Fish and Wildlife Service ("FWS") acknowledged that although it has limited data, the MSO's population is likely stable and well distributed throughout its historic range. *See Recovery Plan for the Mexican Spotted Owl (Strix occidentalis lucida)* (Dec. 1995) ("Recovery Plan").

The FWS listed the MSO as a threatened species in 1993. The primary basis for listing the MSO was the future modification of habitat resulting from timber harvesting on National Forest lands in Arizona and New Mexico under shelterwood (even-aged) harvesting methods, combined with the inadequacy of the Forest Service's then-existing management guidelines for MSO habitat. *Final Rule, supra*, 58 Fed. Reg. at 14266-14269.³ The FWS explained that habitat on National Forest lands that could become suitable MSO habitat in the future must be considered indefinitely unsuitable because of the emphasis placed on shelterwood timber harvesting in the Forest Plans. *Id.* at 14267.

Notably, the FWS disregarded declining timber harvest levels and the Forest Service's implementation of management strategies to protect MSO nest sites. *Id.* at 14261, 14264-66. Region 3 of the Forest Service added the MSO to its regional list of sensitive species in 1983, thereby requiring that the MSO be given special management consideration when the region's first iteration of Forest Plans were issued between 1985 and 1988. The Forest Service also formed a task force in 1988 to develop habitat management direction, and, in 1989, issued management guidelines and inventory protocols, which included the creation of management territories to protect owl nests.

As a consequence of these management efforts, the volume of commercial sawtimber began to decline from late 1980 levels. *See* attached table, Sawtimber Volume Sold, Fiscal Years 1986-2000 Arizona and New Mexico National Forests. On a regional level, the volume of timber sold declined from 348 million board feet mmbf in 1989 to 139 mmbf in 1992 and 104 mmbf in 1993 – the year the MSO was listed. In addition, the harvesting methods shifted from shelterwood to selective cutting, in which mature trees are cut in small groups in order to maintain uneven-aged conditions.

³ Under a shelterwood system, mature trees are removed in two or more cuts. A preparatory cut removes a portion of the mature trees and is intended to make the remaining trees more wind resistant and less susceptible to wildfire and disease. Next, a seed cut removes additional trees in order to allow sunlight to reach the forest floor and regeneration to occur. (Certain trees, particularly ponderosa pine and aspen, are shade-intolerant and do not regenerate well in shaded conditions, in contrast to fir and spruce species.) After new trees are established, a final or removal cut occurs which removes the remaining mature trees.

The FWS, however, did not acknowledge declining timber sale volumes and changes in the way timber sales were planned and conducted by the Forest Service. See *Final Rule, supra*, 56 Fed. Reg. at 14264-68. FWS's dismissal of the Forest Service's efforts to manage MSO habitat and its failure to address the condition of the region's forests were troubling given that the impact of *future* timber harvesting on the region's National Forests was the principal reason for listing the species.

The Forest Service's Region-Wide Forest Plan Amendments

Spurred by the proposed rule listing the MSO published in early 1991, the Forest Service began working on comprehensive amendments to the Region's Forest Plans to eliminate their emphasis on shelterwood timber harvesting methods and to formally add standards and guidelines for the protection of MSO habitat, as well the habitat of another sensitive forest species, the northern goshawk.

The amendment process began in 1992 when the Forest Service published a notice of its intention to prepare an environmental impact statement. See *Arizona Cattle Growers' Ass'n v. Cartwright*, 29 F.Supp.2d 1100, 1102-04 (D. Ariz. 1998) (summary of administrative proceedings relating to the region-wide amendments). The Forest Service explained in a 1993 NEPA scoping report that that the "desired situation is for Forest Plans to more accurately reflect the management practices actually being implemented" through project-level decisions, in addition to incorporating the latest information on the habitat needs of the MSO and the northern goshawk into the plans.

This process culminated in the issuance of a Record of Decision by the Regional Forester in June 1996, which adopted amendments to the Forest Plans for each of the 11 National Forests in Arizona and New Mexico. *Record of Decision for Amendment of Forest Plans* (June 5, 1996). As one would expect, the amendments focused primarily on timber harvesting and, with respect to the MSO, incorporated the recommendations found in the species' Recovery Plan. *Record of Decision*, at 1-2 (general discussion) and 87-91 (specific standards and guidelines applicable to the MSO).⁴

Under the amendments, regional timber production was dramatically reduced. The annual volume of sawtimber harvested from the region's National Forests – which constitute the principal source of commercial timber in the southwest – was reduced to about 80 mmbf per year, which amounted to a reduction of nearly 80 percent from the average annual allowable sale quantity in the region's Forest Plans. Moreover, the average volume of "large" sawtimber, defined as trees with a diameter at breast height greater than 12 inches, was reduced to only 10 mmbf per year. The amendments permitted an additional 70 mmbf of "small" sawtimber (trees with a diameter between 9 inches and 11.9 inches dbh) to be harvested annually. To put these figures into perspective, 10 mmbf is the equivalent of one medium-sized commercial timber sale.

⁴ The recommendations contained in the Recovery Plan focused primarily on timber harvesting, both from the standpoint of avoiding adverse impacts caused by logging certain protected and restricted areas and from the standpoint of limited timber treatments, such as pre-commercial thinning, to reduce fire risk. *MSO Recovery Plan, supra*, at 82-95.

The bottom line is that the Forest Service's region-wide amendments effectively destroyed the region's forest products industry by eliminating public access to commercial-grade timber. The Forest Service certainly was aware that intensive management was needed to address the unsustainable condition of the region's forests, including the removal of timber to reduce stand density, as the attached paper shows. Nevertheless, the agency opted to manage much of the region's forests by promoting dense, multi-story stands for the MSO and, in the process, eliminating access to the timber on which the region's forest products industry depended.

Adding Insult to Injury: *Silver v. Thomas*

Before the Forest Service could complete its region-wide Forest Plan amendment process, environmental groups brought suit against the agency, seeking an injunction compelling the Forest Service to initiate consultation on the effects of each of the region's Forest Plans, prior to their amendment, on the MSO and prohibiting all timber harvesting until the completion of consultation. *See Silver v. Thomas*, 924 F.Supp. 976 (D. Ariz. 1995).

The basis for this lawsuit was the Ninth Circuit's decision in *Pacific Rivers Council v. Thomas*, 30 F.3d 1050 (9th Cir. 1994). In that case, the court held that a Forest Plan is a continuing agency action for the purpose of Section 7(a)(2) of the ESA, 16 U.S.C. § 1536(a)(2), requiring the Forest Service to re-initiate consultation on the effect of the Forest Plan on species listed *after* the Forest Plan has been adopted. *Pacific Rivers*, 30 F.3d at 1056-57. The Ninth Circuit also stated in dicta that it had previously held that timber sales constitute *per se* irrevocable commitments of resources under Section 7(d) of the ESA, 16 U.S.C. § 1536(d), and thus cannot proceed during consultation. *Id.* (following *Lane County Audubon Soc. v. Jamison*, 958 F.2d at 290, 295 (9th Cir. 1992)⁵).

In the *Silver* case, the plaintiffs pointed out that the region's Forest Plans were adopted between 1985 and 1988, and, therefore, no consultation had taken place regarding the effect of the Forest Plans on the MSO, which was not listed until 1993. Consequently, they argued, the Forest Service was violating Section 7(a)(2), just as it did in *Pacific Rivers*. *Silver*, 924 F.Supp. at 982. The Forest Service argued that it had initiated consultation on the Forest Plan amendments and had been consulting on project-level decisions that may affect the MSO. *Id.* at 981.

The district court held, first, that the Forest Plans are agency actions that trigger consultation and, second, that the Forest Plans are "program planning documents" that affect the MSO, following *Pacific Rivers* and *Lane County*. *Id.* at 983-84. The court also held that the initiation of consultation on the amendments to the region's Forest Plans

⁵ In *Lane County*, the court held that *future* timber sales could not proceed under the timber management guidelines at issue until consultation has been completed, but did not enjoin announced and ongoing timber sales, apparently because consultation had been completed at the project level on those sales. 958 F.2d at 295. The *Pacific Rivers*' panel did not consider this distinction, nor did the district court in *Silver*. *See Silver*, 924 F.Supp. at 983.

was irrelevant because until the amendments became effective, ongoing activities would be governed by the existing Forest Plans. *Id.* at 984-85. The court dismissed the Forest Service’s argument that project-level consultations had been completed on all ongoing timber sales, holding that, as a matter of law, project-level consultations are insufficient to comply with the ESA. *Id.* at 985.

Having determined that ongoing violations of the ESA existed, the district court issued sweeping injunctive relief without conducting a hearing. *Id.* at 988-89. The court ordered the Forest Service to immediately commence consultation on the existing Forest Plans, and further ordered the Forest Service to “defer or suspend all timber harvest activities” through the region until consultation has been completed on both the existing Forest Plans and the amendments to the Forest Plans. *Id.* at 989. Thus, all timber harvesting was enjoined, regardless of whether consultation had been completed on a particular timber sale at the project level and regardless of whether a particular timber would even affect the MSO.

**Epilogue: The Demise of the Forest Products Industry
and Proactive Forest Management**

The injunction issued in the *Silver* case remained in effect for nearly 16 months, until November 1996, in part due to procedural maneuvering by the plaintiffs and the district judge’s apparent distrust of the Forest Service. Ultimately the district judge who entered the injunction retired from the bench, and the new district judge assigned to the case vacated the injunction shortly after taking over the case. But the combination of the injunction and the region-wide Forest Plan amendments took their toll on the region’s forest products industry.

The volume of commercial grade timber sold by the Forest Service dropped dramatically and remained at extraordinarily low levels through the rest of the decade, as the attached table shows. At the end of the decade, annual sale volumes were still well below the allowable sale quantity and a small fraction of the net annual growth of sawtimber in the region. The two National Forests with the largest historic sale volume, the Apache-Sitgreaves National Forest in central and eastern Arizona and the Coconino National Forest in north-central Arizona, had sale volumes that averaged 6.4 mmbf and 3.5 mmbf, respectively, from 1997 through 2000. In New Mexico, the situation was even worse; timber sales collectively averaged 4.6 mmbf per year for the five National Forests in that state.

Under these circumstances, the region’s handful of forest products companies simply went out of business. In contrast to other parts of the United States, where private and state-owned lands produce significant volumes of timber, virtually all of the commercial grade timber in Arizona and New Mexico is found on either the region’s National Forests or Indian reservations, such as the White Mountain Apache Reservation in eastern Arizona. Most tribal land is inaccessible to private businesses, leaving the region’s National Forests as the principal source of timber for commercial operations. And without reasonable assurance of access to timber, no business will invest the capital needed to finance a successful forest products company.

As a result, regional timber sale volumes have remained near 1999-2000 levels. In fact, much of the timber harvesting is done by contractors hired by the Forest Service to perform pre-commercial thinning and related maintenance work near urban areas to reduce fire risk to homes and businesses.

Meanwhile, the unsustainable conditions identified by the Forest Service 20 years ago continue to worsen due to the lack of proactive management of the region's forests. The Forest Service explained in 1993:

The current low level of harvest and cultural (pre-commercial thinning) treatments cannot prevent aging and increasing small-tree density of Southwestern forests. They will become older, denser, and perhaps more extensive. However, at some point, ecological limits will be reached, resulting in extensive forest destruction from insects, diseases, and fires. Similar losses are well-documented throughout the Interior West

Changing Conditions in Southwestern Forests, supra, at 5.

The threats identified before the MSO was listed – drought, insects and disease, and intense, stand-destroying wildfires – have become more acute. In June, 2002, for example, the Rodeo-Chediski Fire burned more than 460,000 acres of forested land in east-central Arizona, destroying a number of MSO nest sites in the process.

As discussed, the Public Land Law Commission envisioned a dynamic planning system controlled by detailed criteria specified by Congress and set forth in state-wide or regional land use plans adopted by the agencies, with input by local communities and public land users. The Commission explained:

This approach to providing for multiple uses on the ground will provide a sense of stability to those users of the public lands who fear a constant encroachment on lands devoted primarily to their use. It will reinforce the actions of the administrators so that they will not be subject to a barrage of claims from all sides that a particular use ought to be permitted or barred, all in the name of “multiple use.”

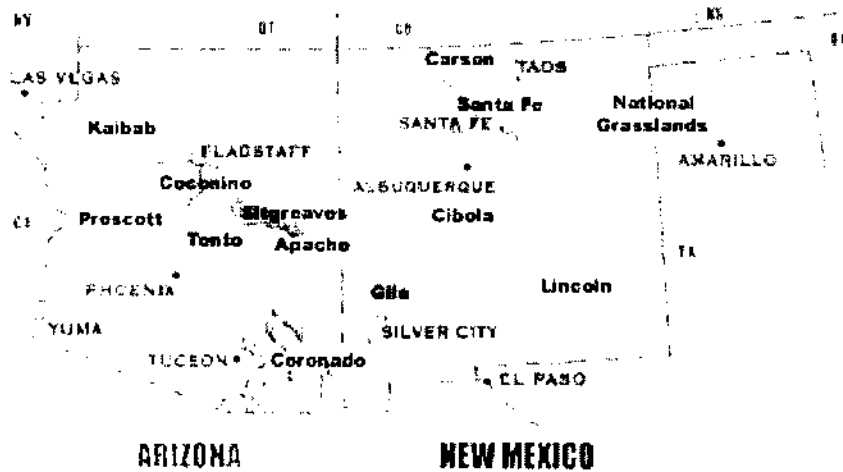
One Third of the Nation's Lands, supra, at 51. As the events surrounding the MSO listing illustrate, however, key planning and management decisions are being driven by the ESA, regardless of the impact on other wildlife species or the overall ecological condition of the public lands.

Southwestern Region

About Us

Southwestern Region Forests and Grasslands

MAP OF THE REGION



QUICK FACTS

- 20.6 million total acres
- 56,000 miles of roads
- 6,000 passenger car miles
- 2,750 miles streams
- 37,900 acres of lakes
- 25% of fishing habitat in the State of New Mexico
- 50% of fishing habitat in the State of Arizona
- 133,087 miles of trails
- 2.7 million acres of Wilderness
- 600+ camping areas
- 82,500 acres dedicated to Alpine skiing
- 45 ski lifts/tramways

ELEVEN NATIONAL FORESTS

Arizona

Apache-Sitgreaves - (East-Central Arizona) • 2 million acres • 450 miles of rivers & streams

Coconino - (Northern Arizona) • 1.8 million acres • Elevations to 12,643 feet

Coronado - (Southern Arizona) • 1.7 million acres • Elevations from 3,000 to 10,000 feet • 8 wilderness areas

New Mexico

Carson - (Northern New Mexico) • 1.5 million acres • Elevations from 6,000 to 13,161 feet • 6 wilderness areas

Cibola - (Central New Mexico) • 1.6 million acres • Elevations from 5,000 to 11,000 feet • 4 wilderness areas • 3 national grasslands (North-Eastern New Mexico, West Oklahoma, and Northwest Texas)

Kaibab - (North-Western Arizona) • 1.6 million acres • Elevations from 5,500 to 10,418 feet • 4 wilderness areas

Prescott - (Central Arizona) 1.25 million acres • 8 wilderness area

Tonto - (Central Arizona) • 2.9 million acres • Elevations from 1,300 to 8,000 feet • 8 wilderness areas • One of the Nation's top 10 visited forests

Gila - (Southwestern New Mexico) • 3.3 million acres • Elevations to 11,000 feet • 3 wilderness areas • 6th largest forest in the continental U.S.

Lincoln - (South Central and Eastern New Mexico) • 1.1 million acres • Elevations from 4,000 to 11,500 feet • 2 wilderness areas • Birthplace of Smokey Bear

Santa Fe - (North-Central New Mexico) • 1.6 million acres • Elevations from 5,300 to 13,103 feet • 4 wilderness areas

Sawtimber Volume Sold, Fiscal Years 1986-2000
Arizona and New Mexico National Forests
(millions of board feet (MMBF))

	<u>Region 3</u>	<u>Arizona</u>	<u>New Mexico</u>	<u>Apache-Sitgreaves</u>	<u>Coconino</u>
Est. Annual Growth	700 MMBF	367 MMBF	334 MMBF		
ASQ ¹	390	267	123	99	89
1986	337.7	212.6	125.1	81.4	47.7
1987	377.2	235.9	141.3	88.7	74.5
1988	320.9	206.0	114.9	75.1	64.9
1989	348.4	252.3	96.1	81.6	82.3
1990	271.9	198.4	73.5	57.7	69.0
1991	226.7	159.4	67.3	94.5	33.1
1992	139.4	115.2	24.2	31.7	53.4
1993	104.4	83.5	20.9	31.8	21.3
1994	44.9	38.2	6.7	10.2	11.1
1995	38.6	30.9	7.7	15.9	8.5
1996	1.0	0.5	0.5	0.5	0.0
1997	13.2	0.6	12.4	0.0	0.0
1998	0.0	0.0	0.0	0.0	0.0
1999	46.8	43.2	3.6	25.5	2.2
2000	35.6	33.1	2.5	7.8	11.6

¹ The Allowable Sale Quantity (ASQ) is the quantity of timber that may be sold over the time period specified by the Region's Forest Plans. It is usually stated on an annual basis as the average annual allowable sale quantity.

United States
Department of
Agriculture

Forest
Service

Southwestern
Region



Changing Conditions in Southwestern Forests and Implications on Land Stewardship



Changing Conditions In Our Forests

Some assert that Southwestern forests have been almost completely logged, especially of large trees. These statements are not based on documented fact, but rather on individuals' perceptions of what they think they have seen happen. This paper describes changes in tree inventories of Arizona and New Mexico forests between 1962 and 1986. It discusses some implications that these changes may have for land stewardship.

Descriptors include forest acreage by major forest type, total volume of wood, tree size, multi-storied conditions, and forest density.

Total Acreage of Forest Land and Its Distribution by Forest Types

Total forested land in Arizona and New Mexico increased by 573,000 acres, or 5 percent, from 1962 to 1986 (See Table 1, page 4). This increase was due to invasion of coniferous forests into areas such as meadows and woodlands.

Mixed conifer increased by a whopping 1,040,000 acres (81 percent). Ponderosa pine decreased slightly, by 206,000 acres (2 percent). In comparison, the acreage of aspen stands decreased by 222,000 acres (46 percent), despite the increase in total forest area. If this trend continues, the aspen cover type will cease to exist as a distinct cover type in about 25 years. It will persist as a species within mixed conifer stands for extended periods (Pearson, 1931).

It is a good thing that the New Mexico Federation of Women's Clubs prevailed in 1948 to get the State Legislature to choose piñon pine over aspen as New Mexico's state tree (Calabrese, 1993). If aspen had been selected, New Mexico could, in 25 short years, have a state tree that could not be found in stands, but only as scattered, individual trees!

This decline in the amount of aspen and meadows within the mixed conifer zone (predominately white fir, Douglas-fir and ponderosa pine, with Southwestern white pine in some areas) should be considered one of the most pressing environmental concerns in the Southwest today. In 1931, Pearson noted some aspen stands and prairies within the mixed conifer zone lacked young conifers and questioned if they would naturally succeed to mixed conifer. Today, little

evidence of such conditions remains, due primarily to control of forest fires and ecological succession. Ecological succession is the gradual supplementing of one community of plants by another, generally from species that start quickly on bare ground, such as grasses or aspen trees, to shade-tolerant species, such as fir trees.

Extensive areas of aspen stands no longer exist and young conifer stands have matured substantially. Our forest inventories indicate that the remaining aspen stands in the Southwest have an understory of conifers that will eventually replace the aspen. Meadows persist within the mixed conifer type, but they too are being invaded by conifers. None remain as extensive areas that were once described as prairies. Almost all meadows in the mixed conifer zone show evidence of conifer invasion at their margins. Allen (1989) stated that "Overall, in the southeast portion of the Jemez Mountains open montane grassland area decreased 55% from 554 ha in 1935 to 250 ha in 1981. Several small montane grasslands present in 1935 have disappeared, while the larger grasslands have been fragmented." Within the mixed conifer type, Douglas-fir is decreasing and white

fir is increasing (Van Hooser *et al.*, 1992).

Such profound changes in the forest condition are not surprising. The long history of partial cutting, extensive areas of forests reserved from cutting, and successful fire control in the Southwest have allowed ecological succession to increase the number of conifers, especially the proportion of mixed conifer species such as white fir. This is at the expense of successional tree species such as aspen and ponderosa pine (Van Hooser *et al.*, 1992).

Conifer increase and aspen decrease in the absence of fire or harvest are in accordance with ecological studies of mixed conifers and aspen. Neither aspen nor ponderosa pine regenerate under shaded conditions (Pearson, 1931; Pearson and Marsh, 1935; Moir and Larson, 1985 a,b). Ponderosa pine in the Southwest tends to increase in extent and density at its ecotone with grasslands and oak due to grazing and fire control (Covington and Moore 1992).

These trends have increased the potential habitat suitability for the Mexican spotted owl and other species dependent on dense, multi-story stands. The current and projected timber sale

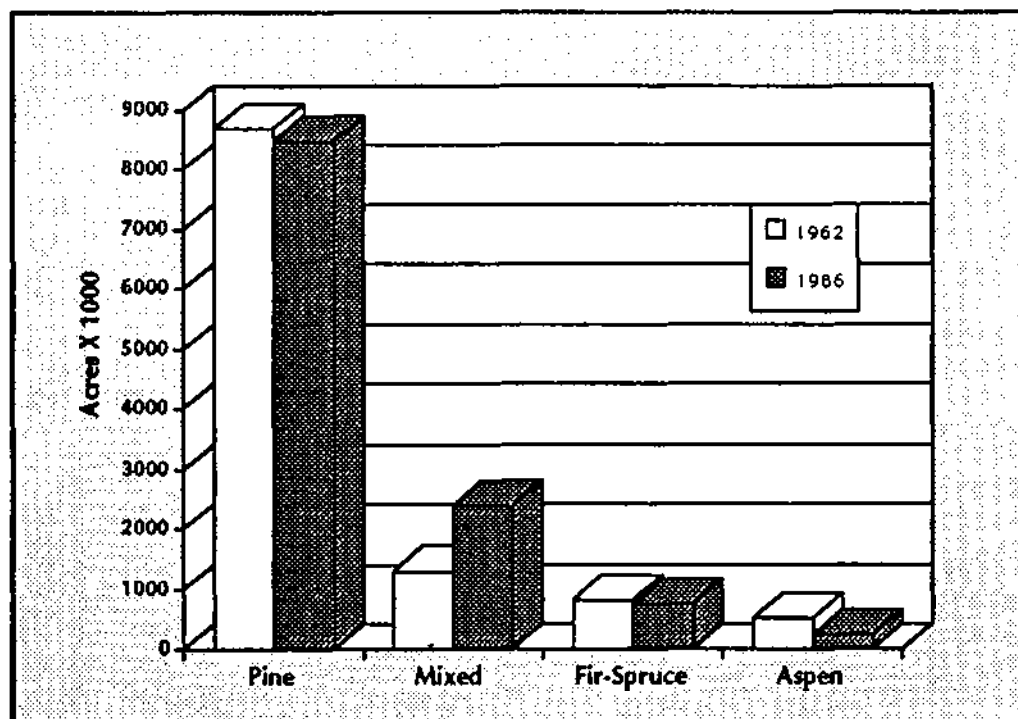


Figure 1. Comparison of forest types in Arizona and New Mexico, 1962 and 1986.

program is too small to mimic the wildfires that had historically maintained the early successional cover types in the Southwestern forest ecosystems.

Total Volume of Wood

Some assert that the Southwest has been logged over, and that the timber industry faces a rapid decline because of over-logging. This is simply not true. Growing stock, or all the wood on trees standing in commercial forests, increased from 1962 to 1986. While forest acreage increased by a modest 5 percent, total tree volume increased by 1,778 million cubic feet (MMCF), or 13 percent. This is despite removal of some 2,200 MMCF (16 percent) of the original volume in the 25-year period. In the national forests, the increase in standing volume was even more pronounced, at 21 percent.

These inventories exclude the additional volume of wood in trees in reserved areas, such as wilderness. Acreage in reserved areas increased 2,119,000 acres, or 232 percent. If we were able to account for growth on the 3,033,000 reserved acres, the volume increases would have been even more pronounced.

Recent national forest sell levels of sawtimber and other products in the Southwestern Region of the Forest Service (Arizona and New Mexico) have averaged slightly over 300 million board feet (MMBF) annually. Sawtimber alone has accounted for about 240 MMBF annually. However, recent timber inventories (Connor *et al.*, 1990; Van Hooser *et al.*, 1992) show that the total net annual growth (gross growth minus mortality and defect) of sawtimber in the Southwestern Region is 701 MMBF. When the timber sale volume is deducted from the total growth, then the net annual increase in

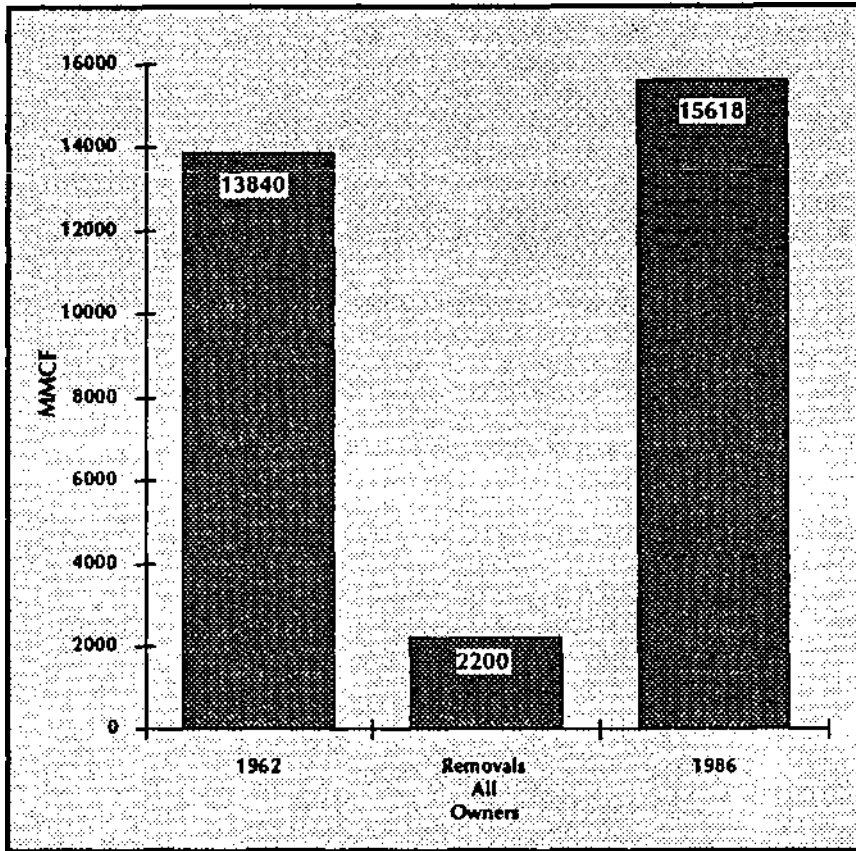


Figure 2. Growing stock volume in 1962, estimated volume removed, and volume remaining in 1986 in Arizona and New Mexico.

volume is 461 MMBF. Thus, statements such as "The days are numbered for the majority of timber industry jobs in this region due principally to over-cutting" are simply untrue in the Southwestern Region.

Tree Size

Another assertion is that practically all trees left in the woods are small, pole-sized trees. However, recent inventories show a different picture. There have been increases in numbers of trees in most size classes.

Data in Table 1 and Figure 3 show that in 1962, there were 8.1 trees per acre over 17 inches (large trees) in diameter breast height (DBH). In 1986, this figure was virtually unchanged at 8.0 trees per acre. The very largest trees, over 20 inches DBH, have decreased by 0.4 trees per acre or 7.4 percent. If we had information on trees in wilderness and other classified areas, this figure could be higher, since there was considerable growth and likely less loss among large trees in wilderness during this same time period.

Other inventories also show an overall increase in large trees. A 1909 inventory on the Kaibab National Forest north of the Grand Canyon (North Kaibab) showed an average of 15 ponderosa pines 16 inches and larger per acre compared to about 27 ponderosa pines in 1989.

In terms of small trees, there has been a dramatic increase in numbers of trees per acre. While an increase in the small-diameter classes probably occurred throughout the century, we have documentation only from 1962 and 1986, when trees from 3 inches DBH to 16.9 inches DBH (Table 1) increased from 132 to 195, or about 48 percent. The total number of trees per acre over one inch in diameter increased from 234 to 294 (26%). Virtually all comparisons of present to historical inventories

show this same trend. The 1909 North Kaibab inventory showed 91 trees per acre 3 inches or less in size. Due largely to fire suppression, this number increased to over 1,100 in a 1989 survey.

Forest Density and Multi-storied Condition

Historical records show many Southwestern forests, especially ponderosa pine, were single-story and sparse and were described in 1904 as open forests. Conditions in what is now the Coconino National Forest were described as follows:

"A yellow-pine forest, as nearly pure as the one in this region, nearly always has an open growth, but not necessarily as lightly and insufficiently stocked as is the case in this forest reserve. The open character of the yellow-pine forest is due partly to the fact that the yellow pine flourishes best when a considerable distance

separates the different trees or groups of trees. It is very evident that the yellow-pine stands, even where entirely untouched by the ax, do not carry an average crop of more than 40 per cent of the timber they are capable of producing. The yellow-pine forest in the reserve is, broadly speaking, a forest long since past its prime and now in a state of decadence. Apparently there has been an almost complete cessation of reproduction over very large areas during the past twenty or twenty-five years (due mostly to sheep use), and there is no evidence that previous to that time, it was at any period, very exuberant." (USGS, 1904).

Such descriptions indicate that the average condition before European settlement were always less dense than today's ponderosa pine forest.

Today's forests have more volume, more trees in nearly every diameter class, and more canopy layers than ever before. Recent research verifies this fact. Dense stands are difficult to maintain in a healthy condition and, in unmanaged

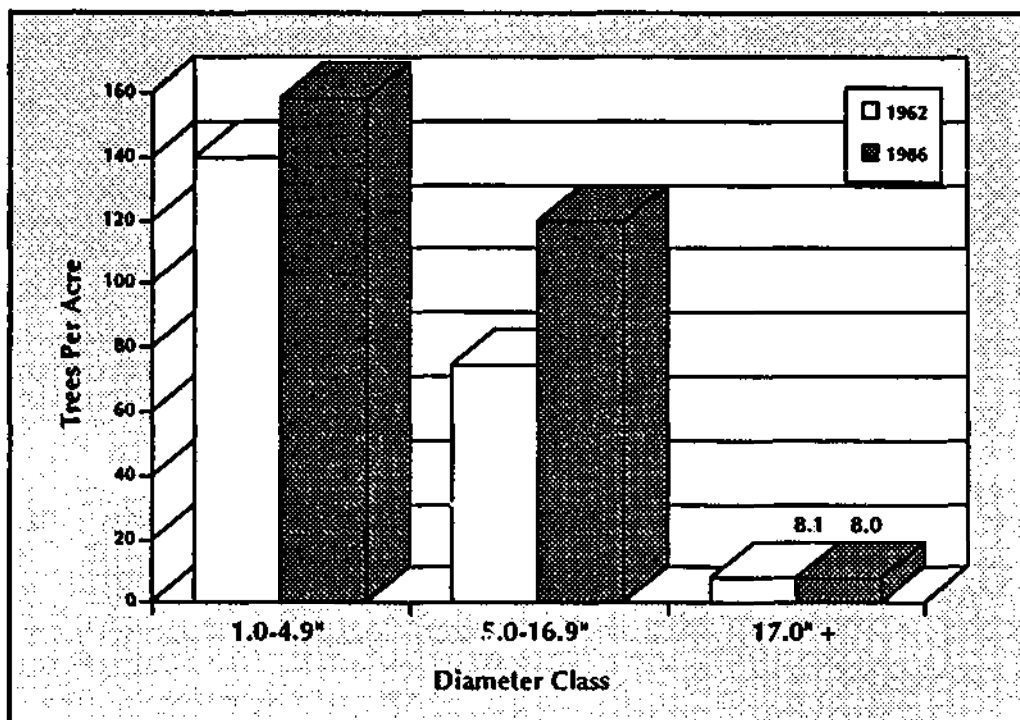


Figure 3. Number of trees per acre by diameter class in Arizona and New Mexico.

condition, are susceptible to catastrophic crown fires and pest/beetle epidemics when they are not properly managed. Covington and Moore (1992) verify these two points:

"Reports from early travelers illustrate the changes in

appearance of the ponderosa pine forest since settlement." Beale, E.F. 1858 report is quoted by Cooper, C.V. 1960 as follows:

"We came to a glorious forest of lofty pines, through which we have travelled ten miles. The country was beautifully undulating, and although we usually associate the idea of barrenness with the pine regions, it was not so in this instance; every foot being covered with the finest grass, and beautiful broad grassy vales extending in every direction. The forest was perfectly open and unencumbered with brush wood, so that the travelling was excellent" (Beale, E.F. 1858).

Cooper (1960) stated that "The overwhelming impression one gets from the older Indians and white pioneers of the Arizona pine forest is that the entire forest was once much more open and park-like than it is today."

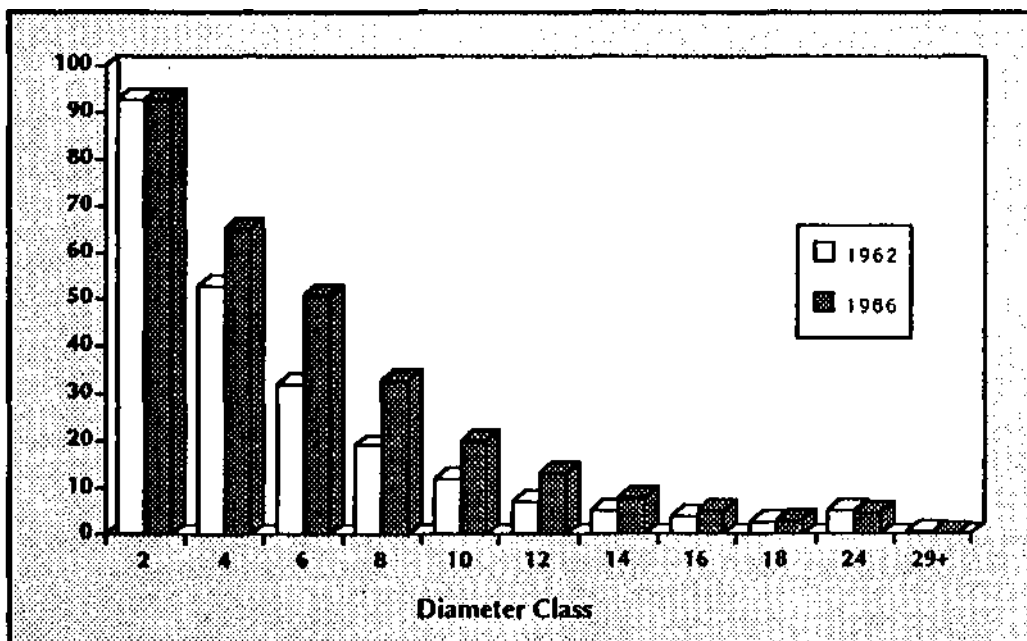


Figure 4. Distribution of trees by two-inch diameter classes on commercial forest lands in Arizona and New Mexico.

"Madany and West (1983) suggested that ponderosa pine seedling survival was probably greater in the early 1900's than in the presettlement days due to reduced competition of grasses (through grazing) with pine seedlings, and the reduced thinning effect that fires once had on seedlings in presettlement times."

"These early descriptions (Whipple 1856 and Beale 1858) of the open nature of presettlement ponderosa pine forests are in agreement with results of recent research which found that canopy coverage by trees of presettlement origin range from 17% (Covington and Sackett 1986), to 22% (White 1985), to 2-31% (Moore unpublished)."

Research by Covington and Moore (1992) shows that the number of trees per acre on the North Kaibab during presettlement was 55.9; in 1990, 276.3; and on the Bar-M area south of Flagstaff, Arizona, the number was 22.8 during presettlement and 851.0 in 1990.

Table 1. Comparison of Timber Inventories, Arizona and New Mexico, All Ownerships

	1962	1986	Differences	Percent Change
Reserved Forest Land, National Forest System (Acres x 1,000)				
	914	2,834	1,920	210
Total Forested Lands, National Forest System				
	7,002	8,068	1,066	15
Acres By Forest Type, All Owners (Acres x 1,000)				
Ponderosa Pine	8,705	8,498	(206)	(2)
Other Conifers (Mixed)	1,278	2,318	1,040	81
Fir-Spruce	692	653	(39)	(6)
Aspen	486	263	(222)	(46)
<i>Total</i>	<i>11,160</i>	<i>11,733</i>	<i>779</i>	<i>5</i>
Growing Stock, MMCF				
National Forest System	8,469	10,258	1,789	21
All Owners	13,840	15,618	1,778	13
Numbers of Growing Stock Trees Per Acre On Timberland, All Species, All Owners				
Inches DBH				
1.0-2.9	93	93	(1)	(1)
3.0-4.9	53	65	12	23
5.0-6.9	32	51	19	60
7.0-8.9	19	33	13	71
9.0-10.9	12	20	8	67
11.0-12.9	7	13	5	70
13.0-14.9	5	8	2	41
15.0-16.9	4	5	1	17
17.0-18.9	2.7	3.0	0.3	10
19.0-28.9	4.9	4.7	(0.2)	(4)
29.0+	0.5	0.3	(0.2)	(32)
<i>Totals</i>	<i>234</i>	<i>294</i>	<i>60</i>	<i>26</i>

Note: These figures are not exactly the same as they occur in the source documents (the Intermountain Research Documents listed in the References). Table 1 has been adjusted based on acreages that had been removed from timberland status between the 1962 and 1980's inventories due to wilderness and other classifications that remove land from the timberland base.

Land Stewardship Implications

Current stands are extremely dense compared to presettlement conditions and are not sustainable in their present state. High tree density is clearly related to susceptibility to bark beetle epidemics (Pearson, 1931; McCambridge *et al.*, 1979; Massey *et al.*, 1977). Significant forest health problems from bark beetles, mountain pine beetle, Western pine beetle, roundheaded pine beetle, Douglas-fir beetle, and Scolytus beetles are certain and tree losses are likely during drought periods when soil moisture is inadequate to support a high density of trees. Also, defoliation by spruce budworm will be a chronic problem. This insect is strongly associated with multi-storied stands of white fir and Douglas-fir throughout the Southwest (Linnane, 1986).

Managing for dense, multi-storied stands in ponderosa pine and Douglas-fir has increased and, if allowed to continue, will increase dwarf mistletoe infection. This parasitic plant spreads by expelling seeds that fall on nearby and understory trees, reducing growth and eventually killing the trees. Small trees never reach large size and stand density is greatly reduced (Hawksworth, 1961).

Two Southwestern Regionwide surveys for dwarf mistletoe conducted 30 years apart indicate that dwarf mistletoe has increased in recent history as forests have become more dense and less stand regeneration has occurred; in the 1950s, 30 percent of the commercial forest was infected and by the 1980s, the infection had reached 39 percent.

High levels of infection eventually eliminate high stand densities and large trees (Hawksworth, 1961). Stands become unsuitable for species such as the Mexican spotted owl, have lower visual quality, and timber productivity is reduced. Open stands of small infected trees can be expected to persist indefinitely until replaced after a stand-destroying event such as fire or clearcutting. If timber cutting, prescribed fire, or natural fire activities are reduced or forgone, dwarf mistletoe infestation can be expected to intensify over time (Parmeter, 1978).

The changed vegetative conditions in Southwestern forests have resulted in dead and down material, insect and disease incidence, and risk of wildfires. Of particular concern is fire in steep, dense, or multi-storied stands of mixed species.

Because of extreme fuel loading, most stands cannot be safely burned to return them to a sustainable condition. In dense stands wildfires are extremely large, hot, and catastrophically destructive to the forest, soil, and endangered wildlife. The most practicable and controllable way to return forests to a healthy, sustainable condition and to maintain and enhance threatened and endangered species habitat is through timber harvest. Thus, the forest management tool best suited to provide long-term health of the forests and for endangered species habitat is tree harvest. Providing jobs and multiple resources is an additional, important benefit of these harvests.

Presently, intensive management is being directed at improving habitat for Mexican spotted owls by promoting dense, multi-storied stands. This will continue to accelerate movement of tree stands toward more dense conditions and increase the probability, extent, and intensity of wildfires beyond what we now experience in the Southwestern mixed conifer and portions of the ponderosa pine forests. Where timber and fuel management activities are forgone, wildfire losses can be expected to be higher than would otherwise occur.

The current low level of harvest and cultural (pre-commercial thinning) treatments cannot prevent aging and increasing small-tree density of Southwestern forests. They will become older, denser, and perhaps more extensive. However, at some point, ecological limits will be reached, resulting in extensive forest destruction from insects, diseases, and fires. Similar losses are well-documented throughout the interior West where the same circumstances have prevailed, such as most recently in the Blue Mountains of eastern Oregon.

Forest management concerns attributed to fire exclusion, resulting in increased tree density in ponderosa pine forests include overstocked sapling patches; reduced tree growth; interrupted nutrient cycles; increased disease, insect infestation, and parasites (e.g., root rot, bark beetle, dwarf mistletoe); decreased forage quality and quantity; increased fuel loading; increased vertical fuel continuity due to dense sapling patches; increased severity and destructive potential of wildfires; increased tree canopy closure;

decreased on-site water availability; decreased stream-flow and ground water recharge; shifts in habitat quality for biota; decreases in some important forest types; decreases in early successional plant communities; and visual unattractiveness.

Many of the above are applicable in mixed conifer also.

There are many social, economic, and politically imposed factors that have contributed to developing forest health problems, which effectively limit treatment of the forest as a whole to improve its health. These factors include:

- Fire prevention and control.
- A budgeted sale program of 310 MMBF.
- Mexican spotted owl guidelines.
- Almost no use of clearcutting.
- Visual quality objectives.
- Smoke management guidelines.
- Forest plan standards and guidelines.
- Large increases in reserved areas such as wilderness.
- Limited budget for precommercial thinning.
- Meager market for small trees (5-9" DBH).
- Protection of threatened and endangered species (thistles, salamanders, etc.).

These limitations are unlikely to change in the near future and they reduce options for the amount of treatment possible.

What Can be Done?

We should start where potential ecological effects are most profound. Correction of forest health problems requires rigorous analysis and careful planning and must be considered in light of the total ecosystem. Some approaches that appear to merit implementation include:

- Increase regeneration of aspen, including large blocks.
- Harvest around urban interface.
- Establish Integrated Pest Management demonstration areas.
- Wilderness fire programs.

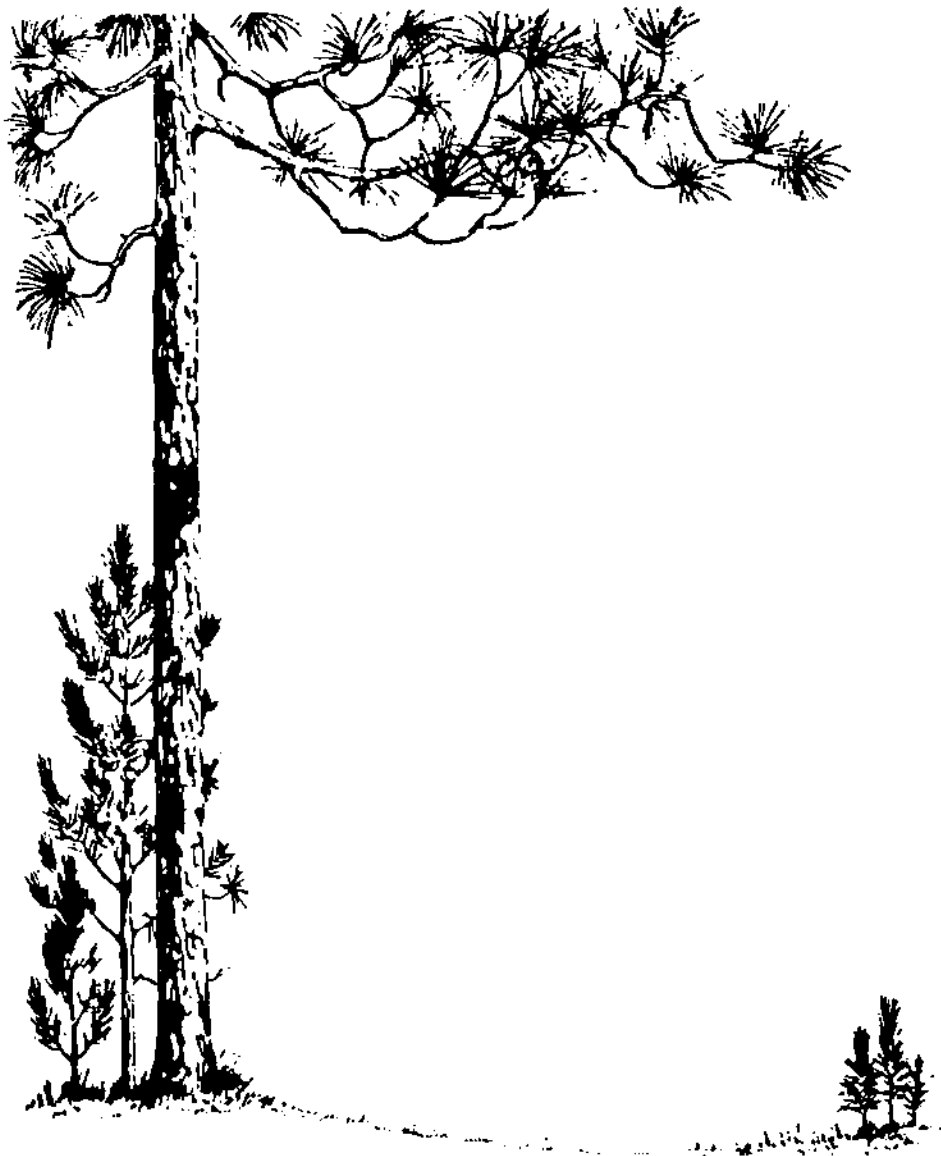
- Prompt salvage of major mortality when it does occur.
- Reduce incidence of white pine blister rust in Lincoln National Forest.
- Re-establish ponderosa pine in selected portions of the white fir habitat type
- Aggressive harvest of small trees.
- Intensive precommercial thinning program.
- Increased prescribed fire program.

- Revise Forest plan standards and guidelines as needed, based on new information and new management, such as management under the Northern goshawk guidelines.

Aggressive implementation of the Northern goshawk management guidelines, designed with forest health in mind, would lead to forests that are sparser and more like presettlement conditions. These forests would be easier to maintain in a healthy condition. We will need to resolve conflicts between

Northern goshawk management guidelines and current Mexican spotted owl management guidelines, which can lead to very unhealthy forests in the long run.

Through the Forest Service Ecosystem Management Scientific Committee, we can work toward modification of the Northern goshawk guidelines to make them even better for forest health.



Conclusion

Assertions about decline in Southwestern forests due to timber harvesting are not based on fact. The data show that tree density, volume, and number of canopy layers increased between 1962 and 1986. Fir is increasing at the expense of aspen and ponderosa

pine. The number of large trees has remained about the same during this period. Unsustainable forest changes are largely due to reduced incidence of fire during the last 100-plus years and failure to replace fire with timber harvest, especially in the small and mid-size

diameter classes. Rather than move toward less disturbance as has been the trend in the recent past, it is vitally important that we address the unsustainable situations created by type conversions and extremely dense forests of today.