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# Of Spotted Owls, Old Growth, and New Policies: A History Since the Interagency Scientific Committee Report

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## **Abstract**

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This paper tracks the recent history of planning, management, and litigation regarding northern spotted owls and their habitat on Federal public lands since the 1989 Interagency Scientific Committee to Address the Conservation of the Northern Spotted Owl (ISC). The ISC report and subsequent plans sparked many economic analyses, appeals, lawsuits, forest management plans, and counterplans. Federal assessments and planning efforts eventually led to the current Northwest Forest Plan which considers owls in the context of ecological and human communities under the rubric of ecosystem management.

Keywords: Spotted owl, old growth, Interagency Scientific Committee, threatened species, Northwest Forest Plan, forest policy, Endangered Species Act.



## Introduction

Recent years have seen vast changes in approaches to and content of public forest management in the Pacific Northwest. Many of the forest issues and controversies that have spun new management plans over the past two decades have revolved around northern spotted owls (*Strix occidentalis caurina*), old-growth forests, and policy for management of Federal public lands. This report summarizes the recent history of technical assessments, public polemics, and agency planning on northern spotted owls and their habitats.<sup>1</sup>

## Life After the Interagency Scientific Committee Report

*The clamorous owl, that nightly hoots,  
and wonders  
At our quaint spirits.  
William Shakespeare,  
"A Midsummer-Night's Dream"  
[1595-1596], act: 2, scene: 2, line: 6*

The report of the Interagency Scientific Committee to Address the Conservation of the Northern Spotted Owl (ISC) (Thomas and others 1990) presented a landmark monograph on a species only relatively recently known to science and the lay public. The work of the ISC had been one of the most complete assessments of a species to date, particularly as applying modern concepts and methods of demographic modeling and conservation biology.

Concerns for one species—the northern spotted owl—have stimulated a focus on the ecosystem itself. Debates fueled by the ISC report have addressed the role of public forest lands in species and biodiversity conservation, the fate of the Endangered Species Act (ESA), and the roles of litigation and the judicial system in public timber management. Even the President of the United States and his White House staff have become involved. In this report—hardly the

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<sup>1</sup>In this report, we discuss events listed more by project or agency than by strict chronological sequence (but see table 1 for a time-line summary). This is because so many activities have occurred concurrently, that a strict chronological listing would not help clarify individual goals, assignments, and motivations.

ending of the story—we trace the sundry events in Federal land management and planning that have unfolded since the ISC was convened in 1989 and their report was first published in 1990.

The earlier history of spotted owl management has been recounted by Bainbridge (1993), Meslow (1992, 1993), Meslow and others (1992), and Thomas and others (1993, summary chapter), and in the ISC report itself (Thomas and others 1990). More recently, Yaffee's (1994) book traces the history of spotted owl management in the USDA Forest Service (FS) during the mid to late 1980s. We begin mostly where the ISC ended.

## The Owl Sparks a Land Planning Revolution

*Andras: Grand marquis of Hell. He  
appears to have the body of an angel  
and the head of a wood owl, and to be  
riding a black wolf and carrying in his  
hand a pointed saber. He teaches  
those whom he favors to kill their  
enemies, masters and servants. He  
stirs up trouble and dissension. He  
commands thirty legions.*

*de Plancy 1965:10*

Few issues in the history of land management planning of public forests in the United States have been as long-lived and intense as that over the fate of old forests in the West. Few issues have had as much to teach in terms of forest management and public involvement. Little did the pioneers in northern spotted owl research in the 1960s and early 1970s—Eric Forsman, Gordon Gould, E. Charles Meslow, Howard Wight, and a few others—then realize that their work would contribute to an ongoing revolution in public forest land management with national and even international policy implications. After decades of obscurity even in the ornithological literature, *S. occidentalis* was quickly to become the focus of leading-edge research, a host of technical analyses, and a shelf full of management strategies.

### **Interagency Scientific Committee Spurs Debate and a Market for Secondary Literature (1990-94)**

Initial publication in 1990 (Thomas and others 1990) of the ISC report and the accompanying maps of northern spotted owl habitat conservation areas (HCAs) spurred a wave of response from scientists and managers alike, and propelled the conservation strategy and its senior author into the harsh light of critical examination. Response was at once divided. Environmental nongovernment organizations denounced the strategy as too reckless for not recommending that all old-growth forests be placed in protected status. Timber industries and their consortia decried the strategy as far too conservative, that the old-growth needs of the spotted owl had been greatly exaggerated, and that the strategy would spell social and economic chaos for the U.S. Pacific Northwest (Beuter 1990).

In short order, a broad secondary literature appeared in response to the ISC report. Lee (1990), for example, warned of great social and cultural changes that would result from implementing the ISC strategy. The Northwest Timber Association, a consortium of timber industries in the Pacific Northwest, published their harsh critique of the ISC report (Northwest Timber Association 1990). Conversely, at the same time, scientists involved in the ISC were recognized in awards made by scientific associations, including The Wildlife Society and Society for Conservation Biology, for the excellence of their work.

The ISC published a summary of their report in the February 1991 issue of *Journal of Forestry* (ISC 1991), which also contained a counterpoint article by Wood (1991) explaining why the owl conservation strategy is "flawed." Later, Watson and Muraoka (1992), Bainbridge (1993), and Yaffee (1994) reviewed some of the intricate links among the timber industries, owl habitat management, and the growing economic instability of timber-dependent communities of the Northwest.

Debate on the issue made for good press. The general media, environmental groups, and timber interests continued to focus on the issue as owls versus jobs (Satchell 1990). In 1990, a *Time* magazine cover story posed the controversy as "owls vs. man" (Gup 1990). Divisiveness continued to be orchestrated both by interest groups

and, as reported by some authors, by the administration of the time (Pytte 1990, Yaffee 1994). For others, however, the issues focused on whether timber should be harvested at all, and what should be the fate of old-growth forests, on Federal public lands (e.g., Chasan 1990, Wilcove 1993, Wilcove and Murphy 1991).

### **Many Economic Analyses Emerge, Few Converge (1990-92)**

During the early 1990s, many economic analyses were conducted. Most focused on the effects on timber-dependent industries and communities from implementing the ISC's proposed spotted owl habitat management strategy, viewing forest production and protection as incommensurate goals. The analyses largely centered on the effects of reducing timber harvest levels (ASQ or allowable sale quantity) on Federal public forest lands because of protection of mature and old-growth forests within spotted owl HCAs.

In 1990 alone, at least seven such economic analyses were presented (Beuter 1990, Gorte 1990, Greber and others 1990, Hamilton and others 1990, Lee 1990, Olson 1990, Satchell 1990), with three more in 1991 (Maki and Olson 1991, Rubin and others 1991, U.S. Department of the Interior 1991a) and three in 1992 (Montgomery and others ca. 1992, Sample and Le Master 1992, Thomas and Verner 1992), not counting other economic assessments presented in various Federal land management planning documents.

Conclusions of these sundry assessments did not always converge. Estimates of economic costs to timber-dependent communities and industries from implementing the ISC strategy ranged widely, from several thousand jobs to many tens of thousands of jobs. Many of these assessments did not deal with pecuniary or secondary effects (either costs or benefits). Most did not deal with positive aspects of changing economies, such as enhancements to secondary recreational industries, or the eventual hiring of hundreds of biologists and other resource specialists to inventory owls and study habitats and forestry effects. Rather, short-term, adverse effects on existing economic institutions seemed to be the prime interest and focus. And the outlook was typically painted as grim.

### **The Interagency Scientific Committee Responds (1991-92)**

The ISC core team with its extended set of technical participants was disbanded after initial publication of their report. They convened once more, however, in 1991 to write a set of “Questions and Answers” (USDA 1991) in response to what they perceived as growing misconceptions and misrepresentations of the strategy and analyses. This government publication was distributed to State and Federal public officials who, at that time, were deliberating on at least three major conservation issues: (1) the fate of ESA, (2) drastic simplification or elimination of the regulations in the National Forest Management Act (NFMA) that pertain to management of viable populations and diversity, and (3) the potential Federal listing of the northern spotted owl subspecies as “threatened” under ESA by the U.S. Department of the Interior (USDI).

In 1992, Thomas and Verner (1992) presented a paper tracing the considerations for economic and social impacts in spotted owl management. They concluded that political, economic, social, and litigative forces always had shaped spotted owl habitat management plans on Federal public land. They noted that the owl habitat conservation strategy offered by the ISC had not been immune to such considerations, and that special interest groups’ increasingly acrimonious calls for “balance” in forest resource management had already been addressed in the strategy.

### **“Section 318” is Advanced as an Interim Strategy for Old-Growth Harvesting and Conservation (1989-90)**

By 1989 and before the ISC report was issued, environmental groups had procured a court injunction against the sale of old-growth timber on USDI Bureau of Land Management (BLM) lands near spotted owl sites. A “Northwest Compromise,” also known as the Hatfield-Adams amendment of 1989, was developed by Senators Hatfield of Oregon and Adams of Washington, to sidestep the ongoing litigation and avoid what was perceived as a growing crisis in timber availability and in the viability of timber communities and companies. The amendment entailed Congress attaching a rider (Section 318 of Public Law 101-121) to the Interior and Related Agencies

Appropriations Bill for 1990 that funded FS and BLM. Officially, the rider named as sufficient for preparing timber sales for fiscal year 1990 (1) the then-existing FS Environmental Impact Statement (EIS) and BLM’s supplemental management plans for spotted owls and (2) expansion of designated Spotted Owl Habitat Areas as set out in the rider. The rider also called for the creation of the ISC (Thomas and others 1993).

The rider called for FS and BLM (not ISC) to delineate “ecologically significant” old-growth timber stands for interim protection while the Regional (Pacific Northwest Region) EIS at the time was being written (Baldwin 1990). In 1989-90, while the ISC was writing its report, National Forests of the Pacific Northwest responded to the Section 318 rider mandates with an “incident command team” structure akin to the paramilitary organization successfully used to fight major forest wildfires. The Section 318 incident command teams quickly produced analyses and maps of old-growth forest stands and engaged citizens’ advisory boards, as instructed in the rider, to delineate and modify the 1990 timber sales (USDA 1990). The teams identified selected old-growth forest stands that are small, highly fragmented, and heavily affected by early successional species invasions as the first to be planned for harvest.<sup>2</sup>

### **The Lineage of Spotted Owl EISs Grows (1991-92)**

On 23 May 1991, U.S. District Judge William L. Dwyer of Federal District Court issued an injunction against the FS disallowing timber sales in spotted owl habitat (Dwyer 1991). This was in response to a directive issued by the FS to operate “in a manner not inconsistent with” the

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<sup>2</sup> Later, the Scientific Analysis Team (Thomas and others 1993) and the Forest Ecosystem Management Assessment Team (FEMAT 1993) would revisit the rather hasty assumption that smaller and more fragmented old-growth forest patches have lower ecological significance. Both teams concluded that, where larger patches of old growth no longer exist, small, fragmented, and isolated old-growth forest patches actually are valuable sources of fungi, lichens, bryophytes, invertebrates, and small mammals that are closely associated with old-growth forests. Such species are important for nutrient cycling and for maintaining other forest ecosystem functions affecting diversity, productivity, and sustainability of both young and old forests throughout a heavily managed landscape.

ISC guidelines rather than to adopt the ISC guidelines per se. The FS was ordered by the Court to produce an EIS following the guidelines of the National Environmental Policy Act (NEPA) to legally adopt a conservation management plan. The plan also had to adhere to the guidelines of ESA. The EIS and conservation plan would then replace the guidelines in the existing 1984 Regional Guide (USDA 1984), and in the subsequent Record of Decision (USDA 1988b) resulting from the regional spotted owl habitat management EIS (USDA 1988a) produced before the ISC report. The court injunction eventually led to a second, new regional EIS on spotted owl habitat management (USDA 1992a) and even to a third regional EIS dealing with the entire old-forest ecosystem (USDA and USDI 1994).<sup>3</sup>

Meanwhile, BLM had chosen to ignore the ISC guidelines and soon was entertaining its own appeals and lawsuits. On 19 February 1992, Portland Audubon Society and others brought suit against BLM on the basis of a lack of an acceptable conservation strategy that complied with Federal laws and regulations (Frye 1992). Eventually, the FS and BLM would join forces and produce a joint EIS and conservation strategy (USDA and USDI 1994).

### **Appeals and Litigation Remain Part of the Process (1991)**

Legal challenges to existing and proposed Federal forest management plans continued (see summaries in Grubbs 1990; also see Rowland 1993; Thomas and others 1993). In fall 1991, the Seattle Audubon Society and others filed suit over the Pacific Northwest Region plan of the FS in Federal District Court, on the grounds that existing guidelines failed to provide an acceptable conservation strategy that would meet the mandates of

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<sup>3</sup>As of this writing, since 1985, the Pacific Northwest Region of the FS will have produced four regional EISs, each having a record of decision (e.g., USDA 1988b, Mosley 1992) and a proposed conservation strategy for spotted owl habitat management. One EIS accompanied the 1984 Pacific Northwest Regional Guide and three others followed (USDA 1988a, USDA 1992a, USDA and USDI 1994). Each EIS included a draft as well as a final version, so the number of regional EIS documents on owl habitat management actually totaled eight. As will be discussed below, the number of alternative, proposed conservation strategies also more than kept pace with this production.

NFMA and NEPA. They cited the ISC report as evidence of potential viability concerns. During the court hearings, analyses of potential economic effects were presented by all parties, including intervenors from timber industry. The basis of the arguments from environmental groups and timber industry would later completely reverse during the proceedings of the Endangered Species Committee for considering exemption for timber sales on BLM lands (Thomas and others 1993).

### **The Gang of Four Finds No Silver Bullet (1991)**

In May 1991, the Agriculture Committee and the Merchant Marine and Fisheries Committee of the U.S. House of Representatives chartered a group of experts as a "Scientific Panel on Late-Successional Forest Ecosystems." Four experts in forest ecology or management were chosen to lead the task of analyzing and reporting on conditions and management of late-successional and old-growth (LSOG) forests on Federal lands of the Pacific Northwest within the range of the northern spotted owl. The four chosen were Jerry Franklin, forest ecologist, University of Washington; John Gordon, dean, School of Forestry, Yale University; K. Norman Johnson, economist, Oregon State University; and Jack Ward Thomas, research wildlife biologist (later, Chief), FS. The charter directed the panel (pejoratively called the "Gang of Four" by a timber industry spokesperson) to assess the viability of all vertebrate species closely associated with late-successional forests, at-risk fish stocks, and the integrity of late-successional forests, at-risk fish stocks, and the integrity of late-successional forest ecosystems within the owl's range. Species viability was a focus of the effort because the regulations implementing NFMA (36 CFR 219.19) specify that the FS shall provide for viable populations of all native and desired nonnative vertebrate species within the planning area. For the panel's work, the viability standard would be extended to BLM as well. And for what would prove to be a major turning point in focus for planning assessments in the region, this charter expanded the officially recognized scope of the issue beyond spotted owls to include viability of all associated species and the integrity of the LSOG forest ecosystem (Thomas and others 1993).

The panel's final report of 8 October 1991 (Gordon and others 1991) concluded that the distribution and amount of LSOG forests on Federal public lands were insufficient for supporting both high species viability and existing timber harvest rates; and that the best way to ensure long-term persistence of viable old-growth ecosystems and their component species including northern spotted owls, marbled murrelets (*Brachyramphus marmoratus*), and at-risk anadromous fish, is to establish LSOG reserves. The LSOG reserves also should be supplemented with (1) "owl addition areas" to ensure correct sizing and spacing of habitats for maintaining northern spotted owls as per ISC guidelines, and (2) "key watersheds" for protecting critical anadromous fish spawning habitat.

Producing the "Gang of Four" report entailed gathering from Federal agencies several hundred of the best experts to map LSOG forests and species. The report presented 14 management alternatives ranging from current National Forest and BLM plans, through extensive protection of all remaining LSOG forests, spotted owl habitats, and key watersheds for fish. Most alternatives also had three variations that specified levels of retention of old-forest habitat patches and components (large trees, large snags, and down logs, etc.) to be provided on general-management "matrix" lands in between the LSOG reserves, owl addition areas, and key watersheds. The panel also presented potential levels of timber harvest and many timber-related jobs expected under each alternative but deliberately made no recommendation for which alternative should be selected.

During this time, the U.S. Congress also had held hearings on management of old-growth forests (e.g., see report by Henderson 1990 which chronicled the recent rapid declines in amounts of old-growth forests as the basis for management controversies and, ultimately, the hearings). Although various House and Senate Committees considered several of the panel's alternatives in deliberations and pending bills, none made it to member vote or into legislation. Their failure to act threw the controversy back into the Federal Court's arena. The controversy over the fate of LSOG forests in the Pacific Northwest continued and intensified.

### **The Owl is Listed in a Storm of Polemics (1990-92)**

Publication of the ISC report eventually lent weight to USDI Fish and Wildlife Service's (FWS) status assessments and listing procedures for the northern spotted owl, although initially these were two independent efforts. In 1990, Anderson and others (1990) produced a (fourth) status review of the northern spotted owl and concluded that its viability was being imperiled by continued cutting of older forests. By June 1990, FWS officially listed the northern spotted owl as threatened throughout its range (USDI FWS 1990). (This was 4 years after the Committee on the Status of Endangered Wildlife in Canada declared the bird an endangered species in 1986.) With the FWS Federal listing, implications for forest management in the Pacific Northwest were profound (Franzreb 1993).

Next, in 1991, after a period of inaction, the FWS was ordered by the Court to propose critical habitat for the subspecies (USDI 1991b). After much public debate over criteria for identifying and delineating critical spotted owl habitat (e.g., see Bart and Holthausen 1993), FWS decreased the total area of critical habitat and issued the final designation in 1992 (USDI FWS 1992a).

Designation of critical habitat for the northern spotted owl carried legal mandates that Federal agencies must seek consultation for proposed, potentially habitat-disturbing activities under particular conditions. There were no state or private lands included in the designation of critical habitat. Still, there was increasing concern that state and private lands would be subject to Federal control, and that the outfall of the listing decision, critical habitat designation, and the subsequent recovery plan would interact, be thrust upon state and private lands, and contribute to economic chaos.

The FWS produced a draft economic analysis of the effects of designating critical habitat for the owl, but that was just the beginning of further economic assessments and polemics. In December 1992, a Federal District Court ruled in favor of Douglas County, Oregon, which asserted that FWS must prepare an EIS on designation of critical habitat under ESA. The EIS would continue

to consider economic and social ramifications of the designation, as also had been considered as part of the critical habitat rule.

Concurrent to the initial critical habitat designation, USDI chartered a Northern Spotted Owl Recovery Team, the first FWS recovery team to consist of more nonbiologists than biologists. Included in the recovery team's deliberations were recovery goals for population performance and appropriate forest management activities that would be commensurate with protection of the owl and its habitat (e.g., Agee and Edmonds 1991). After many delays, the recovery team's report (USDI FWS 1992c), which essentially was only a slight modification of the ISC report, was finally issued by USDI in draft form but, as of this writing, has not been signed and finalized.

The recovery plan also was one of the first FWS recovery plans to recommend as a recovery objective for a threatened taxon an overall population size **smaller** than the existing one. As many scientists and technical assessment teams (including ISC) previously concluded, however, the near-term problem with spotted owl habitat was deemed to be more one of increasing fragmentation of habitat and isolation of pairs and populations than one of low total population size per se. The recovery team concluded that—following the ISC strategy—if appropriately linked and secured from further loss from timber cutting, a smaller owl population could still reach recovery objectives.

The recovery plan also suggested, as was further developed by the Scientific Panel on Late-Successional Forest Ecosystems, that a broader ecosystem perspective should be applied to management of northern spotted owls and their habitats (Anthony 1992). It would take at least two more technical team charters (Thomas and others 1993, and FEMAT 1993, listed here in order of publication) with the continuing contributions of some of the recovery team biologists (including Robert Anthony and Richard Holthausen) to more fully achieve this synthesis in 1994.

The ESA also provided that habitat conservation plans (HCPs) be written for management of threatened species and their habitats on state and private land (ESA, Section 4(D)). Indeed, several northern spotted owl HCPs have been drafted, reviewed by FWS, and even instituted on

some private timber industry lands (e.g., Diller 1993, Hanson and others 1993, Nelson and others 1991, PLC 1992).

As well, ESA mandated that formal "consultation" ensue between Federal agencies and FWS before management actions can begin that could potentially harm the species or its habitat (ESA, Section 7). In response to this, the FS and BLM formalized a biological evaluation (BE) process of determining the conditions and potential risks to spotted owls or their habitats from proposed management activities. The BE process included a standard survey protocol for locating spotted owls (USDI FWS 1992b). The consultation process, however, also had its detractors, including the World Wildlife Fund (Barry and others 1992).

### **The "God Squad" Deliberates on Owls Versus Timber Sales (1991)**

In June 1991, as a result of BLM failing to adopt the ISC guidelines, FWS assigned "jeopardy opinions" on 44 of 175 timber sales proposed for 1991 in Oregon on BLM land. The FWS concluded that the timber sales would lead to irretrievable harm to viability of the northern spotted owl, particularly in terms of loss of crucial dispersal habitat on BLM land that links the spotted owl populations of the Oregon Coast Range with that in the Cascade Range in Oregon. The BLM requested an exemption from Section 7 of ESA which would then allow them to sell the timber and cut the trees. On 1 October 1991, Interior Secretary Manual Lujan determined that BLM's application was sufficient to convene the Endangered Species Committee (the so-called "God Squad") for the third time in U.S. history. The Committee consisted of six Cabinet level appointees and one nominee from the involved state (in this case, Oregon) (Thomas and others 1993).

A month of evidentiary hearings in Portland during January 1992 included testimony from 97 witnesses. As Thomas and others (1993) summarized, in the adversarial proceedings, the BLM and intervenors from timber industry and affected Oregon counties put the science of the ISC on trial. Among the reports presented were results from a post-ISC workshop of spotted owl scientists held in Fort Collins, Colorado (later published as Forsman and others 1996). The workshop scientists had concluded that demographic

studies of five northern spotted owl populations showed that the populations were declining at a combined rate of 7.5 percent per year, and that this rate was increasing over time (Thomas and others 1993).

A public hearing was held February 1992, and on 14 May 1992, the committee voted five to two to exempt 13 of the 44 BLM timber sales from the provisions of ESA (U.S. Government 1990). As a quid pro quo, however, the committee directed BLM to immediately implement the still-draft Northern Spotted Owl Recovery Plan and to use the recovery plan to produce their new 10-year management plans. In essence, the committee gave both sides a victory by exempting a relatively insignificant number of acres to be logged and telling BLM to cease delay and adopt the recovery plan, which was a close facsimile of the ISC strategy that BLM had previously abandoned.

### **Congress Entertains Intervention (1989-93)**

From 1989 to 1993, U.S. Senate and House committees had considered legislation to quell further litigation and solve the forest management crisis of the Northwest. Proposed, but never voted on, were many riders and bills that would variously eliminate or strengthen ESA, NEPA, and NFMA, and their implementing regulations. By June 1992, shortly after the Scientific Panel on Late-Successional Forest Ecosystems issued their report, no less than nine individual bills were being discussed or introduced in committees. At that time, timber sales in northern spotted owl habitat on FS and BLM lands had been enjoined and both House Agriculture and House Interior Committees offered solutions based on the scientific panel's alternatives. Most of the focus was on options offering protection to the spotted owl similar to that prescribed in USDI's Northern Spotted Owl Recovery Plan that had been patterned on the ISC strategy. But no legislation was brought forward to the full House (Thomas and others 1993).

### **BLM and USDI Devise New Plans (1990-92)**

Between 1990 and 1992, the BLM produced at least three sets of resource and spotted owl management plans. To avoid what was likely perceived as unnecessary and, certainly, politically unacceptable management constraints in

the ISC guidelines, the Bush administration appointed a task force of political appointees headed by Assistant Secretary of Agriculture James Moseley to examine the ISC report and find lower cost alternatives. Deadline after deadline passed, and on 21 September 1990, the task force produced not a report but a press release stating that FS would operate in a "manner not inconsistent with" the ISC's conservation strategy. It also stated, however, that the BLM would provide timber sales consistent with the so-called Jamison strategy (USDI BLM ca. 1990), named after Cy Jamison, Director of BLM.

The press release stated that the new Jamison strategy for BLM would provide the same level of protection as intended in the ISC conservation strategy, but that it would not impose as severe a restriction on timber harvesting in suitable spotted owl habitat on BLM lands in Oregon. It did not explain how this would be accomplished, however. The new Jamison strategy was never provided in detail, never peer reviewed, and never presented as other than a press release. No EIS or record of decision in the Federal Register accompanied the announcement (Thomas and others 1993).

By late 1990, BLM had next produced a set of management guidelines for the northern spotted owl for fiscal years 1991 and 1992 (USDI BLM 1990). These guidelines aimed at protection of options for future management of spotted owl habitat in Oregon, and roughly followed the ISC conservation strategy. Then, by 1992, BLM had revised their district resource management plans and issued a series of drafts (e.g., USDI BLM 1992), which more faithfully followed the ISC strategy and used new technologies to model potential spotted owl response to habitat distribution (McKelvey 1992, McKelvey and others 1993).

Yet also in 1992, and concurrent with the release of USDI's unsigned draft Northern Spotted Owl Recovery Plan, USDI Secretary Manuel Lujan Jr. released an administration-sponsored "Owl Preservation Plan" drafted by five assistant and deputy assistant secretaries of Agriculture and the Interior (Lujan and others 1992). The Owl Preservation Plan (also called at the time the Lujan plan) followed some aspects of the Draft Spotted Owl Recovery Plan but called for protection of only half of the old-forest habitat in the range of the northern spotted owl. The plan was

drafted with full knowledge that its implementation would necessitate amending ESA and NFMA. Government scientists who assembled to review the plan projected a 50-percent likelihood of extinction of the northern spotted owl under this plan, and Cooper Ornithological Society issued a statement denouncing the Owl Preservation Plan as a formula for extinction (Cooper Ornithological Society 1992). Congress decided not to act or hold hearings on this suggested plan (Thomas and others 1993), possibly because of ongoing litigation between National Audubon Society and others, and Lujan (Frye 1992).

### **Timber Industry Advances a Plan of Their Own (1991)**

In 1991, in response to the EIS on northern spotted owls being prepared by the FS, timber industries of the Pacific Northwest prepared their own conservation strategy for owl habitat management on Federal public lands. They dubbed it a Multi-Resource Strategy and it was used as a basis for one of the alternatives in the FS draft EIS. In the draft and final EISs (USDA 1992a), the Multi-Resource Strategy did not receive high marks for viability protection of the owl, and this alternative was not selected in the record of decision. External peer reviews (e.g., Pimm 1991) also found it less conservatory than ISC or other conservation strategies.

### **Habitat Conservation Plans and the “4(D) Rule” Sprout in Washington and California (1994-96)**

In late 1994, the State of Washington announced its intent to develop and implement an HCP for the northern spotted owl on State trust lands. The overall aim of such an HCP is to allow timber harvesting and other management activities under a framework of managing the land for species conservation and ecosystem health.<sup>4</sup> The HCP covered state forest lands managed by Washington Department of Natural Resources totaling 1.6 million acres and focused on riparian zones,

<sup>4</sup>Section 10 of ESA allows landowners to negotiate with the Secretary of the Interior on a conservation plan to mitigate and minimize impacts on threatened or endangered species, while conducting lawful activities such as timber harvesting and forest management. An HCA can allow incidental take of listed species within the plan guidelines.

including conservation of salmon habitat; northern spotted owl habitat; marbled murrelet habitat; conservation assessments for additional candidate species, endemics, and other species likely to be listed; and forest health. The goals of the HCP were to comply with ESA while continuing a timber sales program; reduce costs for project-specific surveys of northern spotted owls; allow more predictable levels of timber sales; consider unlisted species; and ensure forest productivity and growth. If successful, the HCP may help set a precedent of proactive management of a threatened species and its habitat by State landholders in the Pacific Northwest.

Still, fears grew that FWS would assert restrictive spotted owl habitat planning guidelines on non-Federal lands, particularly on private lands. Between 1994 and 1996, FWS engaged in a major and controversial project designed to answer the question of how to evaluate the effects of projects on northern spotted owl habitat on non-Federal lands under ESA, Section 4(D). The answer came in the form of the so-called 4(D) Rule which is a broad-based regulatory vehicle that allows for the “take” of a significant portion of the owl population on non-Federal lands. The 4(D) Rule—still in draft as of this writing—has been written only for Washington and California, as the State of Oregon has asked to be excluded.

The draft 4(D) Rule stipulates that locations of northern spotted owls on non-Federal lands would be identified based on their need to contribute to overall owl population recovery at least on Federal lands. On a site-specific basis, it is still to be assumed that owl recovery takes precedence. But land owners are given the choice of either protecting specific owl sites under the ESA Section 4(D) “take” guidelines, or under an HCP.

The FWS acknowledged that the draft 4(D) Rule would lead to the extirpation of northern spotted owls in southwest Washington. The FWS found this acceptable based on recent field research and modeling suggesting that spotted owls on the Olympic Peninsula—long suspected of being demographically isolated from populations in the Cascade Range in Washington—may be able to hold their own over time<sup>5</sup> (also see Holthausen and others 1995).

<sup>5</sup>Personal communication. 1997. C. Ogden, wildlife biologist, Regional Ecosystem Office, 333 SW First Avenue, Portland, OR 97224.

Over 1993-96, the FWS aggressively worked with non-Federal land owners in developing HCPs for owl management issues. Significant advances in this area were made in the development of HCPs by several private corporations. These HCPs currently stipulate that the land holders would be able to negotiate for providing spotted owl dispersal habitat across a broad area, in lieu of providing nesting, resting, and foraging (NRF) spotted owl habitat. Typically, dispersal habitat includes forests substantially younger in age and often less dense than NRF habitat; NRF habitat is mature or late-successional forest that is usually more valuable economically. Thus, owl habitat on non-Federal lands, under these HCPs, would likely trend toward providing for spotted owl dispersal rather than for reproduction.

Also, under the draft 4(D) Rule, the FWS would defer to individual American Indian tribes the management of spotted owl habitat on those lands. Each tribe would provide their own management guidelines, in the spirit of FWS honoring their self-government. This applies to tribes in Washington and California but not Oregon; Oregon tribes would be managed under the more traditional approach via the ESA Section 7 consultation process for each timber sale and forest management activity potentially disturbing spotted owl habitat. The FWS excluded tribes in Oregon from this approach because the State of Oregon so requested; however, as of this writing, the question of how the State of Oregon can essentially direct the activities of sovereign tribes has not yet been resolved.

### **Interest Grows in the Other Two Subspecies**

After the ISC report, much interest was raised as to the fate and management of the California spotted owl (*Strix occidentalis occidentalis*) and its habitat. Appointed by a Steering Committee of State (California) and Federal agency representatives, plus representatives of timber industry, environmental groups, and county officials, in 1992 a committee of scientists produced the California Spotted Owl (CASPO) report (Verner and others 1992b). This technical evaluation addresses historic, current, and potential changes in California spotted owl populations and their habitats (e.g., Beck and Gould 1992, Verner and others

1992a, Verner and Taylor 1992). Field studies on spotted owl demography and habitats also continued in southern California, where massive urbanization, recreation, air quality, and isolation of owls were but some of the many potential threats to maintaining viable owl populations.

It was not long after publication of the ISC report, too, that the FWS published a status review on the Mexican subspecies of the spotted owl (*S. o. lucida*) (USDI FWS 1991c) and soon thereafter listed it as a threatened subspecies (USDI FWS 1991d) with a recovery plan underway. Subsequent studies (e.g., Seamans and Gutierrez 1995) have added to our understanding of that subspecies.

### **Toward Ecosystem Management**

*There is a reason and a purpose why the northern spotted owl is being more noticeable today. I for one believe that one out of many reasons is the type of forestry practices we allow today, allowing overharvesting of our timber resources and entry into natural "old growth" settings. One recommendation to consider is to analyze and restructure more carefully our Old Growth Management Plan. ...Furthermore, all measures shall be taken to assist in preserving, protecting, and enhancing the Northern Spotted Owl's existence.*

*Lonnie Selam, Chair, Fish and Wildlife Committee, Yakama Nation Tribal Council, In Culture Committee Official Action #040-8990, Sept. 20, 1990; Yakama Indian Nation, Washington.*

### **The Owl Becomes an "Unintended" Catalyst for Ecosystem Management (1992-93)**

Both management polemics and scientific studies of spotted owls often have emphasized the importance of maintaining the general forest ecosystem in which the birds (and people) reside. Original studies were aimed at better understanding the autecology of the species, but soon the owl would be seen as an unintended catalyst for furthering a more holistic approach to forest ecosystem planning (Meslow 1993). The ISC had pointed out that the preservation of the spotted owl was the wrong question and pointed to the

more critical question of ecosystem conservation and function. Such a general ecosystem context for owl management and forest planning was advanced by Anthony (1992), among others, and was formally institutionalized by the FS with the commissioning of the Scientific Analysis Team (SAT) in 1992.

In 1992, the FS submitted its Final EIS on Management for the Northern Spotted Owl in the National Forests (USDA 1992a) in response to U.S. District Court Judge Dwyer's order of 1991. On 3 March 1992, Assistant Secretary James Mosely issued a record of decision adopting the FS's preferred alternative, which was the equivalent of the ISC conservation strategy (Thomas and others 1993). The BLM still insisted on following an independent course and did not do likewise.

Then, on 25 March 1992, Seattle Audubon Society filed a new challenge to the legality of the EIS and record of decision on the basis that the EIS violated NEPA by failing to consider new information on environmental effects of logging in spotted owl habitat, and that the EIS did not prescribe measures to protect critical habitat or assess the viability of other species closely associated with old-growth forests and northern spotted owl habitat. Judge Dwyer held a hearing on the case on 22 May 1992 and ruled on 28 May that the FS had not fully complied with NEPA. Shortly thereafter, he enjoined FS timber sales in northern spotted owl habitat.

On 30 July 1992, stirred by this court injunction, the FS Chief commissioned a technical SAT to provide the assessments ordered by Judge Dwyer. The Court had rejected the government's contention that once a species was listed as threatened, the requirements of ESA negated the requirement in regulations issued pursuant to NFMA to ensure viability of all native and desired nonnative vertebrate species by FS planning area. Judge Dwyer rejected this argument and said both applied.

The SAT was comprised of FS and FWS scientists and technical experts. The team was to evaluate **all** vertebrate species that may be associated with late-successional forests and to suggest mitigations to assure high viability for those species, which were to include at-risk fish stocks. The report of the SAT (Thomas and others 1993) provided an analysis of the FS's

EIS alternatives, recommended changes to the selected alternative to better account for all species, identified key areas of scientific uncertainty and unknowns, and recommended substantial inventory and monitoring efforts to reduce the high-priority unknowns.

Anticipating that circumstances were likely to lead eventually to a demand to examine life forms other than vertebrates, the SAT asked for and received permission to extend the assessment to all life forms of macroorganisms. This was a significant step toward a broader ecological basis for evaluating ecosystems.

The SAT report published the first catalogue of all species and species groups closely associated with late-successional forests and northern spotted owl habitats, and an evaluation of their environmental requirements and their individual potential viability effects under each planning alternative. Some 667 species were listed as closely associated. The species evaluated included fungi, lichens, bryophytes and other nonvascular plants, as well as vascular plants, invertebrates (particularly mollusks and arthropods), fish, amphibians, reptiles, birds, and mammals. The report was a significant step toward an ecological approach to forest ecosystem management but still, by necessity of its charter, tiered off the existing management guidelines for northern spotted owls. The evolution toward recognition of the value of biodiversity and ecosystem management took yet another significant step.

### **The President Launches an Ecosystem Plan (1993)**

Issuance of the SAT report spurred yet another round of regional and forest plan modifications, and the controversies continued. The Presidential campaign of 1991 between George Bush and Bill Clinton saw both candidates visiting the Northwest and speaking out on the spotted owl issue. Present George Bush attacked the situation that had developed. Candidate Bill Clinton promised that, upon assuming the Presidency, he would convene a "forest summit" to address the issue. The Presidential election and subsequent changes in the Administration quickly led to new interest in resolving the timber and forest management crises of the Northwest.

In April 1993, President Clinton and Vice President Gore held a televised, landmark Forest Conference in Portland, Oregon. They ordered a scientific and technical team to be formed that would provide a new evaluation and set of recommendations for forest ecosystem management on Federal public lands within the range of the northern spotted owl with a 60-day time line for accomplishment of their task.

The technical team, called the Forest Ecosystem Management Assessment Team (FEMAT), consisted of Federal, State, private, and university specialists in many fields including ecology, biology, economics, sociology, forestry, silviculture, fire ecology, and other areas. Over 600 persons were ultimately involved. As with the previous SAT effort, the entirety of all life forms and ecosystem processes would be addressed. In 1993, the FEMAT team issued its thousand-page report (with summary—FEMAT 1993), which was prepared in 90 days, with a set of 10 alternatives for management.

The FEMAT report was viewed by many as a hallmark effort to view forest management from a broad ecological perspective, putting meat on the skeletal dicta of the FS for beginning a new era of ecosystem management. In the FEMAT report, the spotted owl was assessed along with many other species closely associated with old-growth forest habitats within the range of the northern spotted owl subspecies. Among other advances, the FEMAT work forced more clearly the issue of using new, uncertain, and disparate sources of information in evaluating large-area effects on ecosystems and species (Lattin 1993).

Concomitant with the production of the FEMAT report was an interagency (FS and BLM) EIS team engaged in applying the new evaluations and management recommendations. A technical team modeled the viability of northern spotted owl populations (Raphael and others 1994). The modeling results were presented as graphs depicting mean owl population size over 100 years by management alternative and physiographic province (owl population) and under three different “rule sets” of modeling assumptions; maps of the owl’s range showing predicted mean occupancy, by owl pairs and by 20-percent occupancy classes, over 50 years; and maps showing “strongholds” of locations occupied at

rates of 70 percent or greater, over 100 years. The modeling results were used by the EIS team to select and defend a management alternative.

By 1993, a new EIS had been produced, based on the FEMAT report, that identified the President’s choice of option 9 as the proposed action. Option 9 called for designation of late-successional forest reserves for preserving LSOG forests and riparian environments, forest matrix lands for timber production, and adaptive management areas for testing new silvicultural techniques. Critics from environmental groups viewed option 9 as far too lenient and too ill-specified for adequate management and protection for old-growth forests. Eventually, on 13 April 1994, the Secretaries of the Interior and Agriculture issued a record of decision (USDA and USDI 1994) that selected a slightly amended option 9 whose additions addressed some of these concerns. The record amended the planning documents of two Forest Service regions, 19 National Forests, and 7 BLM districts. It called for conservation of much of the northern spotted owl habitat on FS and BLM lands, which hold 90 percent of the Federal land area within the range of the northern spotted owl (Dwyer 1994). Of this Federal land area, 77 percent would now occur as various reserves, with the remainder available for active forest management or timber harvesting under other existing environmental and procedural guidelines (fig. 1).<sup>6</sup>

The record of decision (USDA and USDI 1994) provided additional guidelines for legally providing for spotted owl and marbled murrelet habitat, and incorporated an aquatic conservation strategy to protect at-risk species and stocks of anadromous fish and to conduct watershed analysis as a basis for monitoring. It also offered a substantial set of management guidelines coined “survey and manage,” which dealt explicitly with inventory surveys and monitoring studies needed to supply information on the lesser known and potentially vulnerable species of fungi, lichens, plants, and animals. In this new framework, the northern spotted owl was addressed as but one of many

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<sup>6</sup>As a result of these new land allocations, the FS and BLM estimated that the plan would yield about 1 billion board feet of timber per year, representing a 73-percent reduction from the “unsustainable” average timber sale levels of the 1980s (Dwyer 1994).

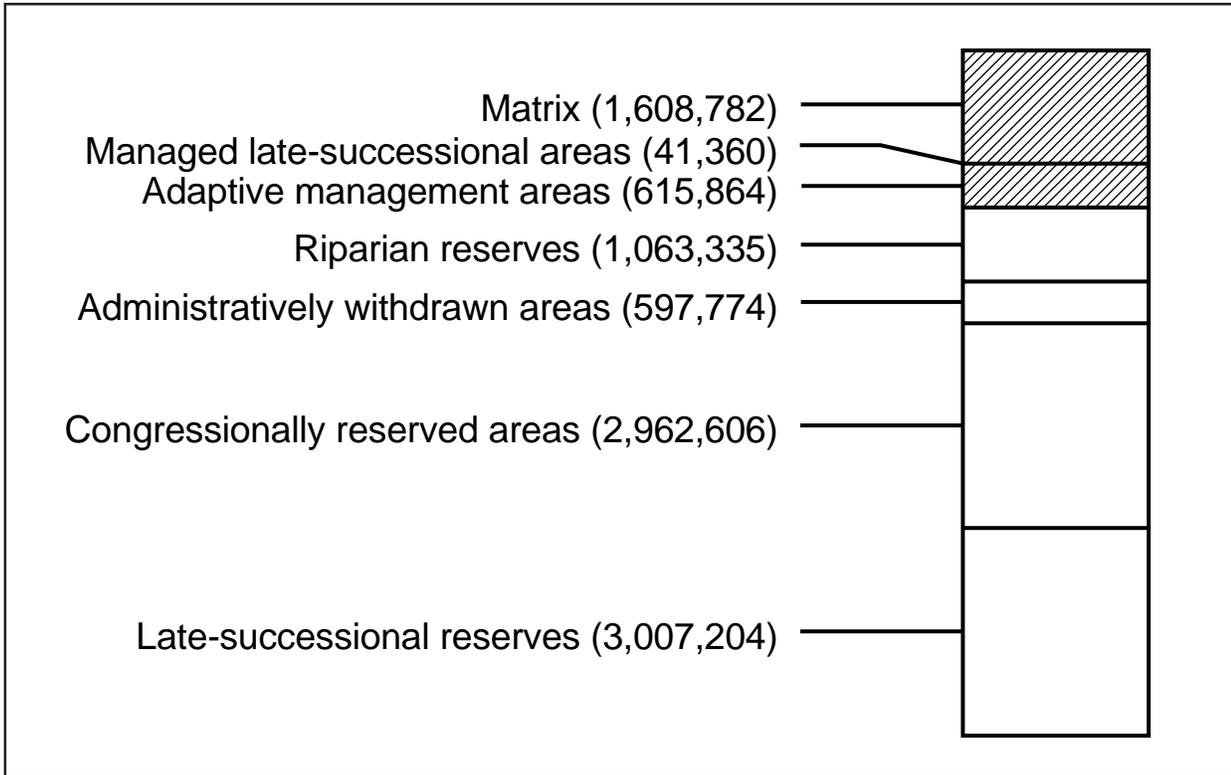


Figure 1—The current distribution of land area allocations for USDA Forest Service and USDI Bureau of Land Management, within the range of the northern spotted owl, resulting from the Northwest Forest Plan of 1994. Matrix lands, managed late-successional areas, and adaptive management areas (shown in hatching) constitute 23 percent of the total area of about 9,896,900 ha (24,455,300 acres), and are each available for timber harvesting and other resource management activities under appropriate environmental and procedural regulations.

species and ecosystem components to be dealt with in forest ecosystem management. The record of decision also called for watershed analyses at the Forest level (USDA and USDI 1994:B-20ff.) to evaluate and adjust specific guidelines for ecosystem management.

The FEMAT report sparked new controversy and media coverage, and by 1994, new legal challenges would be leveled that the team effort violated the guidelines of the until-then-obscure Federal Advisory Committee Act (FACA). The FACA was intended to ensure that Federal agencies treat equally all non-Federal and nongovernment interests, and not establish advisory committees consisting of preferential membership. As of this writing, the challenges have not been resolved. The government lost the FACA case in a Washington, DC, court, but the judge, basing the decision on the “separation of powers doctrine,” refused to order an injunction.

#### **A New East-Side Team Revisits the Eastern Border (1993-96)**

In late 1993, the FS and BLM established a new interagency science team of Federal employees to assess (initially due by July 1995, although deadlines extended into 1996) conditions of, and to suggest ecosystem management guidelines for, forests and grasslands in the interior Columbia River basin and adjacent areas. The study area addressed was that east of the crest of the Cascade Range in Washington and Oregon, and south of Canada. The overall project was called the Interior Columbia Basin Ecosystem Management Project (ICBEMP) and consisted of a science team and two EIS teams. The Science Integration Team (SIT), in turn, had as one part of its charge to reassess forest management guidelines in the northern spotted owl’s range along the east slope of the Cascade Range and, if warranted, to provide new management

recommendations. This reassessment was spurred by ongoing research suggesting that northern spotted owl populations and habitats may be very different in this geographic area than on the west side of the Cascade Range.

Under ICBEMP, two EIS teams were created, one for eastern Washington and eastern Oregon, and another for Idaho and Montana. As of this writing, a draft EIS is pending that will use the selected results of the SIT's findings in a set of management alternatives for FS and BLM lands in the interior Columbia River basin.<sup>7</sup> The findings include evaluating any new evidence on northern spotted owl population or habitat ecology along the eastern side of the Cascade Range, that may call for changes in the existing planning guidelines there.

### **Federal Agencies Form a New Coalition for Ecosystem Management (1994-96)**

In the rapidly changing times of the mid-1990s, along with other agencies, the Pacific Northwest Region of the FS reorganized its traditional resource-specific management offices into a broader Regional Ecosystem Office (REO) located in Portland, Oregon. The REO serves as a coordination focus for FS, BLM, FWS, USDI National Park Service (NPS), National Biological Survey, and other organizations.

As of 1996, REO has conducted a round of "implementation monitoring" (an assessment of how well agency guidelines are being followed) on FS and BLM lands, for northern spotted owl habitat management under the Northwest Forest Plan (previously, also called the "President's Forest Plan"). This monitoring focused on inviting public groups to inspect timber sales on the ground to determine how well the agencies have followed the owl guidelines. Although initial response to the monitoring process itself has been favorable, implementation monitoring results on agency compliance with management guidelines are yet forthcoming. The REO also expects to continue to conduct "effectiveness monitoring" studies to determine how well the owl

<sup>7</sup>The SIT, along with the EIS team biologists, assessed evidence of spotted owl biology and habitat use along the eastern slope of the Cascade Range. To date, the assessment and its potential use in the EIS are still underway.

guidelines under the Northwest Forest Plan provide for northern spotted owl populations (also see below under "Scientific Studies Continue").

The Northwest Forest Plan also directed that FS and BLM prepare an assessment of each late-successional reserve. The REO also is charged with reviewing the assessments as well as all proposed silvicultural and timber management activities within each late-successional reserve.

## **Scientific Studies Continue**

### **Habitat Studies Improve Our Understanding But Still Spark Discussion**

Since the release of the ISC report, many studies on habitat of northern spotted owls have helped improve our scientific understanding of the subspecies and its habitat. The ISC report itself presented summaries of research that provided strong evidence that northern spotted owls select mature and old-growth forests at equal or greater frequencies than the forests' availability within owl home range areas, and that the owls use younger forests in much lower frequencies. Such patterns were apparent and striking in landscapes consisting of even-aged stands of vegetation but were less clear in landscapes where forests consisted of uneven mixes of ages and sizes of trees. Among other locations, uneven age mixes are found in the redwood (*Sequoia sempervirens* (D. Don) Endl.) forests of northwestern California, which occur mostly on private timber company land.

It was soon made clear that the simple terminology of "young-growth" (or "second-growth") and "old-growth" forests could mean different things to different people. Specific forest stand structures and composition, and the degree of heterogeneity of stands across a landscape, needed to be precisely described when assessing use and selection patterns by spotted owls and especially when using the term young-growth forest. In the 1990s, industry conducted a series of studies to demonstrate abundance and productivity of northern spotted owls in second-growth forests (Folliard and Reese 1991, Kerns 1991), which were typically managed forest landscapes with mature or old-growth forest inclusions to which the owls oriented.

In 1990, the California Department of Forestry issued a set of definitions of spotted owl habitat on state and private lands in California (California Department of Forestry 1990). Habitat studies continued in Washington, Oregon, and California on private and FS lands alike (e.g., Hessburg 1992, Irwin 1992). And during the legal and administrative fracas of northern spotted owl habitat planning on Federal public lands, some individual National Forests produced their own Forest-level plans (e.g., Wenatchee National Forest; USDA 1992b), drawing in large part on habitat evaluations in “young growth” forests or in the differently structured forests on the east slope of the Cascade Range. The National Forest-level spotted owl habitat plans would eventually be replaced by the broader regional spotted owl habitat plans.

### **Demography Analyses and Population Modeling Proclaim Declining Owl Populations (1993-96)**

In December 1993, at the request of the Secretaries of Agriculture and the Interior, a major scientific workshop was held at Fort Collins, Colorado, to analyze all available demographic data on northern spotted owls. The workshop focused on mark-recapture studies, was led by K.P. Burnham, D.R. Anderson, and G.C. White, and was attended by many spotted owl scientists with 3 or more years of demographic data on spotted owl populations. Results of the workshop were published by the Cooper Ornithological Society (Forsman and others 1996). Results suggested broad-scale demographic declines in northern spotted owl populations.

The workshop was convened as part of the EIS analysis supporting what was to become the Northwest Forest Plan. The most comprehensive analysis emerging from the workshop was a new “meta-analysis” conducted by Burnham and others (1996) that merged the demographic studies of individual northern spotted owl populations. This was done to determine the overall trend of the subspecies throughout all geographic study areas combined. Results indicated that the overall subspecies is declining demographically ( $\lambda$ , the parameter representing the annual rate of change in population size, was estimated as 0.9548, SE = 0.017, where a  $\lambda$  value of 1 implies stability, <1 a decline, and >1 an increase). The major culprit contributing to this

decline is an **accelerating** decline in adult female survival, a situation not anticipated by ISC or by other groups analyzing the status of the subspecies. The finding of an accelerating decline in adult female survival has sparked recent major concern over the future of the subspecies, and has underscored a call to continue population monitoring (Raphael and others 1996). Whether, and how, existing northern spotted owl management guidelines will be amended to account for these findings remains to be seen.

The EIS analysis (Raphael and others 1994) also included use of a spatially explicit demography model which helped highlight geographic areas of potential strength and weakness in maintaining spotted owl populations. Weak areas included the Oregon Coast Range and southwest Washington. This modeling provided useful, location-specific information on which validation studies might be focused. It also provided a good example of using such models for broad-based conservation assessment, particularly in providing an easy to understand map showing areas of expected population change. The map proved particularly helpful in discussions with nonbiologists.

### **Silviculture Studies Challenge the Preservation Paradigm for Spotted Owl Habitat (1991-94)**

In the early 1990s, a series of studies also began that focused on the potential use of silviculture for restoring or maintaining suitable spotted owl habitat. Irwin and colleagues (e.g., Irwin and Wigley 1993), Oliver and others (1994), and other researchers, promoted an experimental basis for habitat management and use of silviculture. An experimental approach also was suggested in the Draft Recovery Plan (USDI FWS 1992c) and in many other planning documents under the umbrella of adaptive forest management.

Silviculture studies were particularly sought by FS and timber companies interested in reducing fire hazard in the drier forests of the east slope of the Cascade Range (Irwin 1992). Similar concerns were being expressed for maintaining spotted owl habitat in the increasingly fire-prone forests in the Sierra Nevada (Weatherspoon and others 1992).

West-side research on silviculture, forest vegetation response, and habitat of the northern flying squirrel (*Glaucomys sabrinus*) and spotted owl

habitat began in the low-elevation Douglas-fir (*Pseudotsuga menziesii* (Mirb.) Franco) forests of Fort Lewis, Washington, with the work of Carey and Miller (1991) and others (Curtis 1991; also see Carey 1994, Kerschke and Carey 1992, Thomas and Carey 1992). Other studies in managed BLM forests began in southern Oregon (e.g., Meslow and others 1991).

These lastly mentioned studies begin to address the real issue. Studies of using silviculture for maintaining or restoring spotted owl habitat do not address the need for the multitude of other species thought to be closely associated with late-successional or old-growth forests. As ISC itself insisted, the question is one of ecosystem complexity and biodiversity and not just one of owls.

### **Researchers Continue to Model Owl Populations (1994-96)**

The plight of the northern spotted owl has helped to spur new scientific research on modeling effects of forest and habitat fragmentation on viability of wildlife populations. Recent studies on demographic models and reserve design (Anderson and Mahato 1995, Lamberson and others 1994, Murphy and Noon 1992), demographic viability of spotted owl populations (Bart 1995, papers in Forsman and others 1996), effect of habitat pattern on owl population persistence (Holthausen and others 1995), and use of habitat conditions to infer population viability (Boyce and others 1994) have continued to explore the modeling paradigm.

### **Inventory and Monitoring Studies Help to Track Owl Populations (1989-96)**

Meanwhile, spotted owl scientists were continuing to monitor owl populations in selected ecological provinces (papers in Forsman and others 1996). Funding for such studies often seemed to allow the creation of many new demographic studies but not their continuance, which has proven to be a point of difficulty in evaluating short-term data on this long-lived species (Burnham and others 1996). Studies of this type typically need to continue for at least 8 years and ideally at least a decade, before the annual variation in demographic factors (survival, reproduction, and dispersal rates and patterns) can be correctly attributed to chance or to longer term innate trends. Funding for few studies on northern spotted owl demography have continued for this length.

Between 1989 and 1993, the management arms of the FS and BLM conducted inventory and monitoring of northern spotted owl habitats and populations. The surveys were conducted in both designated spotted owl habitat conservation areas and in randomly selected sites, to compare differences in abundance, occupation rates, and trends over time (Crites and O'Halloran 1991).

Also during this time, research on monitoring design (Azuma and others 1990, Max and others 1990, Ward and others 1991) and on field methods (Ganey 1990, Guetterman and others 1991) continued. The FS, BLM, and FWS developed standardized protocols for field monitoring of northern spotted owls (USDI FWS 1992b).

In the late 1980s and early 1990s, the FS and BLM employed many field biologists to locate and count owls, and map owl habitat areas, in Washington and Oregon. Parallel efforts were pursued in California (Robinson 1992a, 1992b). The science of inventory and monitoring had progressed far from the early days of opportunistic sightings and rigorously planned but largely cursory surveys conducted by lone biologists (e.g., Marcot and Gardetto 1980).

From 1991 to 1994, part of the Federal agencies' survey direction had entailed inventory of spotted owls in HCAs (and in analogous designated habitats derived from the Draft Northern Spotted Owl Recovery Plan and later the Northwest Forest Plan resulting from the FEMAT effort). As of this writing, the FS in Washington and Oregon intends to continue owl monitoring in at least the Bull Run Watershed of the northern Oregon Cascade Range, and monitoring in California will continue under separate administration. By 1994, FS administrations in Washington, Oregon, and California had adopted a common computer database structure for tracking spotted owl sightings from inventory and monitoring efforts. The continuing demographic studies, however, provide by far the most scientifically reliable estimates of population status and trend throughout the range of the subspecies.

Monitoring of owls had continued during this period also on BLM lands in Oregon (Lint 1992), providing the best and longest term data on site occupancy and breeding success. The NPS, too, had funded some owl monitoring efforts (e.g., Fredrickson and others 1990, Snetsinger and

others 1991). Habitats for owls have been characterized in the Olympic Mountains of northwestern Washington (Holthausen and others 1995), the eastern slope of the Cascade Range in Washington (Buchanan and others 1995), and northern California (Hunter and others 1995), as new observations of spotted owl demography continue to be made (Forsman and others 1995, 1996; Sovern and others 1994).

By 1996, the FS did not require inventories or surveys for northern spotted owls per se in so-called matrix lands (Federal lands outside late-successional reserves designated through the Northwest Forest Plan) but instead requires local project work to base evaluations on at least existing owl inventory data and occurrence of spotted owl habitat. Local FS projects in owl habitat are subject to seasonal activity restrictions (FS field offices have the option to conduct surveys for spotted owls per se to avoid seasonal restrictions). Northern spotted owl inventories to date provide a reasonably broad coverage of FS and BLM lands. Use of such data in coordination with FWS on Section 7 consultation under ESA provides an efficient and economical means of evaluating site-specific effects of proposed management activities.<sup>9</sup>

By 1996, a Spotted Owl Monitoring Committee has been formed under direction of BLM and in coordination with the Pacific Northwest Research Station of the FS and the REO in Portland, Oregon. This Committee oversees and coordinates the regional monitoring of selected northern spotted owl populations, particularly through owl demographic studies. Selected owl demography monitoring studies are continuing in northwestern California (Willow Creek), the Olympic Peninsula of northwestern Washington, and elsewhere.

The Spotted Owl Monitoring Committee is developing a master, recommended monitoring plan for the northern spotted owl. As of this writing, this committee has developed a set of draft recommendations that call for continuance of existing demographic studies for at least 5 years, after which it might be possible to drop some

studies depending on findings. The committee also is recommending that an independent monitoring approach, using a randomized owl calling survey, be implemented as a check on the demographic studies.

Much of the spotted owl inventory effort has wound down as of this writing, in response to a rapidly declining workforce and resources in Federal conservation agencies, and to increases in demands elsewhere. Most northern spotted owl demographic monitoring studies are continuing, however, to help answer persistent, scientific questions. Among the questions still not fully resolved are (1) What is the true, long-term demographic trend of the subspecies? (2) What is the relative contribution to this trend from management on Federal, State, private, and other forest lands? (3) What is the population response by owls to new forest management objectives (e.g., to maintain long-term resource sustainability under Ecosystem Management) and new silvicultural approaches (e.g., small canopy-gap openings), particularly on Federal public lands? (4) What is the long-term effect of the continued invasion of the spotted owl's range by its prime avian competitor, the barred owl (*Strix varia*)? (5) How will the distribution and size of habitats called for in the new forest management plans specifically provide for interacting populations of spotted owls over time? (6) How will new fire and fuels management guidelines, and recent stand-replacing fire events, affect spotted owl populations, particularly in the drier or easterly portions of the Olympic Peninsula, Cascade Range, and interior northern California? Research on these and other questions can continue to provide empirical understanding (Verner 1992).

## Conclusions and Lessons

A few conclusions and lessons may be drawn from this review of the recent history of spotted owl planning and management.

### The Court Sets a Viability Standard

Since the ISC report, the dissension among Federal congressional, executive, departmental, and agency directives, policies, laws, regulations, and management decisions have served only to stall efficient conservation action and to prolong environmental concerns and problems. This

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<sup>9</sup> Personal communication. 1997. G. Gunderson, wildlife biologist, Natural Resources Unit, Forest Service, 333 SW First Avenue, Portland, OR 97224.

“period of dissension” has called into serious question the future of autonomous decision-making in some of the Federal land management agencies, particularly FS and BLM. Short-term congressional directives, such as the Section 318 timber sales, and foot-dragging by agencies, at best merely postponed tough resource decisions and essentially made long-term, professional, sound resource stewardship on the ground all the harder to assert and implement. It was the judicial cases and decisions that broke the major stalemates.

Perhaps the most important outcome of recent litigation on spotted owl management was the ruling made by Judge Dwyer on 21 December 1994 upholding the FS approach to assessing population viability of vertebrate species. Among his ruling points, Dwyer (1994) concluded that the viability regulation (36 CFR 219.19 regulation implementing NFMA) is consistent in all respects with NFMA and multiple-use management; the Secretary of the Interior was not incorrect in deciding to manage the BLM forests so as to preserve viable populations of vertebrate species; that the use of an 80-percent or better likelihood of providing habitat supporting viable populations of vertebrate species was appropriate; and that the additional focus on maintaining viability of invertebrates as well as vertebrates, even though the NFMA regulations specifically mention only vertebrates with regard to maintaining viable populations, is supported by law and was within the legitimate scope of departmental discretion. The 1994 Dwyer ruling also resolved simultaneously four ongoing litigations variously held against the Departments of Agriculture and the Interior.

Successful legal challenge to the viability analysis approach used in the EIS based on the FEMAT report would have meant the undoing of the Northwest Forest Plan and a plunge into yet another round of analysis and planning. The many previous rounds (see table 1)—in part fired by the public review process and fueled by administrative, congressional, departmental, and agency inaction—had consumed a great deal of taxpayer money and experts’ energy. Yet from this tension has at least sprung progress in the technical arenas of ecosystem assessment, biodiversity evaluation, and species modeling, including population viability analysis. And the Dwyer decision, for the first time, described the standard of adequate adherence to the NFMA regulations,

as well as for BLM forest management, pertaining to evaluating and managing for viable populations of native and desired nonnative vertebrate species and invertebrates on these public forest lands. It marked the first time for several years that the owl habitat forests were to be managed by the FS and BLM under a common ecosystem management plan found lawful by the courts.

### **The Species and the System Are Both Key**

It is evident that recent trends in assessment and planning have focused on two concurrent fronts: (1) intensive, species-specific research and modeling of spotted owl demography and habitat patterns; and (2) extensive evaluations of biodiversity of old-forest ecological communities, with the owl as but one component. It is equally evident that these are not competing approaches, and that both are useful in aiding understanding of the effects of management on owls and their communities.

For example, it was one of the prime conclusions of the SAT report (Thomas and others 1993) that the needs of one old-forest indicator taxon, the northern spotted owl, do not fully reflect habitat conditions of all other species closely associated with old forests within the owl’s range. Although this outcome was anticipated by some (namely, the senior author), the degree to which and the species for which this is true could not have been explicitly determined except by taking a broad, biodiversity approach to assessing environments used by, and management effects on, all species closely associated with spotted owl habitat (Marcot 1997). At the same time, to determine what is needed to additionally provide for other old-forest species necessitates knowing their specific habitat and ecological requirements. Like overlapping circles, the needs of many old-forest species coincide but only partially. It is the full extent of all circles together that describes the collective needs of all species in the old-forest ecosystem.

This has become evident, too, in recent evaluations of marbled murrelets and lynx (*Lynx lynx*). For example, the kinds and geographic locations of habitats of northern spotted owls and marbled murrelets overlap, but only partially. As of this writing, a draft recovery plan for marbled murrelets is out for review, and FWS has finalized critical habitat for the species in the Western States (except Alaska). Critical habitat for the marbled

murrelet was identified as all late-successional reserves as mapped in the Northwest Forest Plan within the range of the marbled murrelet, with the addition of some non-Federal lands with marbled murrelet habitat. In this way, much of the critical habitat for marbled murrelets overlaps critical NRF (but not dispersal) habitat for northern spotted owls, although, to be expected, the overlap is not perfect.

In another example, the main overlap between northern spotted owl and lynx habitat, in the geographic area of sympatry (coincidence of the species' distributional ranges), seems to be in denning habitat for lynx. Lynx den under "jack-straw" logs in mature to old-growth forest, such as along the eastern slope of the Cascade Range of northern Washington. Lynx, however, are sensitive to factors that affect spotted owls far less, or not at all, such as road density, elevation, and occurrence of early successional forests. It was the aim of the SAT and FEMAT analyses to combine such species-specific requirements, along with habitat analyses, field studies, and ecological modeling, among all old-forest species of conservation concern, in a joint and comprehensive approach to assessing and ultimately managing old-forest wildlife communities.

In a similar way, fish habitat conservation overlaps partially with that of spotted owl habitat. Thus far, the 1990s have seen increasing conservation concerns over coho salmon (*Oncorhynchus kisutch*) in coastal Oregon and California, particularly in the Umpqua basin which has several at-risk fish species, as well as for bull trout (*Salvelinus confluentus*) and many other fish species and stocks within the owl's range. The overlap, however, between fish habitat and owl habitat is not very complete, as the SAT report, ISC report, and draft Spotted Owl Recovery Plan all acknowledge. One aspect of this is that habitat for these at-risk fish species and stocks is of course more oriented around stream conditions (but influence of upslope disturbances also affect in-stream conditions). The locations of key watersheds (sensu FEMAT 1993, Gordon and others 1991) for these at-risk fish, however, often overlap the general distribution of northern spotted owls (ISC report) and the late-successional reserves (Northwest Forest Plan). Thus, it may be more efficient to continue to coordinate habitat conser-

vation assessments and measures among individual species such as murrelets, lynx, fish, and owls, where possible.

The REO (discussed above) also has as its charge the development of survey and manage guidelines to ensure timely and efficient inventories and surveys for a long list of plant and animal species not well known but likely closely associated with northern spotted owl habitat. The efficiency of current "survey and manage" activities is not clear. Species currently are treated mostly individually with only a small effort to combine surveys among species. The REO, however, has created a single database on all known sites of the survey and manage species, and is currently developing new and more multifunctional approaches and databases for addressing survey and manage species (see footnotes 3 and 5).

Much greater efficiencies in managing for spotted owls and their associates can be expected from such integrated efforts. Beyond this is the opportunity for conservation to do more with less under the rubric of ecosystem management, by combining conservation goals, by overlapping critical habitat and other old-forest designations where ecologically appropriate, and by merging survey and inventory activities across species and agencies.

### **Of Coarse Filters and Efficient Management**

Another conclusion from the recent spotted owl history is that a simple, so-called coarse-filter approach does not suffice for ensuring that all needs of spotted owls and old-growth forest communities are met. In this context, coarse-filter management refers to specifying macrohabitat conditions (vegetation cover types and their successional or structural stages)—namely, late-successional and old-growth NRF habitat for northern spotted owls—and assuming that management of such forests adequately meets the biological requirements of all associated plant and animal species.

But the obverse side of the coarse-filter management coin is not necessarily a species-by-species approach, which has proven to be a costly and data-hungry (but much more reliable) tactic to meet mandates for conserving biodiversity and maintaining demographic viability of wildlife populations. A less intensive approach, as used in

the FEMAT analyses and the ongoing interior Columbia basin EIS assessments, is to specify species' requirements in terms of microhabitat conditions—namely, substrates, dominant plant species (such as dominant tree species), and other key environmental correlates that influence species abundance. This approach still requires species-specific or at least species group-specific information on selected habitats and environments. But it does not demand intensive demographic research and analyses on each species before assessments can be made and management guidelines crafted. To us, this approach seems to better meet the needs of adaptive management: posing management guidelines as hypotheses that are tested (and amended, as appropriate) by field trials and monitoring research. It seems to us that much good scientific and technical effort has been wasted in arguing differences between species and community approaches, and between coarse and fine-filter approaches, when we have had the need and capability to dine at all tables.

### **Nothing Substitutes for Monitoring Studies**

At the same time, as evidenced by recent research findings on spotted owls, marbled murrelets, and other species, efficiencies provided by broad-scale and coarse-filter management cannot substitute for species-specific effectiveness monitoring studies. For example, conducting implementation monitoring—itsself a worthy activity that determines if administrative units are correctly carrying out management guidelines—cannot tell us about the demographic trend of populations of spotted owls or other old-forest species. It is clear that difficult choices will need to be made to appropriately allocate increasingly finite funds between broad-based inventories and species-specific studies. The lessons of the spotted owl tell us that some balance of the two—that is, both—are essential.

Another lesson to learn from this recent spotted owl history is the value of continued, long-term population demography studies. No short-term inventory or computer model can provide the kind of basic, empirical understanding derived from such studies, particularly if populations are on an accelerating decline not anticipated from ISC or other previous analyses.

Demographic analysis based on field work has reinforced the message that the conservation measures initially provided in the ISC report in fact may not be stringent enough to ensure a high probability of continued existence of well-distributed northern spotted owl populations throughout their range. The Northwest Forest Plan EIS team had used this demographic analysis as support for the conservatory nature of the plan, in response to criticisms that the plan was too stringent in providing for spotted owls and LSOG forests.

A lesson can be drawn as well on the value of population and habitat modeling in general for species such as the spotted owl. The EIS team made what we consider to be appropriate use of the spotted owl demography and habitat model results. They used the results to help corroborate confidence in the Northwest Forest Plan guidelines, not to “prove” that the guidelines are “right” or to determine the “real” trends of spotted owl populations. They used the models not to formulate management guidelines and decisions but more to validate the relatively conservatory nature of the decision, and to identify geographic areas potentially needing additional study.

### **Models Are Tools, Not the House**

Much of the litigation against the Federal agencies in the name of spotted owl conservation has focused on agency process, including the use of models in crafting management guidelines and planning alternatives. Over the past half-decade, many case hearings, depositions, and affidavits, and many spotted owl plans used models of spotted owl populations and habitats. Models have been variously touted as the only true answer and thus the savior of management polemics, or as fatally flawed and thus the prevaricator of too-conservative (or too-liberal) conclusions.

In our estimate, models are merely tools—in the case of spotted owl monitoring and management, increasingly sophisticated and often recondite tools, such as with metaanalysis of demographic monitoring or spatially explicit population dynamics analyses—but they are tools nonetheless. As such, to date, the spotted owl models were probably used most correctly and effectively in the Northwest Forest Plan EIS; that is, to help test and corroborate confidence in the plan's approach, not to “compute” new land use allocations or to

make allocation decisions per se. The models can be used to validate the nature of a potential decision, to identify additional geographic areas for further management focus, and to identify topics needing additional research, such as adult female survivorship or the role of suboptimal habitat. But it should be remembered by scientists and managers alike that models are merely tools; they help build and test the strength of the house, but they are not the house itself.

## To Arrive Where We Started

*Stolas: Grand prince of hell. He appears in the shape of an owl. When he assumes the shape of a man and appears before exorcists, he teaches astronomy, prophecy based on the study of plants, and the value of precious stones. Twenty-six legions look upon him as their general.*

*de Plancy 1965:162.*

In the 138 years since Xantus (1859) first described *Syrnium occidentale* (later renamed *Strix occidentalis*), much of the landscape of North America has undergone rather startling change. In the West, as the early national parks were being designated, railroads were being laid and old-growth forests of the lowlands were being cleared for settlement. Around the end of the 19th century, forest reserves, later redesignated as National Forests, were established to protect conifer woodlands as sources of public timber. And from the beginning, management of the spotted owl and its old-forest allies was to be inextricably tied both with the fate of those forest ecosystems and with the well-being of human communities.

We have arrived to where we started in another way, too. It seems a remarkable irony that the spotted owl came to be federally listed in the United States as a threatened species—**twice**. The 1990 listing of the northern spotted owl by FWS is well known. But few might remember that the spotted owl was briefly included in the FWS's 1973 Red Book as a threatened species, just before ESA was instituted. After the Act, the

Red Book listings did not apply and for the next 17 years the owl was no longer considered federally threatened.<sup>9</sup>

Ironically, too, it is ESA itself that specifies its primary purpose as providing "...a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved ..." (ESA, Sec. 2(b)). Only until recently, the management controversy has focused mainly on the species-specific issues.

Although hindsight is seldom myopic, it still may be helpful to remember when prescient foresight had warned of impending conflicts in spotted owl planning. In the 1974 North American Wildlife and Natural Resources Conference, long before the controversies of owls and old growth had sprouted, Overton and Hunt (1974: 334) anticipated by two decades our "new" era of ecosystem management:

The concern of the future of the spotted owl resolves into a concern about the future of old growth forest. ... Isolated into one-on-one conflict with timber needs, the spotted owl cannot be expected to fare well, and anyway this just isn't the right way to go about the problem. The spotted owl, timber production and old growth should, along with many other elements, be considered part of the total forest system, and management questions directed to the forest as a whole, rather than to the individual parts.

Overton and Hunt (1974) continued by proposing that forest biological and sociological diversity become the context within which individual management actions are assessed and overall planning goals are developed:

The management unit is thus a sociological-ecological entity, with a sustained yield of forest products *and* a sustained spectrum of ecological diversity which have been chosen by the society in forming the unit (p. 347, emphasis in original).

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<sup>9</sup>To this catalog we might also add the current listings of the northern spotted owl in British Columbia as federally threatened in Canada (listed by the national government of Canada), and of the Mexican spotted owl as federally threatened in the United States (listed by USDI under ESA). To date, the California spotted owl has remained federally unlisted. At the State level, Washington, Oregon, and California have each listed the northern subspecies as threatened or an equivalent status.

Since cultural values can be expected to change, the only feasible conservation policy is one that conserves *options*. ... [A] *strategy of preserved diversity* appears to be the only device which will yield a high chance of adaptability to unforeseen eventuality (p. 349, emphasis in original).

Overton and Hunt proposed that a planning approach to spotted owl habitat, old-growth forests, and other forest resources should be based on intergenerational equity for maintaining forest resource use options and forest diversity for future generations. They concluded that:

The longer we wait before accepting this position, the more difficult it will be *both* to save some old growth in reserve *and* to achieve a smooth transition. We are rapidly spending options which we will need in 20 years – and which future generations are going to need even more than we do. (p. 352, emphasis in original )

Current agency directives, including the Northwest Forest Plan, lack explicit goals for maintaining intergenerational equity for forest resource use options and forest diversity. Will this too become a point of explicit contention in public forest management?

Remembering, too, the prescient 1978 writings of Hamilton Tyler (Tyler and Phillips 1978:188), “It may yet come about that a little known species of owl [the spotted owl] will be the means of saving not only its own kind, but also the parklike owl groves for future generations of owls and humans to enjoy together. If so, it will be a very wise move in owl history.”

*There was an old owl lived in an oak,  
The more he heard, the less he spoke;  
The less he spoke, the more he heard,  
O, if men were all like that wise bird!*

*Punch, Vol. LXVIII, p. 155 [1875]*

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## Acronyms, Selected Terms, and Nicknames Used in the Text

(See table 1 caption for additional acronyms)

**4(D) Rule**—FWS's regulatory vehicle to clarify take of spotted owls on non-Federal lands.

**ASQ**—Allowable sale quantity.

**BE**—Biological evaluation.

**BLM**—USDI Bureau of Land Management.

**CASPO Report**—California Spotted Owl report.

**coarse filter**—The identification of a macrohabitat (usually, vegetation cover types and their successional or structural stages), sometimes for a specific species such as an indicator species (for example, the northern spotted owl), for simplifying multispecies wildlife management. It is assumed under the coarse filter approach that the ecological requirements of all species closely associated with the same macrohabitat will be met.

**Conservation Strategy**—The approach to management of northern spotted owl habitat as presented in the ISC report.

**EIS**—Environmental impact statement.

**ESA**—Endangered Species Act.

**FACA**—Federal Advisory Committee Act.

**FEMAT**—Forest Ecosystem Management Assessment Team, convened and completed in 1993, to present and analyze alternatives for ecosystem management of old forests of the Pacific Northwest within the range of the northern spotted owl.

**Forest Summit**—Conference convened in Portland, Oregon, by President Clinton in 1993, to hear controversies over forest land management.

**FS**—USDA Forest Service.

**FWS**—USDI Fish and Wildlife Service.

**Gang of Four**—Pejorative name given to the congressionally mandated Scientific Panel on Late-Successional Forest Ecosystems.

**God Squad**—Pejorative name given to the Endangered Species Committee, a Cabinet-level group convened to review case-specific merits of adhering to the Endangered Species Act and to provide a solution to management controversies and stalemates deemed intractable at agency or Departmental levels.

**HCP**—Habitat Conservation Plan, part of the regulatory mechanisms provided by the Endangered Species Act.

**ICBEMP**—Interior Columbia Basin Ecosystem Management Project, established in 1993.

**ISC**—Interagency Scientific Committee to Address the Conservation of the Northern Spotted Owl, convened and final report published in 1989.

**Jamison Strategy**—A supposed plan for managing northern spotted owl habitat on BLM lands that would produce the same level of protection as the ISC Conservation Strategy but have less constraints on timber harvesting. Issued only as a press release in 1990 by a task force appointed by Assistant Secretary of Agriculture James Moseley.

**Late-Successional Reserves (LSRs)**—Land allocations containing much of the late-successional and old-growth forests and northern spotted owl nesting, resting, and feeding habitat on FS and BLM lands in the Pacific Northwest, as designated through the Northwest Forest Plan.

**LSOG**—Late-successional and old-growth forests, as mapped by the Scientific Panel on Late-Successional Forests (or "Gang of Four").

**Matrix lands**—Federal lands outside late-successional reserves described in the Northwest Forest Plan.

**Multi-Resource Strategy**—Timber industry's northern spotted owl conservation plan, ca. 1991.

**Northwest Forest Plan**—The final selected course of action resulting from the EIS based on the FEMAT report and Option 9. Also initially called the "President's Forest Plan."

**NPS**—USDI National Park Service.

**NRF habitat**—Northern spotted owl nesting, resting, and foraging habitat, usually described in terms of LSOG forests.

**Option 9**—The alternative, out of 10 presented, in the final FEMAT report that was selected by President Clinton as the selected course of action for management.

**Owl Preservation Plan**—A northern spotted owl conservation strategy released in 1992 by USDI Secretary Lujan that would protect half of the old-forest habitat in the range of the northern spotted owl as called for in the USDI Draft Spotted Owl Recovery Plan.

**President's Forest Plan**—See Northwest Forest Plan.

**REO**—Regional Ecosystem Office, an inter-agency unit headquartered in Portland, Oregon, with responsibilities including overseeing spotted owl monitoring and studies on “survey and manage species.”

**SAT**—Scientific Analysis Team, commissioned by FS Chief in 1992, to assess viability of all species closely associated with northern spotted owl habitat.

**Section 318**—Also called Northwest Compromise, the Hatfield-Adams amendment of 1989 consisting of a rider to the Interior and Related Agencies Appropriations Bill for 1990.

**SIT**—Science Integration Team (one facet of ICBEMP, the other facet being two EIS teams).

**Spotted Owl Monitoring Committee**—A team convened under REO to develop and oversee compliance with a northern spotted owl monitoring plan on Federal lands.

**Survey and Manage Species**—The name given to the list of old-forest species identified in the FEMAT report that require additional inventory, monitoring, or basic scientific study.

**USDA**—U.S. Department of Agriculture.

**USDI**—U.S. Department of the Interior.

**Table 1—A chronology of northern spotted owl management since convening of the Interagency Scientific Committee (ISC) on the Northern Spotted Owl in 1989<sup>a</sup>**

Year	Agency and related activities
<b>1989</b>	<p><u>FS</u>—Institutes several-year program to inventory and monitor spotted owls. Environmentalists and timber industry both file suits. Judge Dwyer issues an injunction against timber sales, citing NFMA and NEPA violations.</p> <p><u>BLM</u>—Continues long-term spotted owl monitoring program.</p> <p><u>FWS</u>—GAO criticizes the decision on the listing petition.</p> <p><u>Congress/Administration</u>—Congress adapts Section 318 of Interior Appropriations Act to prohibit review of timber sales (ISC established).</p>
<b>1990</b>	<p><u>FS</u>—ISC conservation report is released and presented to Congress. Proposes to manage in a manner “not inconsistent with” ISC plan.</p> <p><u>BLM</u>—ISC conservation report is released and presented to Congress. Announces alternative to ISC plan that provides less protection.</p> <p><u>FWS</u>—Fourth northern spotted owl status report is issued, concludes viability is imperiled by continued forest management. Owl formally listed as threatened under the ESA. Environmentalists ask for the designation of critical habitat.</p> <p><u>Other agencies and groups</u>—NPS continues its monitoring of spotted owls. ISC plan denounced by timber industry as too conservative; at least seven analyses of ISC plan are released portending economic chaos. FS, timber industries, and others engage in experimental silvicultural studies of spotted owl habitat.</p> <p><u>Congress/Administration</u>—Bush administration fails to endorse ISC report. Bush administration convenes a new interagency committee to develop an alternative approach. Committee concludes the FS and BLM should be exempt from key forest management laws and BLM should follow the “Jamison strategy.”</p>
<b>1991</b>	<p><u>FS</u>—Audubon and others file suit against FS citing unacceptable owl conservation plan and violation of Federal laws and regulations, citing ISC report. Judge Dwyer rules that NFMA was violated by not fully adopting the ISC plan. Judge Dwyer issues an injunction barring timber sales on 17 National Forests in WA, OR, and CA, and orders FS to produce new EIS. FS proposes to implement the ISC plan as ordered by Judge Dwyer. Ninth Circuit Court of Appeals upholds Judge Dwyer’s ruling against the FS.</p> <p><u>BLM</u>—Environmentalists file suit over failure to follow ESA requirements. Judge Jones rules that BLM violated the ESA. BLM asks for “God Squad” to be convened to exempt 44 timber sales.</p> <p><u>FWS</u>—FWS proposes critical habitat for northern spotted owl. Recovery team convened. Judge Zilly rules ESA was violated because critical habitat was not designated. FWS issues status review of Mexican spotted owl, lists it as threatened subspecies, begins recovery planning.</p> <p><u>Other agencies and groups</u>—EPA declares that the BLM has failed to comply with NEPA regulations. Three more economic analyses of ISC plan are released. Timber industry proposed their own “Multi-Resource Strategy.”</p> <p><u>Congress/Administration</u>—Agriculture Secretary Madigan urges Congress to limit the court’s control over timber harvest. U.S. House of Representatives charters Scientific Panel on Late-Successional Forest Ecosystems (“Gang of Four”) to produce assessment and plan for Pacific Northwest old growth. Gang of Four presents report with 14 management alternatives to Congress; some alternatives considered in pending bills and in deliberations; none makes it to vote or into legislation. U.S. Congress holds hearings on management of old-growth forests.</p>

**Table 1—A chronology of northern spotted owl management since convening of the Interagency Scientific Committee (ISC) on the Northern Spotted Owl in 1989<sup>a</sup> (continued)**

Year	Agency and related activities
<b>1992</b>	<p><u>FS</u>—FS presents its second regional EIS on spotted owl habitat management to Judge Dwyer.</p> <p><u>BLM</u>—Issues third set of resource and spotted owl management plans since 1990.</p> <p>Audubon and others bring suit against BLM citing violation of Federal laws and regulations on spotted owl habitat management and planning.</p> <p>Judge Frye issues an injunction barring timber sales because of NEPA violations.</p> <p>God Squad is convened and hearings are held.</p> <p><u>FWS</u>—Critical habitat for northern spotted owl revised, decreased in area, and issued as final designation.</p> <p>Federal Court rules in favor of Douglas County, Oregon, mandating that FWS must prepare an EIS on designation of critical habitat under ESA.</p> <p>Draft Recovery Plan is submitted to Interior Secretary Lujan.</p> <p><u>Other agencies and groups</u>—USDI issues standardized protocol for surveying spotted owls.</p> <p>EPA withdraws claim against BLM in opening day of God Squad hearings.</p> <p>Three more economic analyses of ISC plan are released.</p> <p>USDI Secretary Lujan issues “Owl Preservation Plan;” scientists project 50-percent likelihood of extinction of the northern spotted owl under this plan; plan not implemented by Congress.</p> <p>Committee of scientists issues technical evaluation of the California spotted owl.</p> <p><u>Congress/Administration</u>—Interior Secretary Lujan fails to act to implement recommendations of the Draft Recovery Plan.</p> <p>“God Squad” exempts 13 of 44 BLM timber sales from ESA provisions, and directs BLM to implement Draft Recovery Plan.</p> <p>Many draft riders and bills are introduced that would variously eliminate or strengthen ESA, NEPA, NFMA; no legislation passed.</p>
<b>1993</b>	<p><u>FS, BLM</u>—FS issues a third regional EIS on spotted owl habitat management.</p> <p>FS publishes Scientific Analysis Team report addressing conservation needs of all old-growth forest species.</p> <p>FS and BLM produce EIS based on the FEMAT report.</p> <p>FS and BLM convene Science Integration Team as part of the Interior Columbia Basin Ecosystem Management Project to address forest management on eastern slope of the Cascade Range.</p> <p><u>Other agencies and groups</u>—FEMAT report issued with 10 management alternatives.</p> <p>Multiagency Regional Ecosystem Office convened in Portland, OR, consisting of FS, BLM, FWS, NPS, NBS, NMFS, EPA, and BIA.</p> <p><u>Congress/Administration</u>—President Clinton, Vice-President Gore, and selected Cabinet members hold a Forest Conference in Portland, OR, and commission FEMAT.</p>
<b>1994</b>	<p><u>FS and BLM</u>—FS and BLM issue joint spotted owl conservation strategy; USDA and USDI issue joint Record of Decision based on amended FEMAT Management Option 9.</p> <p>FS implements President’s Plan resulting from the Record of Decision, as the Northwest Forest Plan.</p> <p><u>Other agencies and groups</u>—Seattle Audubon Society challenges Northwest Forest Plan on adequacy for spotted owl conservation and other late-successional forest species; Judge Dwyer eventually rules that planning and analysis for owls and other species is adequate.</p>

**Table 1—A chronology of northern spotted owl management since convening of the Interagency Scientific Committee (ISC) on the Northern Spotted Owl in 1989<sup>a</sup> (continued)**

Year	Agency and related activities
1995	<p><u>FS</u>—Marbled murrelet habitat management court case (Northwest Forest Resource Council vs. Glickman and Babbitt) affects harvest of some old-growth forests, affecting some spotted owl habitat as well; litigation and management on murrelet and spotted owl habitat at least partially coincide.</p> <p><u>FWS</u>—Site-specific consultation continues pursuant to Section 7 of Endangered Species Act. Northwest Forest Plan answers many consultation questions so that broader based programmatic consultation addresses wider areas (provinces) and longer time periods more efficiently. Benefits viewing spotted owl habitat over a broader area and in landscape or province contexts.</p> <p><u>Congress/Administration</u>—Congress passes Recissions Act (PL 104-19) which directs FS and BLM to move ahead with Section 318 timber sales, previously suspended; gives Secretaries of USDA and USDI discretion to ignore many of the environmental laws and regulations for salvage sales; for the Section 318 sales, it prohibits FS from meeting specific environmental laws and regulations. Secretaries choose to follow the environmental regulations so that salvage sales must meet existing environmental laws and regulations, and in the range of the northern spotted owl, they will follow the standards and guide lines of the Northwest Forest Plan.</p> <p>Congress proposes various amendments to ESA that would reduce its effectiveness.</p>
1996	<p><u>FS</u>—Northwest Forest Resource Council vs. Glickman and Babbitt ruled by Appeals Court in favor of government, whereby murrelet occupancy is defined as known to be nesting; implications for conservation of some spotted owl habitat under Northwest Forest Plan.</p> <p>Regional Ecosystem Office begins evaluation of effect of Recissions Act on the Northwest Forest Plan, relative to the Act’s ability to ensure continued existence of species as required by NFMA, if it would provide the Federal contribution to recovery of ESA-listed species, and if the assumptions of the Northwest Forest Plan can still be met.</p> <p><u>FWS</u>—FWS policy amended to significantly redefine and reduce Candidate Species lists (28 Feb. 1996, Federal Register) and to change how species listing petitions would be handled. Ramifications for reducing impetus for protection of some late-successional species associated with spotted owl habitat.</p>

<sup>a</sup> Acronyms are as follows. Agencies and groups: BIA = Bureau of Indian Affairs, BLM = USDI Bureau of Land Management, EPA = Environmental Protection Agency, FEMAT = Forest Ecosystem Management Assessment Team, GAO = General Accounting Office, FS = USDA Forest Service, FWS = USDI Fish and Wildlife Service, NBS = USDI National Biological Survey (now a Division under US Geological Survey), NMFS = National Marine Fisheries Service, NPS = USDI National Park Service. Laws and related terms: EIS = environmental impact statement, ESA = Endangered Species Act, NEPA = National Environmental Policy Act, NFMA = National Forest Management Act.

**Marcot, Bruce G.; Thomas, Jack Ward. 1997.** Of spotted owls, old growth, and new policies: a history since the Interagency Scientific Committee report. Gen. Tech. Rep. PNW-GTR-408. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 34 p.

This paper tracks the recent history of planning, management, and litigation regarding northern spotted owls and their habitat on Federal public lands since the 1989 Interagency Scientific Committee to Address the Conservation of the Northern Spotted Owl (ISC). The ISC report and subsequent plans sparked many economic analyses, appeals, lawsuits, forest management plans, and counterplans. Federal assessments and planning efforts eventually led to the current Northwest Forest Plan which considers owls in context of ecological and human communities under the rubric of ecosystem management.

Keywords: Spotted owl, old growth, Interagency Scientific Committee, threatened species, Northwest Forest Plan, forest policy, Endangered Species Act.

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