The ambitious Northwest Forest Plan tried to balance desires for timber and biodiversity, but preservation trumped logging—and research. Can the plan be made as adaptable and science-friendly as intended?

Learning to Adapt

For decades, a steady stream of logging trucks rolled out of forests in the Pacific Northwest, piled high with ancient Douglas firs, valued for their huge trunks. Old-growth forests on private lands were the first casualties, and as they disappeared, the loggers turned to national forests. Despite outcries from environmentalists, the pace of clear-cutting intensified in the 1980s—reaching a peak of more than 5 billion board feet a year, enough to build 350,000 three-bedroom houses, much of it from old growth. Then in the early 1990s, environmentalists finally found a weapon powerful enough to fight destruction of these venerable forests: the northern spotted owl, which needs large tracts of old trees to survive.

Not long after the owl was added to the endangered species list in 1990, environmental groups sued on its behalf, and a federal judge ordered a moratorium on logging in owl habitat. The rumble of trucks from the national forests silenced, but the volume of the debate only got louder. As it played on national media, the bitter battle pitted birds against jobs. Activists spiked trees to damage mills, while loggers held protests and cut down old-growth trees at night. The tension ratcheted up.

Out of this political crisis came the largest, most ambitious forest conservation plan ever. Called the Northwest Forest Plan (NWFP), it covers 9.8 million hectares of federal land in California, Oregon, and Washington. Striving for compromise, the plan tried to balance the needs of loggers and endangered species. To meet that tall order, the architects set up special research areas to devise new ways of cutting timber that would be benign or even beneficial to wildlife. Economic and ecological progress would be monitored, and the plan would be altered decade by decade as needed—a process called adaptive management.

Now, more than 10 years and $50 million in monitoring costs later, researchers and forest managers have taken the first major stab at assessing how well the plan is working. This fall, they will publish a series of extensive reports, with a synthesis slated for release this month. The bottom line, they say, is that the plan is basically on track: Old-growth forest has been preserved, and watersheds are improving. But several key goals have not been met. Some forests face the risk of catastrophic fires; the spotted owl population is still declining; and timber sales never came near projections, meaning lost jobs and dollars for both the timber industry and the U.S. Forest Service (USFS).

Flash point. Cutting of old-growth trees, like this Douglas fir, created bitter conflict and led to the Northwest Forest Plan.

Another shortcoming is the relative dearth of new approaches for improving the plan. Despite good intentions, the goal of devising and studying alternative management strategies essentially fizzled. Officials say that fixing this is a top priority, as is reducing fire risk.

But keeping the plan on track—let alone boosting its activities—faces serious challenges, as funding for the USFS in the Pacific Northwest has fallen dramatically. Forest service officials say that changes in regulations governing the plan, implemented by the Bush Administration, will give them needed flexibility, but environmentalists worry that the changes provide license for irresponsible logging that could threaten remaining old-growth forests.

Legal logjam

Several broad environmental laws passed in the 1970s made the conflict between logging and old-growth conservation all but inevitable. The Endangered Species Act (ESA) of 1973 requires the conservation of habitat that listed species depend on, and sections of the National Forest Management Act mandate that populations of species be kept viable. Forest service officials knew in the 1980s that the spotted owl was likely to be listed but, under pressure from politicians in the northwest, continued to allow cutting of old-growth forests—until the Seattle Audubon Society and other groups sued.

In March 1989, a federal circuit judge blocked sales of timber within the range of the owl, an area encompassing the remaining old growth. Congress intervened, allowing a few timber sales to go through, enraging environmentalists. The issue rose to prominence in the 1992 presidential campaign.

A few months after the election, President Clinton asked a large group of scientists from USFS, the Bureau of Land Management (BLM), and universities to provide a range of options that could end the judicial moratorium. The Forest Ecosystem Management Assessment Team (FEMAT) was charged with finding ways to protect the long-term health of the forest across the range of the spotted owl while providing "a predictable and sustainable level of timber sales and nontimber resources that will not degrade the environment."

A core team of several dozen researchers, led by wildlife biologist Jack Ward Thomas of USFS, holed up for 3 months in a Portland office building, working around the clock and calling on more than 100 outside scientists when needed. "The mood was one of great

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intensity and focus," says FEMAT participant Norman Johnson of Oregon State University in Corvallis. From this came a 1366-page document that laid out 10 distinct management options. All of them took a broad view, focusing on managing the entire ecosystem rather than just the spotted owl. But to survive court challenges, any plan had to comply with laws aimed at species protection.

Clinton picked Option 9, which set up a patchwork of old-growth areas—45 so-called Late Successional Reserves, totaling 2.8 million hectares or almost 30% of federal land in the plan area. The primary objective in these reserves was to ensure the survival of old-growth forest habitat that the owl requires. Some 1.9 million hectares outside the reserves, called the matrix, would be available for logging, except near owl nests.

To figure out what type of management would be most compatible with conservation and timber goals, the plan set aside 10 areas (see map, p. 690), totaling 603,000 hectares, for experimentation with restoration and harvesting approaches. It also called for different management strategies in various reserves, depending on local conditions. For instance, the pine forests east of the Cascade Range are drier and more prone to fire than those to the west, and decades of fire suppression had led to a buildup of brush and deadwood. They would need aggressive management, including thinning and prescribed burns, to prevent catastrophic fires. To the west of the mountains, by contrast, the idea was to accelerate the development of old-growth habitat by thinning second-growth plantations.

Because officials expected salmon to be listed under ESA, the plan also includes a substantial Aquatic Conservation Strategy. To prevent erosion, which adds sediment and can destroy fish habitat, the plan creates a system of riparian reserves: 100-meter-wide no-logging strips on either side of streams, totaling 903,000 hectares. As more was learned about watershed ecology, the buffers were to be adjusted to the minimum size necessary to conserve fish, thus allowing more logging.

Before it was implemented, Option 9 went to the departments of Interior and Agriculture, where it was modified—presumably to make it legally more airtight—without scientific advice from FEMAT. The biggest change was to expand the scope of protection beyond species listed under the ESA to include several hundred largely unstudied species whose status was unknown. "The precautionary principle went berserk at that point," Thomas says.

Under this additional "survey and manage" program, before any ground-disturbing activity could take place, the agency had to check for the presence of any of these organisms, including lichens and invertebrates, and devise a plan to minimize impact on them. Although this provision has helped the overall plan hold up to court challenges, it had unintended and wide-ranging consequences. In particular, because it made the plan substantially trickier to implement, much logging and many adaptive-management experiments never got off the ground. "It almost made it impossible to pursue the actions in Option 9," says Thomas, who was chief of USFS from 1993 to 1996.

Northwest Forest Plan: A Decade Later

OLD GROWTH
Despite forest fires, the plan area ended up with slightly more old forests than expected. Only 0.2% of old growth was logged, but critics say even that was too much.

SPOTTED OWL
Likely reasons for population declines include competition from barred owls and habitat loss on private land.

MARBLED MURRELET
Populations of this endangered seabird were expected to decrease by 35% but apparently remained stable for unknown reasons.

RIPARIAN HABITAT
Some 4800 kilometers of roads were decommissioned and deadwood added to streams to improve fish habitat.

TIMBER AND ECONOMICS
Lawsuits and complex regulations meant far less timber, little improvement in fire risk, and slower maturation of managed forests. Some towns suffered seriously, although the region prospered overall.

ADAPTIVE MANAGEMENT AREAS
Most research sites never saw much action, due to lawsuits, bureaucracy, and limited funding.

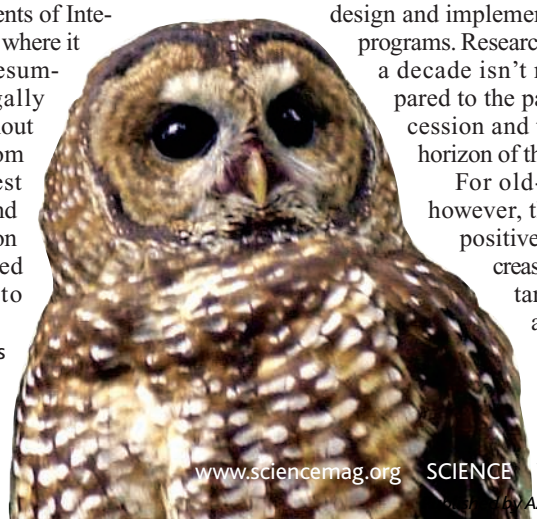
Charting progress

This spring, USFS and BLM began previewing the first monitoring results. In some cases, the data are too sparse to yield a useful assessment, because it took several years to design and implement the monitoring programs. Researchers also note that a decade isn't much time compared to the pace of forest succession and the century-long horizon of the plan.

For old-growth forests, however, the trend appears positive. Older forest increased by 245,000 hectares between 1994 and 2003, about the amount originally expected. "Perhaps we can conclude for the short term that the policies are working," says USFS's Melinda Moeur, who led the old-growth monitoring team. But environmentalists counter that the net increase—tabulated when an average tree diameter crosses a certain threshold—means only marginal improvement in habitat, while the 6800 hectares of older forest that were clear-cut represent real setbacks. "The losses are catastrophic, while the gains are incremental," says Doug Heiken of the Oregon Natural Resources Council in Eugene.

The plan fell far short of its goal in terms of timber production. About 0.8 billion board feet per year were expected to be put up for sale each year; in most years less than half of that was. A major factor was the stringent requirements of the "survey and manage" program. Environmental groups also slowed things down with lawsuits to prevent any harvesting they thought detrimental.

This decline in timber harvesting had both economic and ecological effects. Although it cost roughly 23,000 timber-related jobs, that was less than some had feared. Jobs with USFS also disappeared and were not replaced. Yet over the decade, some 800,000 other jobs were created in the region. As former timber workers and USFS employees moved out, they were replaced by retirees and telecommuters. Overall, the Pacific Northwest did not suffer economically because of the plan, says forest economist Richard Haynes of USFS, but some rural communities were hit quite hard. The shortfall of cutting also has ecological implications. The paucity of clear-cutting in former plantations, which would mimic the effects of a severe windstorm or major fire, means that the northwest could end up many decades from now with a lack of early succes-



Decline. Spotted owls face competition from an invasive species.

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sional forests, which are prized for their biological diversity. And because there was little thinning, which both provides timber and helps accelerate forest succession to old growth, the fire hazard continued to increase in eastern old-growth forests.

Another disappointment is that despite the progress in habitat preservation, the population of spotted owls is estimated to be declining at 3.4% per year. The culprit is a surprise: invasive species. Barred owls, which are native to the central and eastern United States, have moved west over the past few decades. The newcomers seem to dissuade spotted owls from hooting, and spotted owls are apparently more likely to leave their territory if barred owls appear. Moreover, their diets overlap 75%, so they may be competing for food as well. "Barred owls may ultimately be as big or bigger a threat than habitat loss," says Eric Forsman, a wildlife biologist with USFS in Corvallis.

Thin is in. Selective logging can speed forest maturation, reduce fire risk, and produce timber.

Trying to adapt

A cornerstone of the original plan was adaptive management—essentially, learning by doing and monitoring—which had never been tried on this scale before. The plan called for setting aside 10 adaptive-management areas (AMAs), where scientists would test ideas about how to create or restore forest or riparian habitat and protect threatened species while integrating timber harvest. Most never got off the ground, which leaves the Forest Service with few new ideas to guide efforts to improve the plan. "It's been an extremely frustrating decade," says forest ecologist Bernard Bormann of USFS. "The progress has been very slow."

Several factors scuttled the projects. Tension and lack of trust between forest managers and environmental groups figured large. When environmental groups felt that foresters were using AMAs primarily to extract timber rather than to improve the ecosystems, they sued. However, Dave Werntz of the Northwest Ecosystem Alliance in Bellingham, Washington, says that trust has been building, thanks to better communication and good-faith efforts: "We're doing a better job today at implementing the Northwest Forest Plan than any time in the past."

Other problems remain: When national forest budgets got tight, these experiments were axed or fell lower on priority lists. In addition, rather than being encouraged to try novel approaches, local managers had to offer evidence to the U.S. Fish and Wildlife Service (FWS) that experiments wouldn't harm listed species. In many cases, managers simply gave up trying to make projects work or walked on eggshells to avoid legal trouble. "Caution seems to have trumped creativity," says Elaine Brong, BLM's director for Oregon and Washington.

There were a few exceptions. The Blue River Adaptive Management Area, for instance, was set up to recreate the effects of historical patterns of forest fires across

Mixed success. Old growth was preserved on federal land, but not many experiments took place.

23,000 hectares in the Cascades near Eugene, Oregon. Cutting, combined with prescribed burns, has yielded timber at a low but constant rate. The project began only 5 years ago, so no results have emerged yet. But modeling indicates that the experiment will create more old forest than the standard design of the NWFP will and much more intermediate-age forests. "We'll end up with what we believe is a more natural system," says geomorphologist Fred Swanson of USFS. And thinning experiments in the Siuslaw National Forest near Waldport, Oregon, are probing the best way to accelerate the maturation of younger forests, says Bormann, the lead scientist. Thanks to the thinning, the Siuslaw now produces more timber than any other national forest in the NWFP.

Overall, scientists say the plan is succeeding at its goal of conserving old-growth ecosystems. "So far so good," sums up Thomas Spies, a forest ecologist with USFS. Conservation wasn't the exclusive goal at the outset, of course, but the agency seems resigned that it won't meet its timber harvests. "If we can keep them flat, then we'll be doing pretty good," says USFS spokesperson Rex Holloway.

That state of affairs—if it holds—distresses the timber lobby but pleases environmentalists. The Bush Administration has, however, implemented several changes that could swing the balance, such as eliminating the "survey and manage" requirements last year to boost timber production. Other major changes, which affect all national forests, include removing the concept of retaining viable populations from the National Forest Management Act and lessening mandatory monitoring and requirements for environmental-impact statements. The changes "give total discretion to the local forest manager on how to manage the forest," says Michael Leahy of Defenders of Wildlife in Washington, D.C., which has filed suit.

How these changes specifically affect the operation of the plan will be determined by the Regional Interagency Executive Committee (REIC), made up of officials from USFS, BLM, and other agencies. This group will also decide how to modify the plan based on what's been learned over the past decade. A key priority is "getting the AMAs to work," says Linda Goodman, regional forester of USFS's Pacific Northwest Region and a REIC member. One strategy is increased involvement of FWS and the National Oceanic and Atmospheric Administration's National Marine Fisheries Service, which are responsible for endangered species, in research design so that scientists and managers have more latitude to take risks.

Yet as they hope to ramp up research and management activities for the next decade, Forest Service managers face a declining budget and downsizing. The agency's budget dropped 35% in the NWFP area during the first decade, which forced it to cut 36% of positions and close about 23% of its field offices in the plan area. "I'm very concerned," says Jerry Franklin of the University of Washington, Seattle. "What's happening is a real threat to carrying forward the plan successfully." To a large extent, the question of funding will determine how much monitoring and experimentation will continue—and what researchers will have learned about managing the forests 10 years from now.

—ERIK STOKSTAD

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