



## RESEARCH SUMMARY

# Labor Market Impacts of Land Protection: The Northern Spotted Owl

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### KEY TAKEAWAYS

1. The Endangered Species Act often places restrictions on land use in order to protect wildlife. This was the case in 1990 when the northern spotted owl became a threatened species after decades of logging in Washington, Oregon and northern California destroyed much of its habitat. Soon after, 6.9 million acres of forest land was designated as critical habitat, prohibiting logging.
2. This study examines the impacts of the Endangered Species Act 1990 listing of the northern spotted owl on the timber sector, specifically changes in industry employment levels, and the number of logging establishments not due to cyclical economic conditions and ongoing sector-specific trends.
3. The study finds that compared to regional employment in the sector, timber employment declined by 14 percent, but that compared to the industry at the national level, it declined by 28 percent in the impacted counties. These reductions reflect a decline of about 32,000 jobs in the Lumber and Wood Products sector when compared nationally, or 16,000 jobs when compared within the region. These estimates are significantly lower than the projections made by the industry around the time of the listing (up to 130,000 jobs) and align with federal projections (13,000 near-term jobs and 28,000 jobs in the long run).
4. To account for possible changes in global timber markets, the study compares timber employment in the impacted counties to the Canadian sector and finds no similar decline in Canada. In other words, the declines in the Pacific Northwest and northern California were not due to larger industry trends.
5. The researchers find that timber sales in the northern spotted owl-states' forests declined by 45 percent relative to other commodities, and the projected future price of lumber doubled. Meanwhile, the unemployed workers didn't flock to similarly land-intensive and physically exertive industries such as agriculture, mining and construction in the region. Only a small percentage of working-age men left the region.
6. This analysis demonstrates that environmental conservation that aims to protect species' habitats can impact related employment. While it is not straightforward to generalize from the case of the northern spotted owl to other Endangered Species Act listings and other industries, several other forest areas are subject to Endangered Species Act regulations that restrict the harvesting of timber.
7. The study adds to our knowledge regarding the impacts of environmental regulation on labor markets outcomes. Previous studies have either evaluated how specific sectors respond to changes in air quality regulations, or how total employment levels across all sectors respond to land-use and conservation regulation. This study joins the two by comparing the Lumber and Wood Products sector, and the impacts caused by the 1990 listing of the northern spotted owl under the Endangered Species Act.
8. While it is not straightforward to generalize from the case of the northern spotted owl to other Endangered Species Act listings and other industries, this analysis does demonstrate that environmental conservation that aims to protect species' habitats can impact related industries and employment in those industries. However, extractive industries such as logging might represent the upper-bound of the negative effect on employment due to conservation policy. For that reason, using the 1990 listing of the northern spotted owl as a cautionary tale might overestimate the average effect the listing under the Endangered Species Act has on job growth in the United States.

## Introduction

The Endangered Species Act was passed in 1973 to prevent the extinction of wildlife, often by placing restrictions on the use of land in habitats critical to wildlife survival. Beyond protecting a specific species, this can have broad social benefits both nationally and locally including watershed protection and creating or enhancing natural amenities that attract new residents, new recreational activities, and increase local economic activity, including employment.

The costs associated with restricted use of the land are concentrated and borne by affected groups. For example, restrictions may burden land-reliant economic sectors—agricultural production, timber harvesting and mineral extraction—affected workers and their communities. Therefore, a key concern with respect to habitat protection and land restrictions is the effect on local labor markets.

In many respects, the northern spotted owl has become the “poster species” for the tension between labor and conservation in the history of the Endangered Species Act. After decades of cutting down the old forests in the Pacific Northwest and northern California where the northern spotted owl lived, Oregon recognized the species as threatened in 1975. However, after more than a decade of reviewing the case, the U.S. Fish and Wildlife Service concluded that the conditions of the Northern Spotted Owl did not justify listing it under the Endangered Species Act.

Disagreeing with the determination, several environmental groups filed a lawsuit against the Fish and Wildlife Service. In November 1988, the U.S. District Court for the Western District of Washington State ruled in favor of the environmental groups. A series of negotiations resulted in the 1989 “Northwest Compromise” which restricted logging in the northern spotted owl’s habitat range.

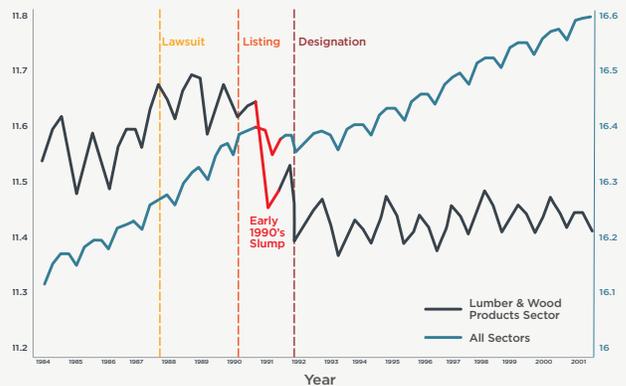
In response to the litigation, the Fish and Wildlife Service listed the northern spotted owl as ‘threatened’ under the Endangered Species Act in 1990. The timber industry objected to the move, projecting job losses of close to 130,000 timber industry and service jobs. The federal government also projected job losses, but significantly less at around 13,000 jobs in the near term and 28,000 jobs in the long run.

In 1992, the Fish and Wildlife Service designated 6.9 million acres of forest land as critical habitat, prohibiting logging in those forests to protect the northern spotted owl. The impact on timber harvests in the region was dramatic, with declines of 87 percent in federal-owned forests and 38 percent overall in the region from 1988 to 1996.

The raw data shows that starting in 1990, employment levels in the lumber and wood products sector began to decline, and by 1994 they were about 20 percent lower relative to the 1989 level. By 2000, employment in the lumber and wood products sector was down by 29.5 percent.

Despite the protections in place, the northern spotted owl has not yet recovered, seeing a 3.8 percent decline in population growth each year from 1985 to 2013. The species continues to be listed, unchanged, as a ‘threatened’ species under the Endangered Species Act.

**Figure 1 • Mean Employment Across Northern Spotted Owl States (Log Points)**



In 2020, the Fish and Wildlife Service found that reclassifying the species to ‘endangered’ was warranted. But the move never happened. Instead, in January 2021, northern spotted owl critical habitat areas were dramatically reduced by 3.4 million acres. This regulatory move was quickly paused by a new administration and is being reviewed, with the latest news indicating a reversal.

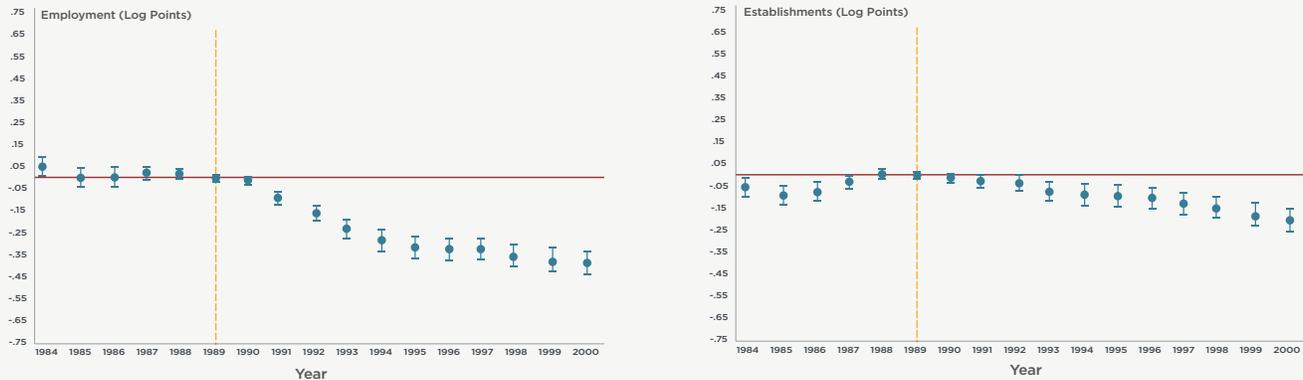
This study examines the employment impacts of the Endangered Species Act 1990 listing of the northern spotted owl, a policy that shifted productive federal timberland in the Pacific Northwest and northern California into environmental conservation, on the timber sector.

## Research Design

The study utilizes empirical approaches and techniques to estimate a causal relationship between timber employment levels and land protections for the northern spotted owl attributable to the 1990 listing. Using spatial data on habitat ranges, the authors compare the counties in the proximity of the protected areas to counties further away, and estimate changes in industry employment levels, and the number of logging establishments. Because the listing and designation of northern spotted owl critical habitat areas arguably had both regional and national impacts, the study considers both a regional framework focused only on the Pacific Northwest and California, as well as a national framework for the contiguous United States.

The study compares data before and after the listing, from 1984 to 2000. The researchers’ empirical focus was to disentangle the reduction in labor demand in the timber industry following the 1990 listing, from cyclical economic conditions, and ongoing sector-specific trends, to identify the causal effect of new protections. They compare timber employment in the affected range—including counties in California, Oregon and Washington that are within 25 km of the northern spotted owl habitat range—to timber employment outside of the affected range before and after the policy. They further contrast this to overall employment and to timber sector employment in Canada. The different comparisons in the analysis allow the researchers to account for confounding factors, like the early 1990s recession and the potential migration of workers.

**Figure 2 • Regional Employment and Establishment Changes from Northern Spotted Owl Listing**



Note: Treated counties are defined as the counties within 25km of northern spotted owl habitat areas in CA, OR, and WA. Capped spikes denote 95% confidence intervals. Standard errors are clustered at the county level. Source: Listing data from the Fish and Wildlife Service. Labor data from the Bureau of Labor Statistics.

## Findings

**Timber employment declined, but not as much as industry had projected.** Prior to the 1990 northern spotted owl listing, from 1984-89, there were approximately 168,500 employees in the timber industry within the Pacific Northwest and California, representing a small percentage of state employment: 0.3 percent in California, 3.1 percent in Oregon, and 1.1 percent in Washington. The affected counties studied involved 114,600 timber jobs.

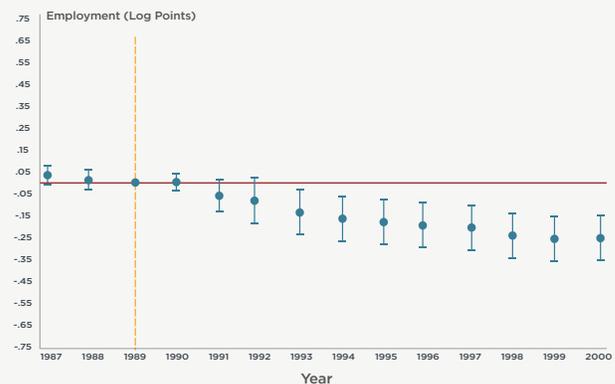
From this baseline, the study finds a decline in timber employment by 14 percent to 28 percent in the counties within 25km of the northern spotted owl habitat range following the 1990 listing up to 2000 relative to the time period between 1984 and 1989. When translated into jobs, these reductions reflect a decline of about 32,000 jobs in the Lumber and Wood Products sector when compared nationally, or 16,000 jobs within the region. These estimates are significantly lower than the projections made by the industry around the time of the listing and align with federal projections.

California experienced a smaller impact relative to Oregon and Washington. Oregon and Washington saw timber employment decline by 28 to 32 percent, from a national perspective. California only saw a decline of 23 percent. Both Oregon and Washington saw the decline in timber employment persist until 2000, while California began recovering in 1996. The ability of California to rebound might be a result of having only a fraction of the northern spotted owl designated critical habitats. This might have allowed firms to move logging activities to California's non-protected areas.

**The decline was not due to larger industry trends.** While the study compares the Lumber and Wood Products sector to other sectors to account for regional changes in economic activity, there could have been changes to demand and supply of timber products more broadly. To account for such changes in global timber markets, the study compared the Lumber and Wood Products sector in the United States, between the northern spotted owl states and the non-northern spotted owl states, to the forestry and logging sector in Canada, before and after the 1990-listing. The study finds that relative to the

Canadian forestry and logging sector, the decline in timber employment only becomes large and precise following 1993. On average, timber employment declined by 23 percent in the northern spotted owl states following the listing relative to timber employment in Canada.

**Figure 3 • U.S. VS. Canada Employment Results**



Note: Treated states are CA, OR, and WA. Capped spikes denote 95% confidence intervals. Standard errors are clustered at the region (state or province) level. Source: Listing data from the Fish and Wildlife Service. Labor data from the Bureau of Labor Statistics Canada.

**There was a significant decline in timber sales and an increase in future prices for lumber.** The study then estimates the effect of the 1990 northern spotted owl listing on the sale of timber from federal forests, as well as the price of timber. The researchers find that timber sales in the northern spotted owl-states' forests declined by 45 percent relative to other commodities.

The future price of lumber doubles, which appears to begin following the designation of critical habitats in 1992, tapering off after a 1994 Northwest Forest Plan began—with volatility increasing after 1994. Given the lack of granularity in the state-level data, and the imperfect fit in the pre-treatment periods, the researchers interpret these results as suggestive of a large increase in lumber prices but are cautious to associate it with the 1990 listing.

Figure 4 • Change in Lumber Future Price



Note: Lumber futures data, deflated using a GDP deflator (2012 as the base year).  
Source: Futures data from CME Group. GDP Deflator data used from U.S. Bureau of Economic Analysis, Gross Domestic Product: Implicit Price Deflator (GDPDEF), retrieved from FRED, Federal Reserve Bank of St. Louis.

**Jobs didn't shift to other sectors locally.** While timber jobs in the region might have been lost and never recovered, another important question is whether affected timber workers found reemployment locally in other sectors. The study looked at labor trends in six other sectors that could have potentially absorbed labor from the Lumber and Wood Products sector as they are either also land-intensive, extractive industries or require similar physical stamina: agriculture (crops and livestock, separately), mining (metals and coal, separately), and construction sectors. As part of the six, the study also included the Land, Mineral, Wildlife & Forest Conservation subsector as it might have increased in size due to a job retraining program that was part of the Northwest Forest Plan. The plan established a Jobs-in-the-Woods program, managed by the Bureau of Land Management, which aimed to train those who lost their jobs in logging to take up work in watershed conservation. The results do not support the idea that any one of these sectors, individually, might have played an important role in absorbing timber workers affected by the 1990 listing.

**There was a small amount of the population, 2 percent of working-age men, who left the region.** Another important question to consider is whether timber workers left the region for employment elsewhere. Focusing on the male population share, the researchers estimate the effect separately for California, Oregon, and Washington. Counties in Oregon and Washington had increasing male working-age population shares prior to 1990, relative to counties in other states, and California had a stable trend prior to 1990. Counties in the three states then saw their male working-age population decline, after 1990, in 2000 and again in 2010. Using the estimated year-by-year population data, the researchers find smaller, by half, effects in 2000 relative to 1989. The year-by-year estimates also show that the decline in the share of this working-age group was on a downward trend from 1984, and that a large drop happened in 1990, coinciding with the 1990s recession.

## Policy Implications

This analysis demonstrates that environmental conservation that aims to protect species' habitats can impact related employment. While it is not straightforward to generalize from the case of the northern spotted owl to other Endangered Species Act listings and other industries, several other forest areas are subject to Endangered Species Act regulations that restrict the harvesting of timber. Extractive industries such as logging and mining are likely the ones that are most strongly affected by conservation policies that place land-use constraints, such as the Endangered Species Act. The 1990 listing of the northern spotted owl is often used as a cautionary tale regarding the Endangered Species Act and conservation policies, yet it likely represents an upper-bound for the negative impacts on job losses and labor demand.

“This case likely represents one of the worst labor market impacts, as it resulted in placing 40 percent of an industry's resource base under protection. The listing of other species would have smaller impacts on other sectors. It should therefore not be taken as a cautionary tale to prevent the listing of species, but rather an example of why we need solid data to show that the costs are real, manageable, and not infinite.”

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