III. Forest Resource Trends and Threats in Oregon

A. Historical perspective

Evidence of humans in Oregon goes back beyond 15,000 years, although there is continued debate as to the actual earliest settlements here. American Indians of various tribes resided in different areas of the state, most subsisting on hunting and fishing. In northwest Oregon, native tribal use of fire played a critical role in establishing many patterns of forest habitat. Around the end of the Pleistocene, the drier climate had created open grasslands and oak savannas throughout much of the Willamette Valley, supporting numerous prairie wildlife species, as well as a diverse endemic flora adapted to grasslands. As the climate got cooler and wetter over time, and summer lightning almost disappeared, American Indians frequently set fires in the Willamette Valley, maintaining the prairies and oak savannas that would otherwise have become conifer forests.

The first white settlement of Oregon began with fur traders, originating with a fur-trading post at Astoria. However, furs were not the only valuable resource in the region, and in 1827, the first sawmill was built. By the time civil government was established in Oregon in 1843, immigration along the Oregon Trail had begun. For the next several decades, the logging industry continued expanding, and began exporting lumber to China, Hawaii, and Australia. At the turn of the 20th century, timber supplies in the Great Lakes region had almost run out, which put new pressure on the forests in the west and inspired an era of large-scale logging in the Columbia River Basin. When the Great Depression began in 1929, the number of lumber mills in the state had risen to 608 and there were also five paper mills, 64 planing mills, and 47 furniture factories. Until this time the major focus of the lumber industry had been in northwest Oregon, but this focus began shifting to the southwestern part of the state. Meanwhile, by 1938, Oregon had surpassed Washington to become the leading lumber producer in the nation. In 1941 Oregon passed a law requiring reforestation after timber harvest.

The years 1945 to 1970 marked an era of intensive forestry and forest management. This included dramatic increases in recreation use, timber production, dam construction, campground construction, and wildlife management. After World War II, the state's natural resource industries continued to drive the state's economy, particularly for timber, as lumber and plywood from Oregon was used to build more and more homes around the country. Important changes also took place in the state's timber industry starting in the 1960s. Previously, sawdust, bark, and other logging by-products had not been used. As the diameter of logs began to decline and the industry began studying ways to conserve, many of these by-products were now being turned into hardboard, pulp and other wood products.

Activity in the state's forest products industry increased greatly in the 1970s due to growth fueled by a strong post-war economy. Coinciding with this peak was an increased public awareness and concern for the environment. In 1971, the Oregon Forest Practices Act, the first of its kind in the United States, required resource protection during logging. Two years later, the Endangered Species Act was passed by Congress. Also in 1973, Oregon approved statewide land use planning. Yet by 1975, sustained-yield harvesting had not been implemented statewide, and western Oregon began to consider banning exports.

By 1990 the U.S. Fish and Wildlife Service had listed the northern spotted owl as a threatened species in Washington, Oregon, and northern California. As a result, this species became the symbol for the protection of old-growth forests. Protection strategies for the spotted owl and other old-growth dependent species radically changed federal land management in the early 1990s, dramatically reducing timber harvest levels in western Oregon. Increasing concerns about ecosystems, salmon and forest health led to similar changes in federal forest land management in eastern Oregon and adjacent states. As the economy recovered from an early 1980s recession, timber harvest began to shift from federal to private, non-industrial timberlands (Figure 3). Since 1992, harvest levels on federal lands have dropped sharply. In the 1970s and 1980s, federal land yielded 50 percent of Oregon's timber harvest, but by 1996 it provided only 17 percent (Beuter 1996). This led to an increase in timber value and a concomitant increase in harvests from non-industrial lands in the early 1990s.

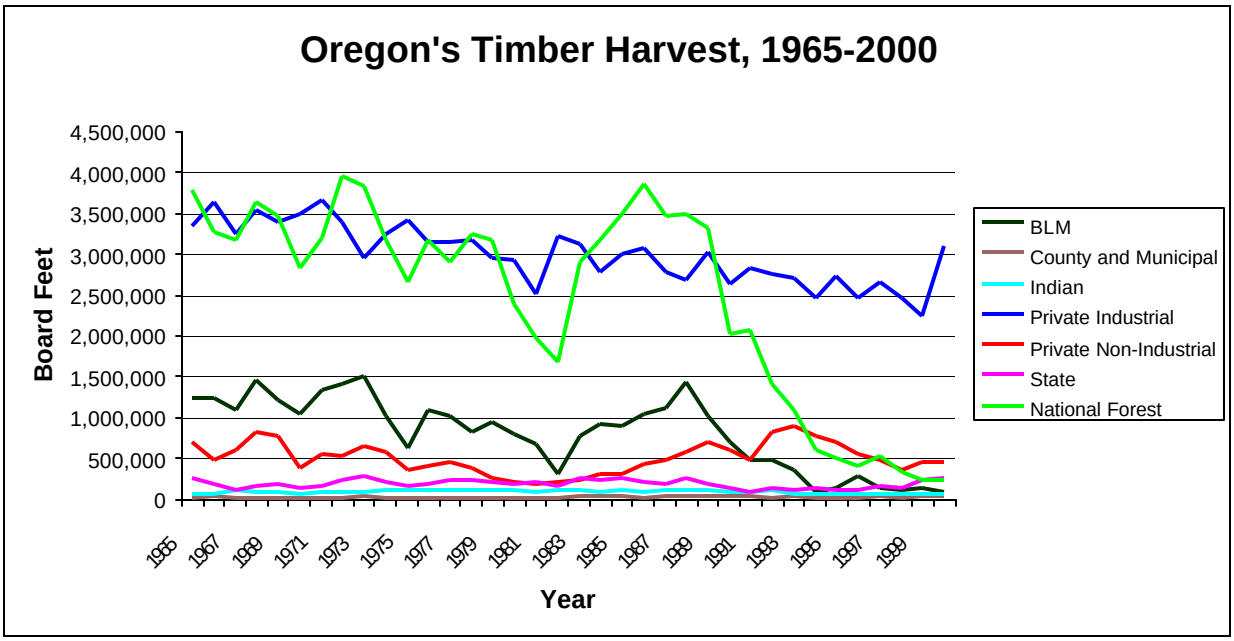

Figure 3. Oregon's timber harvest by ownership group (Oregon Department of Forestry).

In spite of the tremendous economic growth in Oregon during the 1990s, these federal policy changes are still evident in the local economies of some timber dependent counties. Differences in local dependence of Oregon's counties on timber is shown in Figure 4. The Oregon Department of Economic Development has also created a map showing the locations of economically distressed communities in 2000, much of which is from reductions in available timber. This map is shown below as Figure 5.

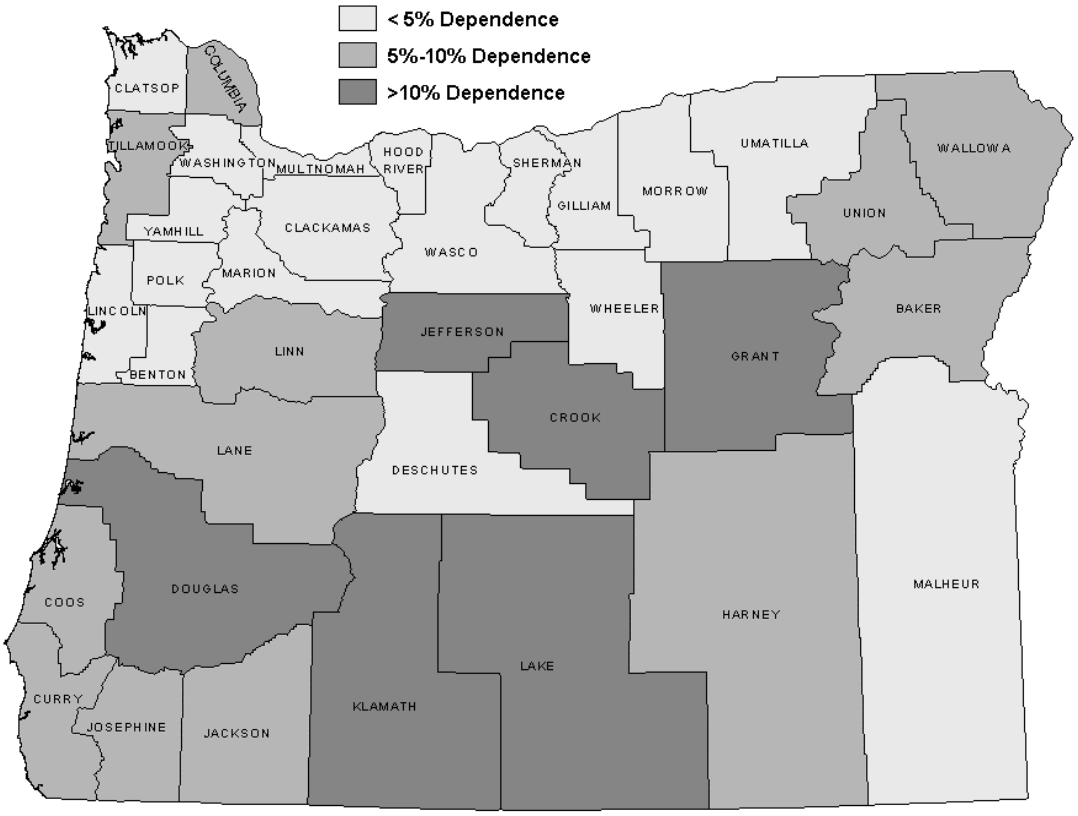

Figure 4. Timber Dependency of Oregon's Counties

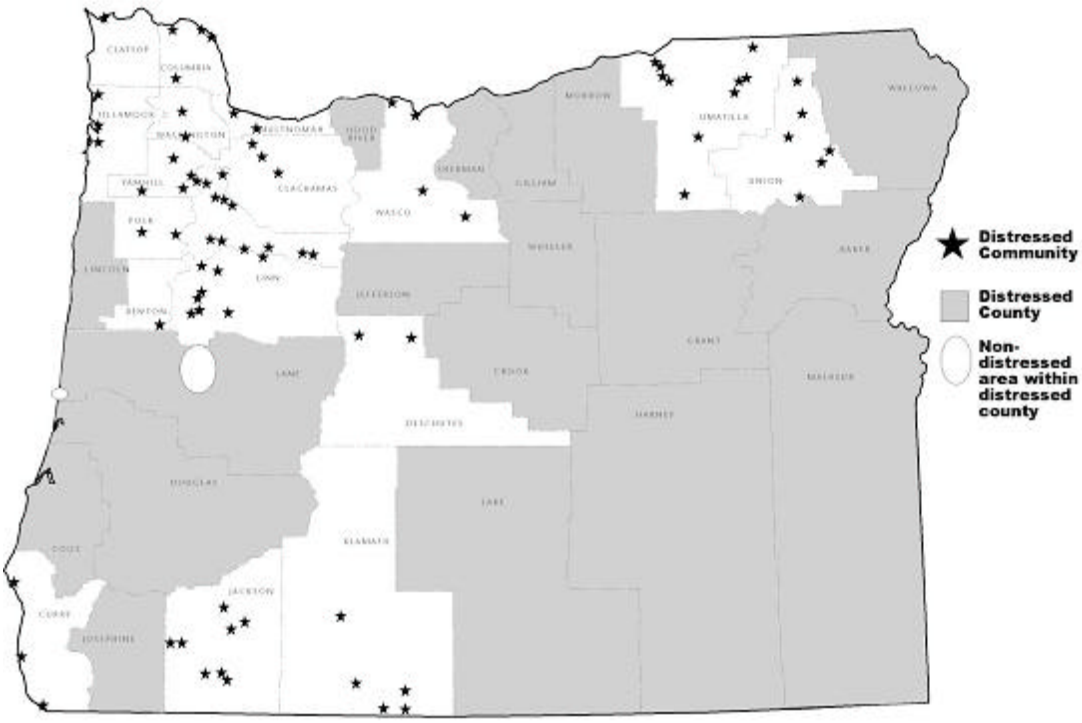

Figure 5. Economically distressed areas in Oregon, 2000.

The forest products industry is no longer Oregon's economic leader (having been surpassed by a thriving high-technology industry). But in spite of this, Oregon still leads the nation in lumber production. Moreover, while the high-tech industry is growing quickly in the Willamette Valley's metropolitan areas, especially Portland, it has little impact on the rest of the state, where the wood products industry still accounts for about one-third of the economic base (Oregon Forest Resources Institute 1999). Oregon continues to grow healthy timber, and much of it is on private land, which will increase in importance as the amount of timber harvested on federal land declines. Nonetheless, forestland has felt the pressure of human encroachment: since the early 1800's, 2.5 million acres of forest in Oregon have been converted to other uses (ODF 2001).

B. Current ownership patterns, land management objectives, and timber harvest trends

Of Oregon's 28 million forested acres, 39 percent is privately owned, 57 percent is federally owned, and the state, tribal and other public entities own the remaining four percent (Figure 6). Land management objectives for these ownership groups vary.

Federal

The USDA Forest Service and USDI Bureau of Land Management (which oversees the Oregon and California Railroad, Coos Bay Wagon Road, and public domain lands) have adopted ecosystem management as the primary method for the management of public forest lands in Oregon. Ecosystem management arose over public concern about timber harvest levels on federal lands in the late 1980s and over concern for federally listed species under the Endangered Species Act such as the northern spotted owl, marbled murrelet and several species of salmon and steelhead. Under ecosystem management, the goods and services produced by the forest (e.g., timber, minerals, recreation, water) are by-products of managing the forest for the protection and restoration of ecological values such as fish and wildlife habitats, old-growth, soil protection, long-term site productivity, watershed health and biodiversity. In western and coastal Oregon, ecosystem management centers on the development of an interconnected late successional (i.e., old-growth) forest ecosystem. In eastern and southwestern Oregon, ecosystem management focuses on restoring healthy forest conditions in areas overstocked and declining in vigor due to decades of fire suppression.

Private

Private industrial forestlands are managed intensively for timber production for competitive economic return. Private non-industrial forest owners – those managing lands less than 5,000 acres and who are not actively involved in the manufacture of wood products – have land management objectives that vary as widely as the number of owners. Some lands have been held for generations and managed as working forests for income through timber, Christmas trees, agriculture, range or some combination of use. Others landowners seek sanctuary from urban areas and emphasize aesthetics and

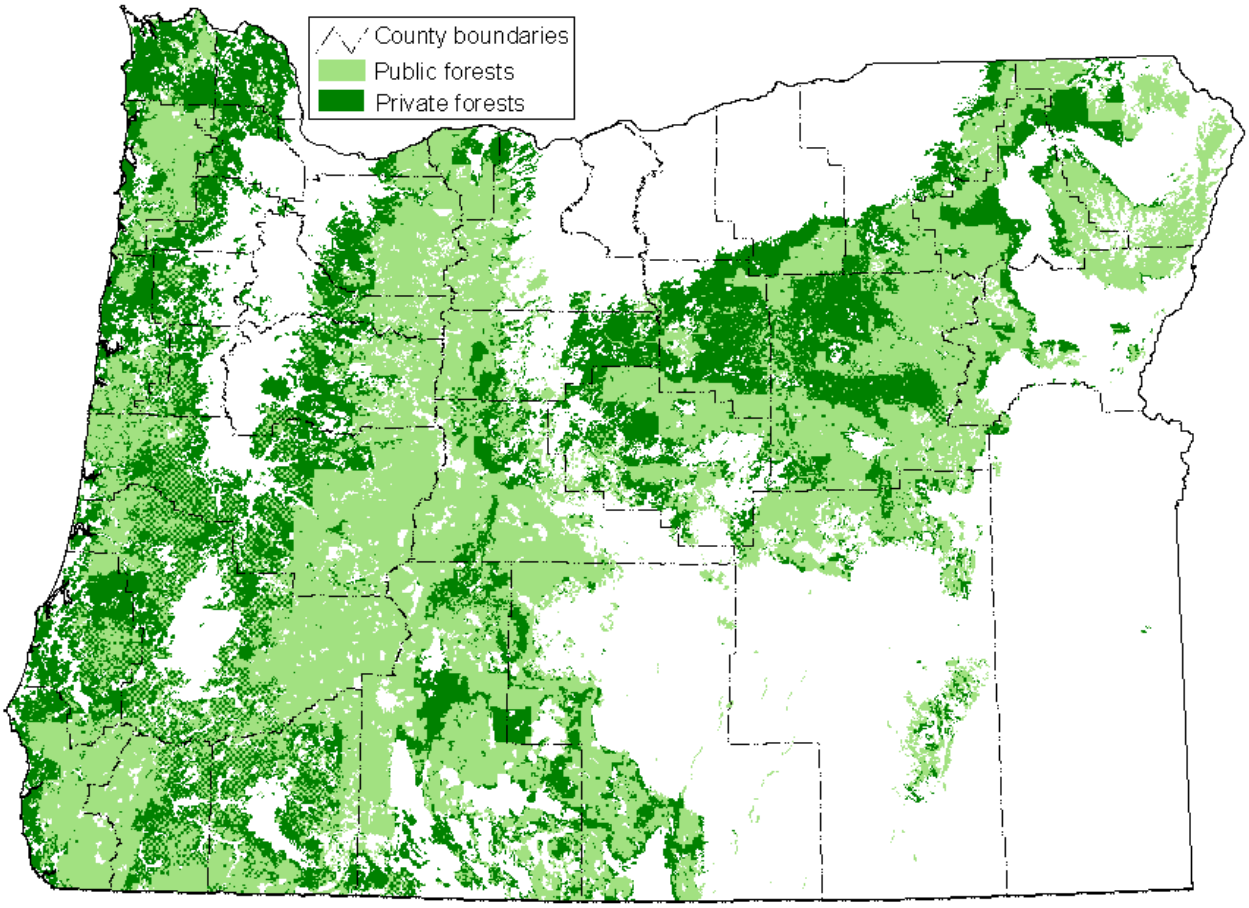

Figure 6. Forest land ownership in Oregon.

wildlife habitat. Many resources (e.g., fish, wildlife, water quality, aesthetics) are protected by mandatory compliance with the Oregon Forest Practices Act, which also requires reforestation after final timber harvest. In addition, both non-industrial and industrial private forest landowners recognize their responsibility to the environment through their stewardship of the public resources found within their holdings. These landowners often voluntarily conduct projects that enhance wildlife habitat and restore in-stream and riparian habitat for salmon and steelhead pursuant to the Oregon Plan for Salmon and Watersheds.

State

State forestlands managed by the Oregon Department of Forestry fall into two groups: those owned by the Oregon Board of Forestry (e.g., the Tillamook State Forest in northwest Oregon) and lands owned by the State Land Board (e.g., the Elliott State Forest in the southern Coast Range). The management objective for Board of Forestry lands is to provide the greatest permanent value to the people of Oregon through healthy, productive, and sustainable forest ecosystems by managing for steady timber harvest and revenues while providing other ecological and social forest values. The objective for most of the State Land Board lands is to generate revenue for the Common School Fund consistent with sound techniques of timber and land management. The Board of Forestry has adopted structure based management (i.e., repeated thinning and extended rotation ages to create older forest characteristics in tree size, down wood and dead trees used by wildlife) as the strategy for achieving greatest permanent value. The management of state forestlands must meet the regulatory requirements of the Oregon Forest Practices Act, state and federal endangered species acts.

Tribal lands

Most American Indian lands in Oregon are lands held in trust by the United States and managed under the sovereign authority of American Indian tribes. The management objectives for these lands vary by each tribal government. American Indians have a deep cultural and spiritual relationship to the land and resources, and value their forestlands accordingly. Forestlands may be managed for timber and minerals for employment, income and tribal business enterprise, but also for their cultural value. Many tribes have adopted integrated resource management plans that schedule the joint production of timber and non-timber resources for employment, shelter, fuel, clothing, crafts, medicinal plants, food, water, fish, wildlife, cultural features and a sense of place. In administering the United States trust responsibility for Indian lands, the USDI Bureau of Indian Affairs and other federal agencies must meet the requirements of federal laws including the Endangered Species and National Environmental Policy acts. However, they do this in a manner that harmonizes treaty or Executive Order rights and tribal sovereignty by working with tribes on a government-to-government basis.

Off-reservation treaty fishing rights

Specific rights were reserved in treaty documents by Indian tribes as usual and accustomed fishing places, outside the bounds of tribal lands or reservations. These rights apply to 24 Indian Tribes in the Pacific Northwest. For these tribes, the access to such sites, usually along streams or marine shorelines, may not be obstructed. This unique access is a tribal property right for those fishing places. The right remains an encumbrance on the land to future owners, whether in state, private or federal ownership.

Other public

The objectives for county, city and regional government forestlands in Oregon vary. In general, local government lands may be held in reserve for parks and greenspace or actively managed for timber as a means to generate revenue. Some lands may be managed for a combination of resource values such as timber, drinking water, aesthetics, recreation and fish and wildlife habitat.

Specific management practices applied by each ownership group reflect their management objectives. Clearcuts and young, healthy and fast-growing forests are prevalent on industrial timberlands in western Oregon since Douglas-fir is a valuable commercial species that

regenerates best in full, open sunlight. National forests and Bureau of Land Management lands comprise millions of acres of late successional reserves where light thinning and natural processes will be relied on to achieve old-growth forest conditions. State forest managers have not adopted a reserve approach. Instead, desired older forest habitat conditions will be achieved through active management of stands over longer rotations.

Since forests are important to the Oregon economy, they have been well studied. Since the late 1950s, there have been several timber supply assessments for western Oregon as increasing timber harvest activity in the state during the post-World War II era prompted questions about the sustainability of Oregon's timber resource. The landmark assessment of timber supply on both federal and private lands was the Oregon State University study, *Timber for Oregon's Tomorrow*, by Dr. John Beuter (Beuter *et al.* 1976). In 1980, the Oregon Board of Forestry completed the *1980 Timber Supply Assessment* (Stere *et al.* 1980) in preparation for its strategic plan for all of Oregon's forestlands, called The Forestry Program for Oregon. Both studies predicted that Oregon would encounter a shortfall in timber supply in the 21st century as the timber harvests shifted away from old-growth forests on federal lands at a time when private timber supplies were still too young in age to make up the difference.

What these assessments did not take into account were changes in federal land management policies that made much of the federal timber supply unavailable by the early 1990s. As such, the predicted shortfall was realized by 1990 for reasons unanticipated and not related to deprecations of standing timber inventory. In 1990, Oregon State University released an updated *Timber for Oregon's Tomorrow – The 1989 Update* (Sessions 1990) and companion reports (Greber *et al.* 1990) that evaluated the timber supply, employment, and income impacts realized by the decline in federal timber availability.

In 1988, the Oregon Board of Forestry conducted its second assessment of Oregon's forests (Lettman 1988). In this assessment, the Board recognized the need to assess all resources, not just timber, and the need to understand how the varying management of all of Oregon's forests in aggregate affects these resources. The Oregon Board of Forestry's third assessment is scheduled for completion in early 2002. This will be the first assessment of the overall sustainability of Oregon's forest. The assessment will use the seven international criteria for sustainable forestry adopted at the 1992 United Nations Conference on Environment and Development held in Rio de Janeiro, Brazil. The Seven Criteria are biological diversity, productive capacity of forest ecosystems, forest ecosystem health and vitality, soil and water resources, global carbon cycles, socioeconomic benefits and legal and economic issues. In 1999, the Oregon Department of Forestry released its First Approximation report (Birch 2000) discussing the available data and indicators to be used to evaluate each criteria in the 2001 assessment.

C. Priority Forest Communities

There have been two comprehensive federal regional ecosystem assessments. The first resulted in President Clinton's Northwest Forest Plan, developed by the Forest Ecosystem Management and Assessment Team (FEMAT) (FEMAT 1993) for western Oregon, western Washington and northwestern California. The second was the Interior Columbia Basin Assessment (Quigley *et al.* 1996), which covered all of eastern Oregon. Both of these assessments have focused on issues related to forest management of federal lands.

In addition, there have been several statewide assessments that took a broader, coarser look at all of Oregon's forests. The first private-public effort was the Oregon Biodiversity Project, a cooperative effort coordinated by the Defenders of Wildlife and completed in 1998. This was an effort to use statewide habitat data and locations of protected areas to identify the best areas in which to work to protect biodiversity (called Conservation Opportunity Areas). The Gap Analysis Project assessment was started in 1990 in Oregon, first by the U.S. Fish and Wildlife Service and then by the U.S. Geological Survey, and completed by the Oregon Natural Heritage Program in 1999. This program created statewide vegetation, habitat, protected areas, and distribution maps for all Oregon's wildlife species. The objective was to identify which species were poorly represented in the current network of wilderness, parks and other protected areas in order to allow land managers and conservation organizations to be proactive and protect species before they become endangered. Most recently, the Governor of Oregon, John Kitzhaber, asked the Oregon State University President, Paul Risser, to coordinate a State of the Environment Report for Oregon (Oregon State of the Environment Report Science Panel, 2000). This project looked at all aspects of the environment statewide, with several chapters devoted to Oregon's forests and their management.

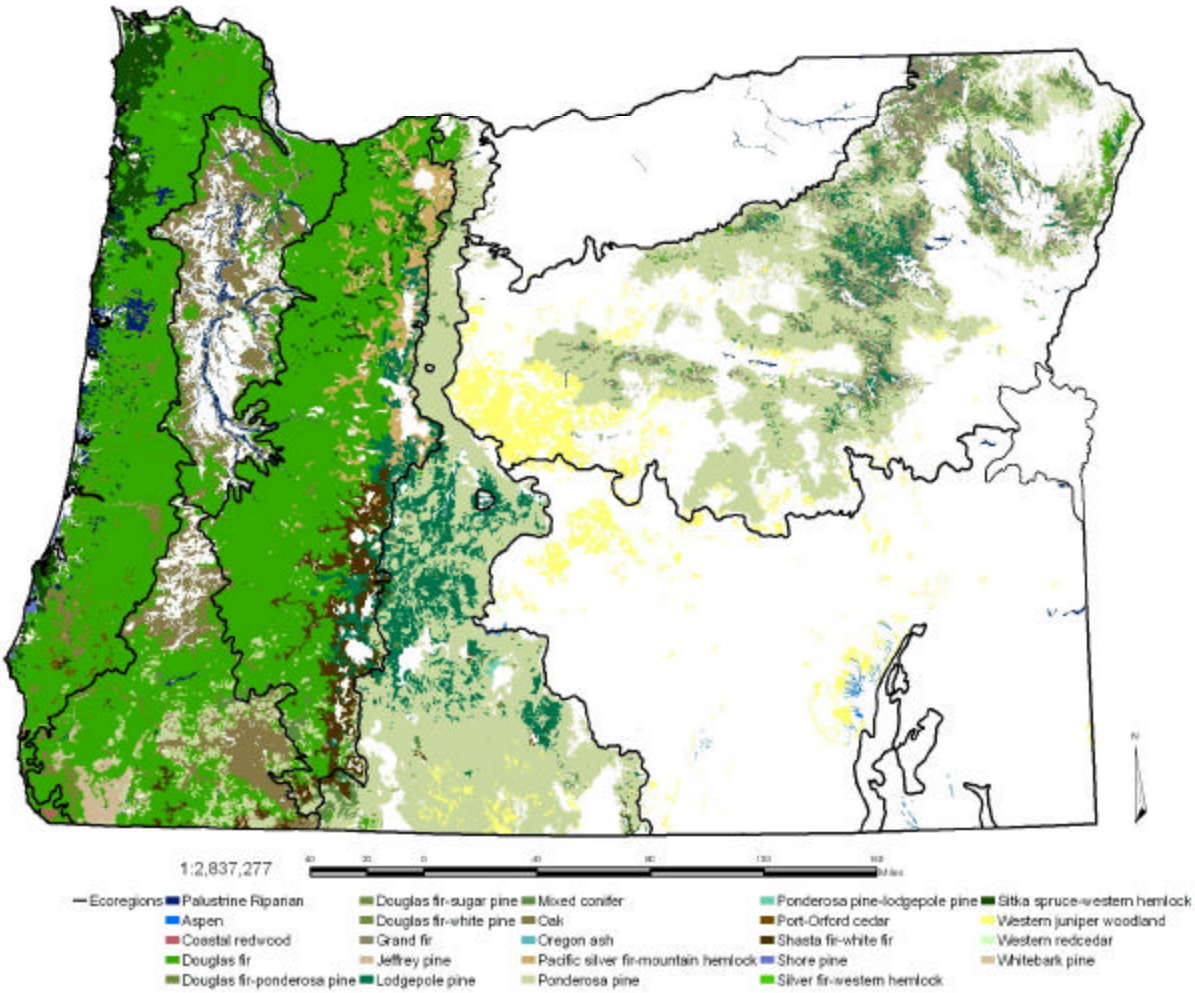

Figure 7. Presettlement forests of Oregon.

The Oregon Natural Heritage Program has developed a vegetation map showing Oregon as it was when the first settlers arrived via the Oregon Trail in the mid-1800s (Figure 7). The information is based on a combination of data. The forest information in this cover includes a forest vegetation map of Oregon and Washington developed by H.J. Andrews with survey data from the 1930s, as well as 1:24,000 vegetation maps based on the General Land Office (GLO) 1850s surveyor's notes. The data included in this AON is the second edition, which is more complete for forests and rangelands, although is still lacking details for the Rogue Valley, the Wallowa Valley, the Grand Ronde Valley, and the Silvies Valley. This data allows the evaluation of how much each of the forest types have declined over the last 150 years, and where the greatest forest losses have occurred.

Currently, there are only two statewide maps of Oregon's vegetation, both developed by the USGS Gap Analysis Project (GAP). Both GAP vegetation maps relied on satellite data. The first was completed in 1992 using data from 1988-1991, and was hand digitized from 1:250,000 hard-copy satellite photographs. The second was completed in 1998 using 1991-1993 images, and was done at 1:100,000 using image-processing tools. For this AON, we have used the 1998 GAP map for the statewide and ecoregional analysis. Figure 8 shows the

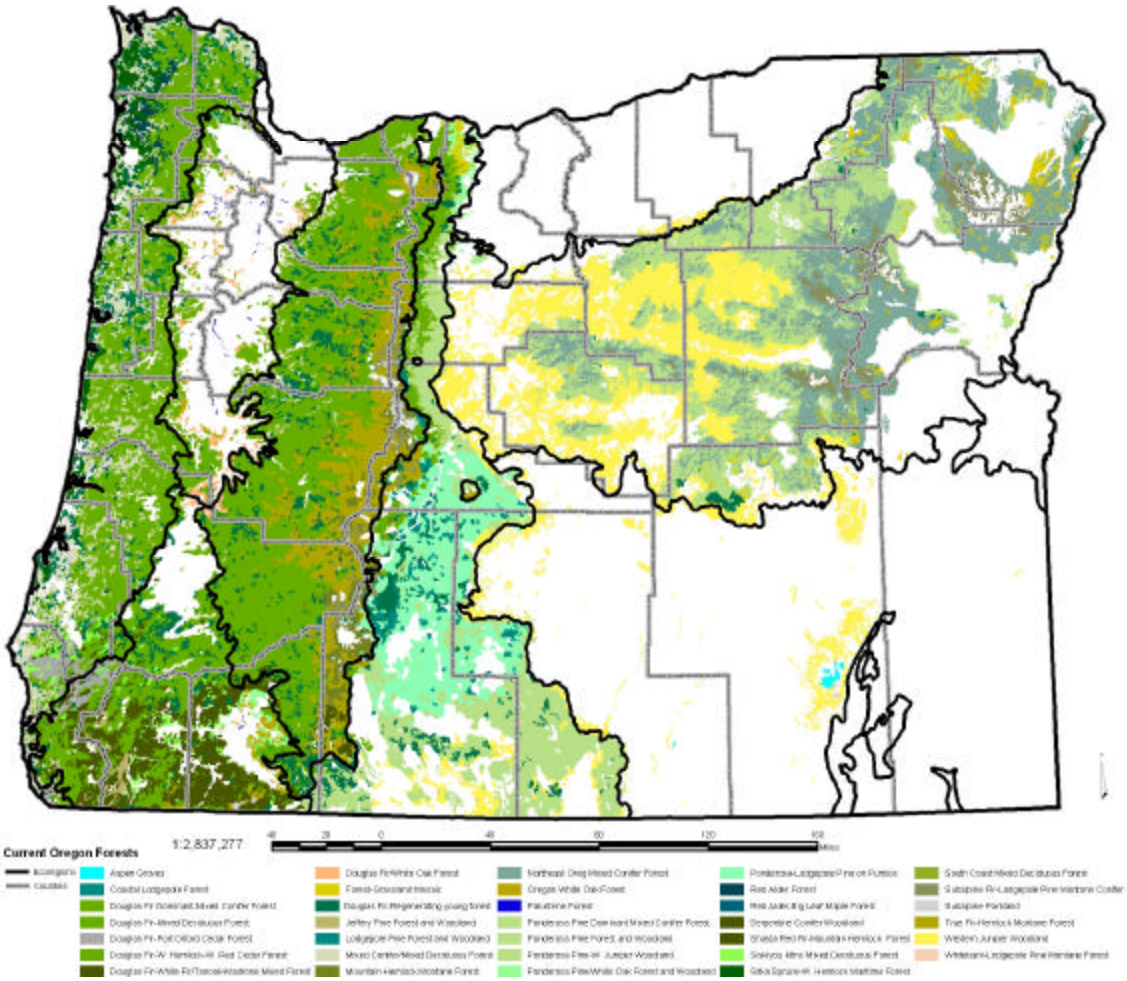

Figure 8. Existing forest vegetation from the Oregon Gap Analysis Project.

distribution of Oregon's forest types in this cover. However, for the Willamette Valley assessment, we were able to use higher resolution (1:24,000) developed by the USDA Forest Sciences Lab at Oregon State University and the Oregon Natural Heritage Program for existing forest vegetation, and compare it to 1:24,000 presettlement vegetation maps developed with GLO data.

To determine how and where forests have been lost, we compared the historical forest vegetation map with maps showing the current distribution of Oregon's forests. The overlay of these two coverages is shown below, as Figure 9. It shows both the historical increases and losses of forests throughout the state. The decreases are from forests being converted to agriculture, urban, residential or industrial uses. Increases shown here are almost entirely a result of the expansion of western juniper into sagebrush and bunchgrass habitats of eastern Oregon, which has been the subject of a number of research papers (Miller and Rose, 1995).

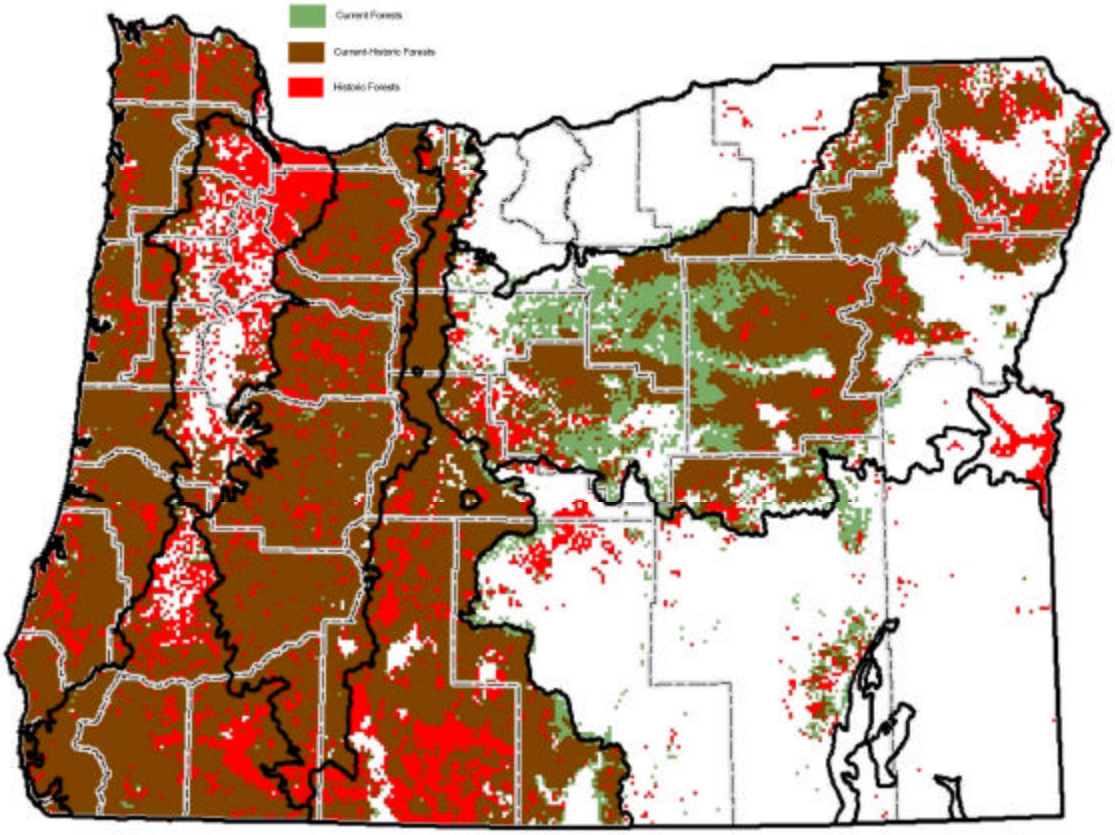

Figure 9. Comparison of presettlement and existing forests in Oregon. (Red are forests lost, brown is no change, and green are areas forests have expanded to).

The National Vegetation Classification System includes over 450 forest, woodland and savanna types described from Oregon. Most of the Oregon forests habitats (or plant associations) have been described by the USDA Forest Service's Area Ecology program. The Forest Service has a number of ongoing efforts to map all of Oregon's forests at fine scales to these plant associations, or to groups of these, called plant association groups. It is important to realize that for the discussion and analysis of forest habitats in this Assessment

of Need, only the very broad habitat types are discussed. Each of the types listed below actually represents many different plant associations and environments.

One clear result of the statewide and regional assessments was the identification of some forest types that have declined significantly since the earliest settlers arrived at the end of the Oregon Trail. Some of these types are well represented in the current network of protected lands. Others are not well protected, and continue to decline. These forest types have been identified as high priority for receiving some type of protection in the Oregon Natural Heritage Plan (State Land Board 1998). These include a number of forested habitats that are both environmentally sensitive and in great need of protection. Of these, three types are primarily found on private lands, and are often those converted to urban, rural residential or agricultural uses.

- Oak forests, woodlands and savannas
  When the earliest settlers arrived, Oregon white oak flourished in the Willamette Valley as well as much of southwest Oregon. These venerable oaks support an abundance of birds and wildlife, are especially important for migrating songbirds, and have the highest potential for commercial use in cooperage, wood flooring and furniture. Oak savannas ? grasslands with scattered trees ? were historically maintained through the American Indian practice of burning. Since settlement, suppression efforts have excluded fire's role in maintaining these savannas, allowing increased stocking and succession of other forest types like Douglas-fir. In addition, the extensive oak savannas, woodlands and mixed oak-conifer woodlands have given way to most of Oregon's cities and towns. Currently, these oak forest types are disappearing faster than any of Oregon's other forest types. For this AON, all forests and woodlands with Oregon white oak, California black oak, canyon live oak, and madrone were included in this category, along with the conifers that often occur with them.

- Cottonwood, alder, ash, and willow riparian bottomland forests
  The Willamette River, the Grand Ronde River, the Rogue River, the Umpqua River and many other river valleys are characterized by large, cottonwood gallery riparian forests (dense, unbroken stands of trees). The rich soils of these bottomlands support giant confers including Douglas-fir, grand fir, western red cedar, and western hemlock, growing with black cottonwood and other deciduous trees, particularly Oregon ash and red and white alder. Found along the multi-channeled large rivers, these forests provide some of the most critical habitats for both fish and wildlife, including woodpeckers, owls, wood ducks, flying squirrels, raccoons, beavers, and song birds. They also are highly prized for their agricultural soils and their river views, and continue to be developed. Fortunately, the Oregon Plan for Salmon and Watersheds has focused on the protection and restoration of many of these forests.

- Ponderosa pine foothill woodlands and forests
  Now associated mainly with eastern Oregon, ponderosa pine woodlands were formerly found throughout western Oregon valleys as well. In southwestern Oregon they include mixed pine forests with sugar pine, incense cedar, Douglas-fir and oaks. Ponderosa pine forests are still abundant in the mountains of eastern and southwestern Oregon, but have dramatically declined in western valleys and along the foothills of the Cascades. They continue to be threatened by development, mostly for suburban and rural residential housing.

D. Demographic trends as they relate to conversion of forest areas

As of 1994, 90 percent of the private land in western Oregon remained in forest and agricultural uses. However, between 1973 and 1994, there were significant shifts in dominant land uses toward more developed categories: low-density residential and urban uses increased while forest and agricultural uses declined (Azuma *et al.* 1999). Figure 10 shows the distribution of those forest habitats that were lost to agricultural and residential development during this time period. Although the amount and uses of western Oregon's private forests remained relatively stable in the 1980s and early 1990s, it is clear that development of these forest lands would seriously reduce future economic and ecological benefits produced from these lands (Azuma *et al.* 1999).

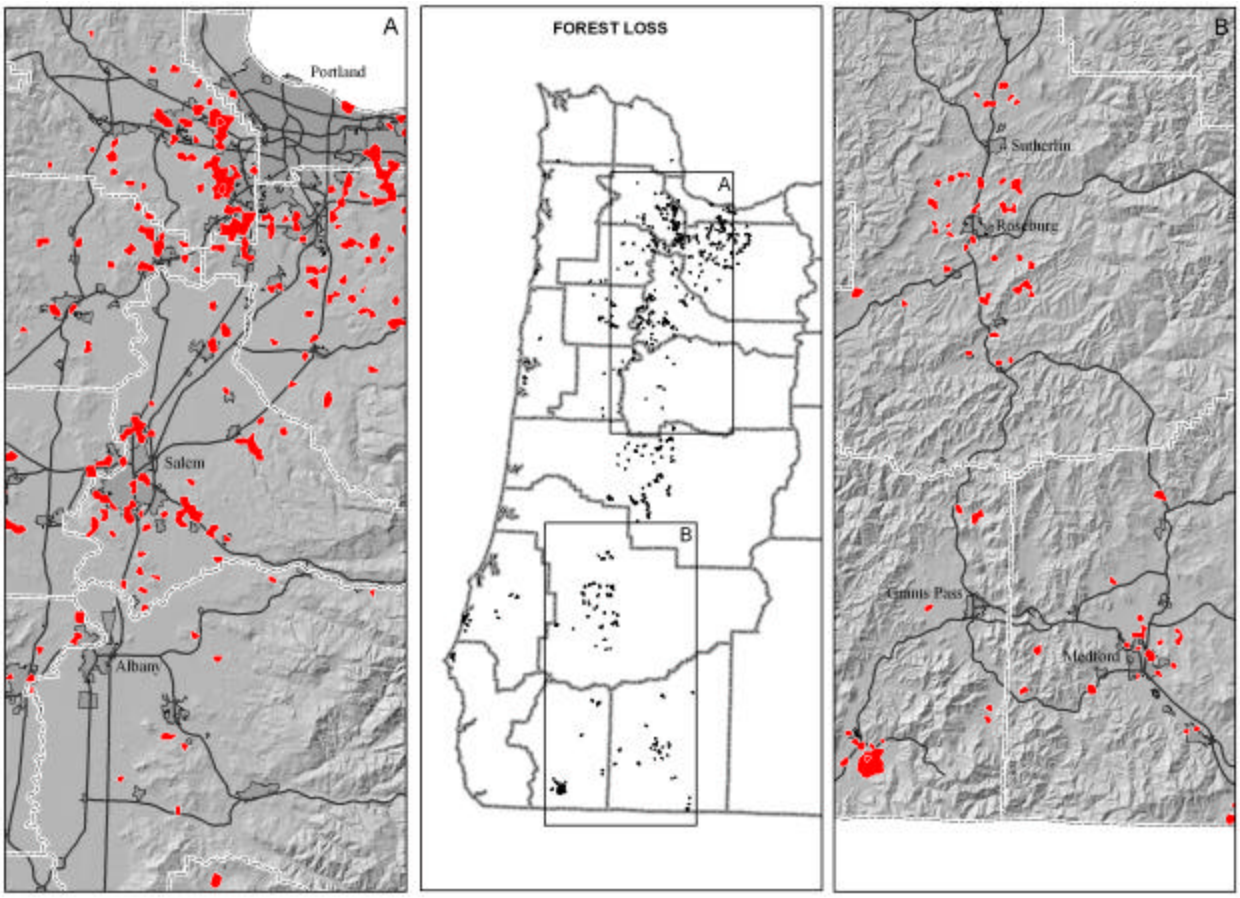

Figure 10. Western Oregon forest conversions 1974-1994. (Rural land lost to conversion in red.)

Oregon's population grew rapidly during the late 1980s and throughout the 1990s (Figure 11). Between 1990 and 1999, the state's population grew from 2,842,321 people to an estimated 3,300,000. This represents a 1.8 percent annual growth rate, almost double the national growth rate. Seventy percent of this growth came from people moving into the state. Many people who value the quality of life afforded by smaller cities, clean air and water, outdoor activities, and open spaces moved to Oregon.

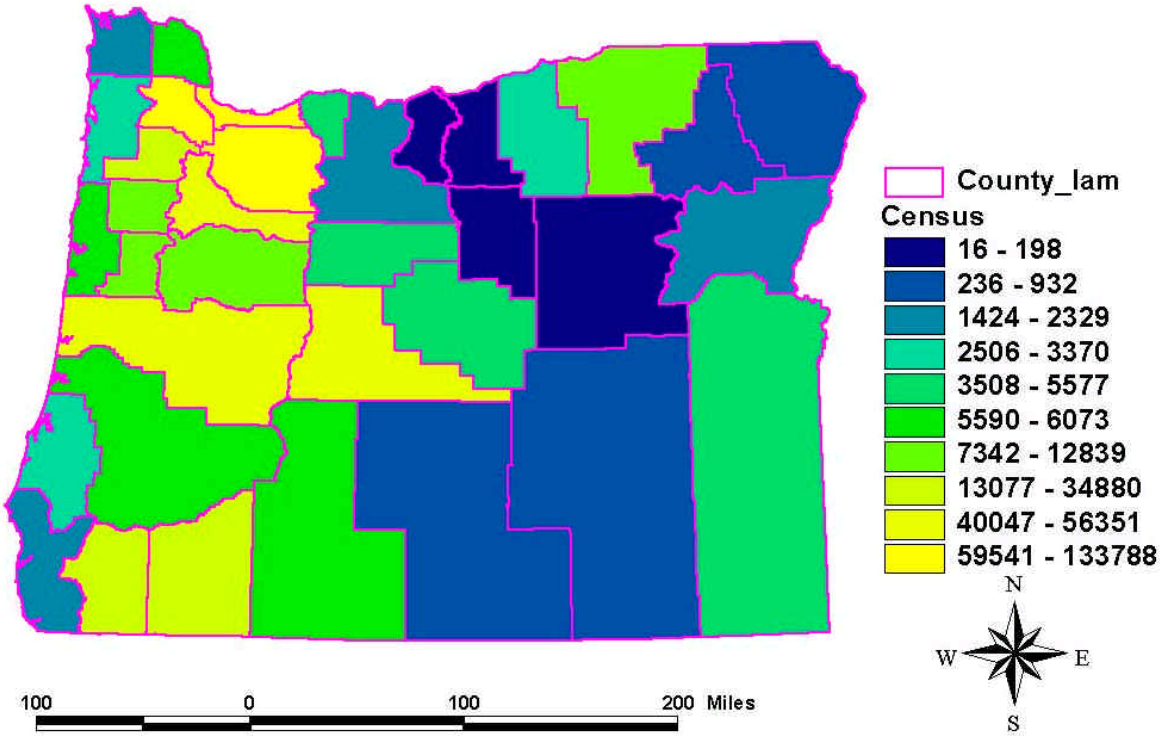

Figure 11. Population change by county, 1990-2000.

Oregon's population is expected to continue to grow rapidly, especially in the Willamette Valley, where the population is expected to double in the next 25 years. Population has been increasing in western Oregon's private forests as well (Azuma *et al*. 1999). With continued economic and population growth, private landowners will face growing pressure to develop their properties.

Oregon State University and U.S. Forest Service Forest Science researchers have developed a map showing how population growth and urban expansion will impact forests in the near future for western Oregon (Figure 12). This map shows urbanization in 1995 and predicts the urbanization of western Oregon in 2005, and 2015, identifying where rural areas are expected to be lost to development. It is these same areas where predicted future losses of forests to development are expected to occur.

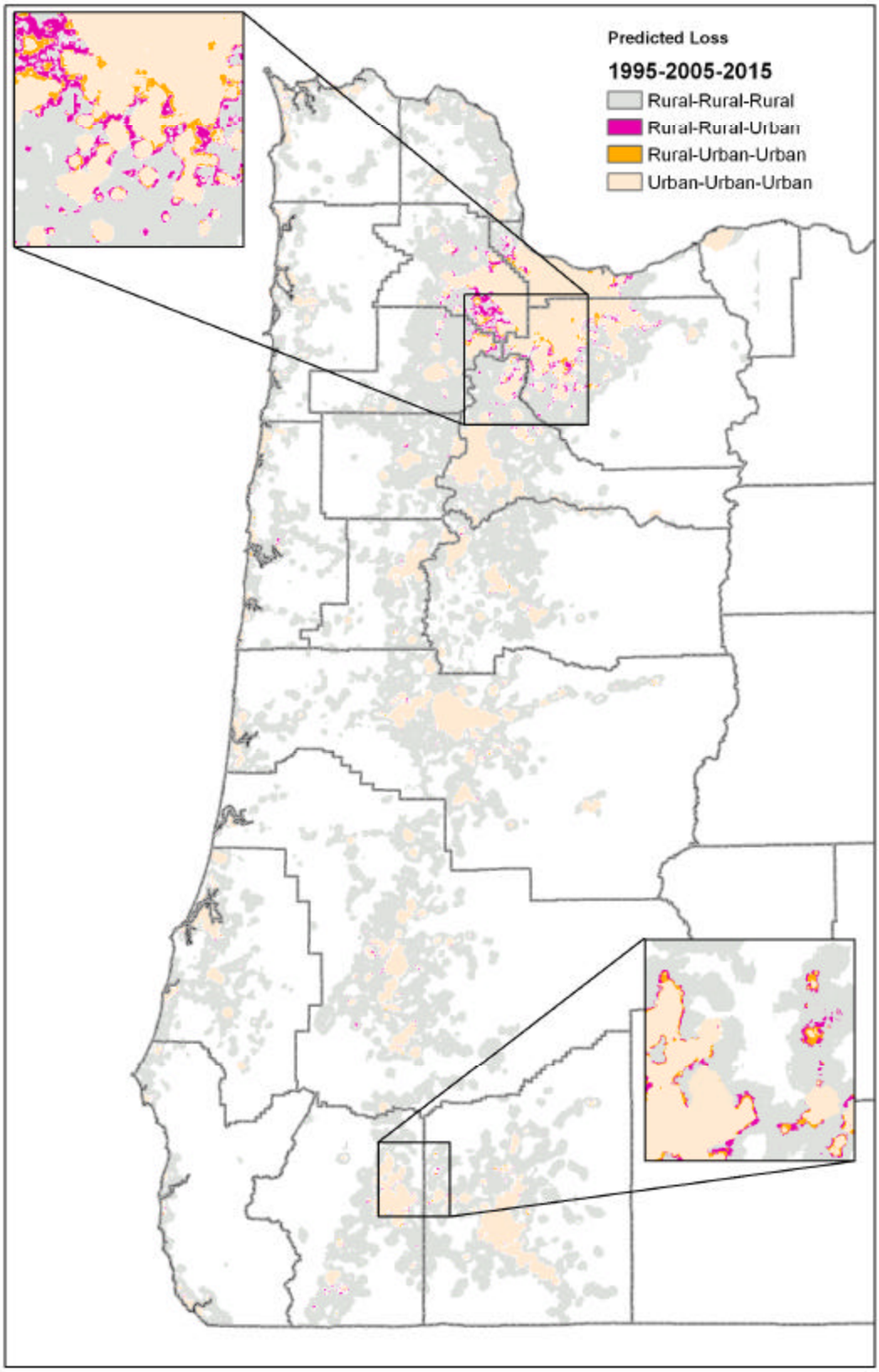

Figure 12. Western Oregon predicted development impacts to rural areas.