PRIME FORESTLAND OR URBAN DEVELOPMENT

MUST WE CHOOSE?

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Abstract

The US Department of Agriculture has assigned responsibility to the Natural Resources Conservation Service to monitor and report on the condition and trends of non-federal lands and waters of the United States and its possessions and territories. This monitoring effort is designed to provide scientifically credible natural resource information to Congress and the Executive branch of government as well as the citizens of the country. This information provides insight so that long term food and fiber supplies can be conserved for future generations.

This paper addresses the concern of recent rapid urbanization in Washington State. Urbanization is directly related to the sharp decline of available forestland to produce timber and fiber products. Washington's forestland is being converted to other uses at a rate that exceeds the rate of conversion in the Pacific Northwest region and the nation as a whole. Between 1992 and 1997 Washington converted an average of 44,000 acres per year of rural resource lands to urban and rural transportation uses. Approximately 21,000 of these acres are conversions from forestland.

Prime Forestland or Urban Land – Must We Choose?

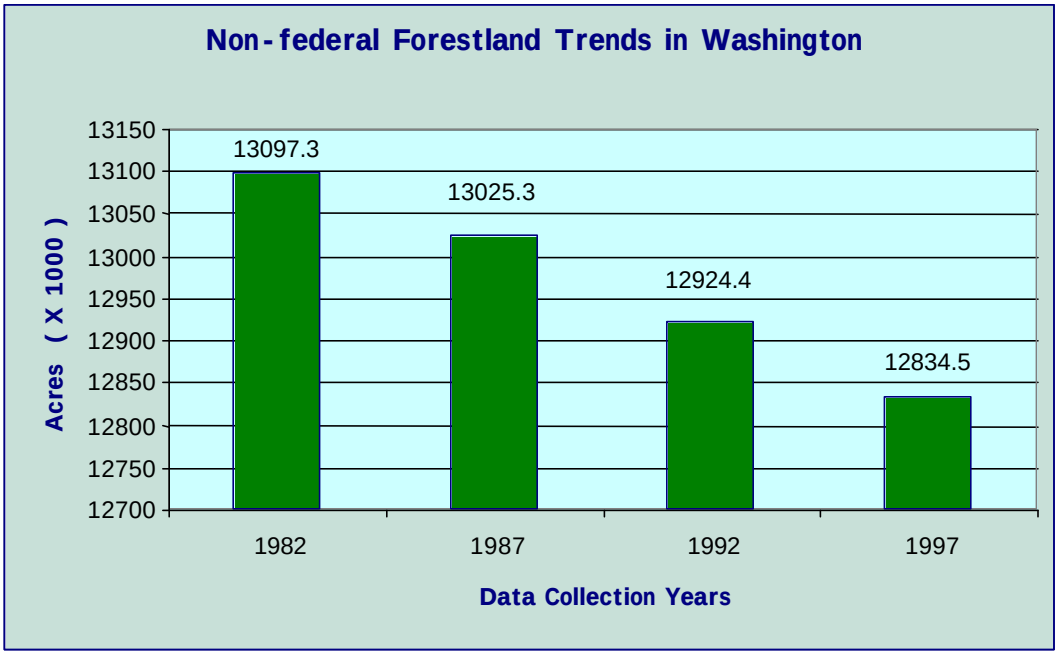
What started out as a rather routine task to estimate the acres of the various uses of land in Washington State through a statistical sampling process has turned into a large database from which powerful natural resource trending information is derived. A longitudinal survey called the National Resources Inventory (NRI) collects natural resource information based on field sampling and remote sensing. Point and area data collection protocols are used in conjunction with sophisticated analysis techniques to develop trend and condition information for natural resources. The NRI has been carried out every five years since 1977. Its current format was adopted in 1982 and the data from 1982, 1987, 1992, and 1997 are the basis for the land use trending information being presented in this paper.

The Natural Resources Conservation Service (NRCS) was assigned the task of monitoring and reporting on the status and trends of non-federal natural resources by the US Department of Agriculture as a result of the Rural Development Act of 1972. This is the companion legislation to the Resources Planning Act which was assigned to the US Forest Service. The NRCS has a long history of conducting surveys and inventories but until 1982 the activities generally focused on single issues such as soil erosion, private recreation facilities, and potential cropland studies. From 1982 to 1997 the NRCS has partnered with the Statistical Laboratory at Iowa State University to collect natural resource information in a standard format. Natural resource information is collected using uniform guidelines within a statistical sampling framework so that the condition and trends of non-federal land and water resources can be monitored and reported as directed by Congress. Beginning in 1997, the NRI program became a continuous yearly process, which seeks to maintain the same long-term trending data as well as a means to investigate current special concern topics for the US Department of Agriculture.

The purpose of this paper is to quantify the changes in land use occurring in Washington State and then relate these changes to some generalized consequences. Specifically, this paper will target the conversion of Washington's private forestland to other uses.

Washington's forestland is being converted to other uses at a rate that exceeds the rate of conversion in the Pacific Northwest region. In the 15-year period, 1982 to 1997, Idaho converted about 1% of its non-federal forestland to non-forest uses and Oregon converted about 1.3% of its non-federal forestland to non-forest uses. In the same period, Washington converted 2.0% of its non-federal forestland to non-forest uses. Nationally, forested acres have increased about 0.9%. As old fields and pastures are planted to pines in the southern United States this national trend may continue. The question is what will the trend for Washington be? The following charts indicate the magnitude of these changes in land use.

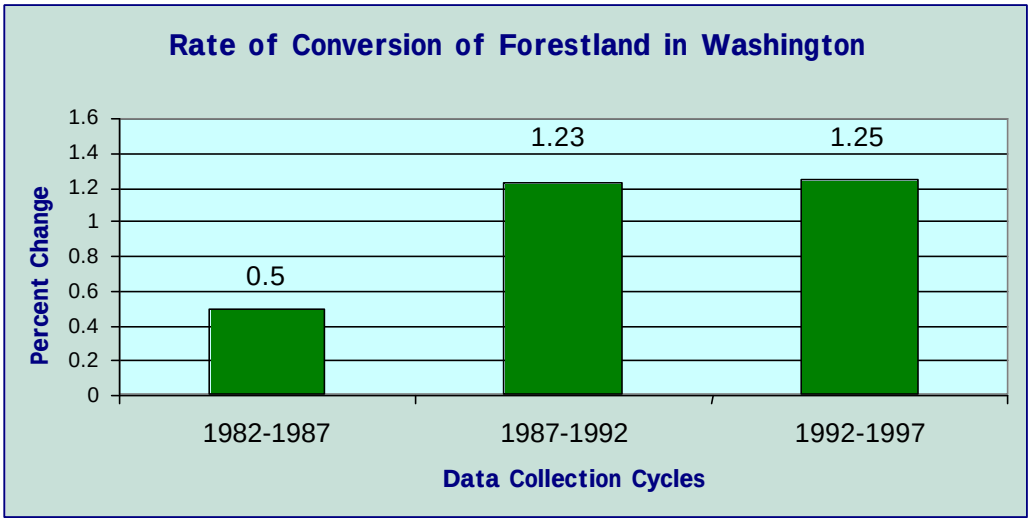
Chart 1 Estimated Non-federal Forestland Trends in Washington



Source: 1997 National Resource Inventory

Chart 1 shows the loss of non-federal forestlands with the decline excellerating in 1987.

Chart 2 Estimated Rate of Conversion of Non-federal Forestland in Washington



Source: 1997 National Resource Inventory

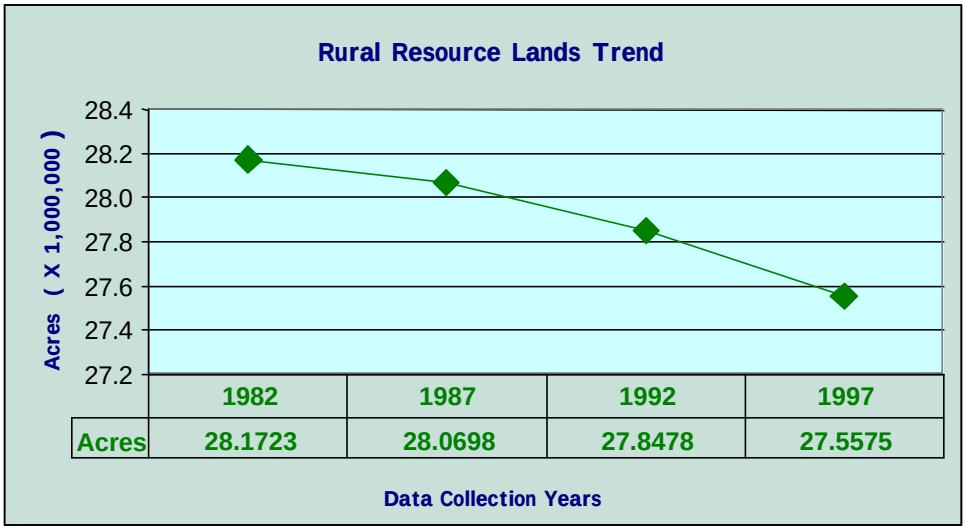
Washington is losing non-federal forestland at an average rate of 17,500 acres (net loss) per year and the rate of land use conversion has increased from 0.50% in 1982 to 1.25% in 1997. This is illustrated in chart 2 above. These are small yearly numbers but this is the same process that has reduced Washington's forestland by 2,000,000 acres since the mid-1930's as reported by the Pacific Northwest Range and Experiment Station. In fact, according to Resource Bulletin 218, "Washington's Public and Private Forests", private industrial forestlands in addition to non-industrial private forestlands are decreasing.

Many segments of our society are concerned about these trends. Individuals and groups are concerned about wildlife habitat, fisheries habitat, open space, space for development, transportation networks, solid waste management, and many other issues related to Washington's land base.

For perspective, the following charts depict the rural land base.

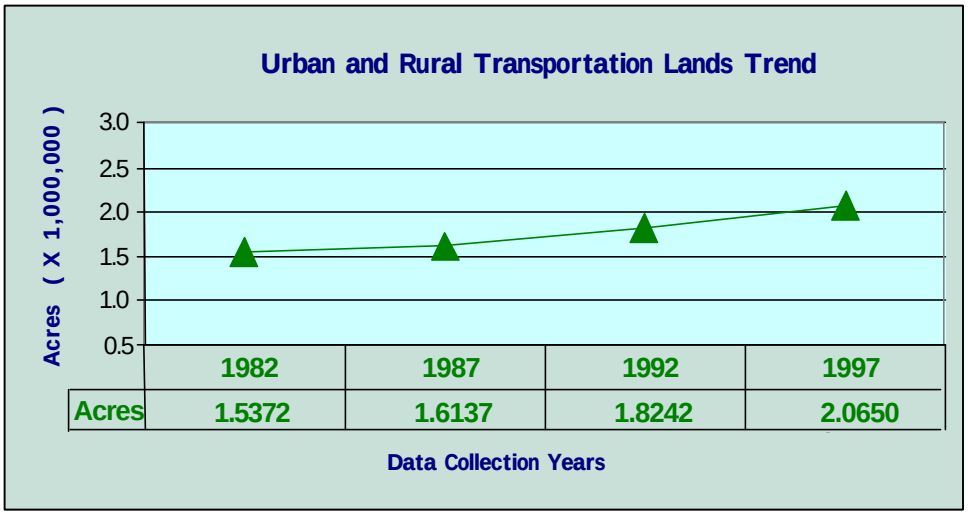
Chart 3a shows that in the 15-year period 1982 to 1997 the total rural resource lands base shrank from 28.1 to 27.5 million acres. These numbers represent the working acres that are the non-federal farms, ranches, and forests of Washington.

Chart 3a Estimated Rural Resource Land Trends



Source: 1997 National Resource Inventory

Chart 3b Estimated Rural Resource Lands Converted to Urban Uses



Source: 1997 National Resource Inventory

Chart 3b demonstrates how urban land and rural transportation networks are on the increase.

This type of urban growth is what you might expect in an area where there is economic vitality and high employment. Washington has been increasing in population faster than our surrounding states especially as new residents come to the Evergreen State. The availability of land and economic good times has helped to fuel these increases in population and subsequent development of rural land.

In the period 1982 to 1992 Washington converted rural resource land to urban land at the average rate of 28,560 acres per year (78 acres/day) and 17,380 acres of this was forestland. Between 1992 and 1997, Washington converted rural land to urban land at the rate of 46,780 acres per year (128 acres/day) and 23,060 acres of this was forestland. In the 1982 to 1992 period 61% of the urban growth was on forestland and in the 1992 to 1997 period 49% of the urban growth was on forestland.

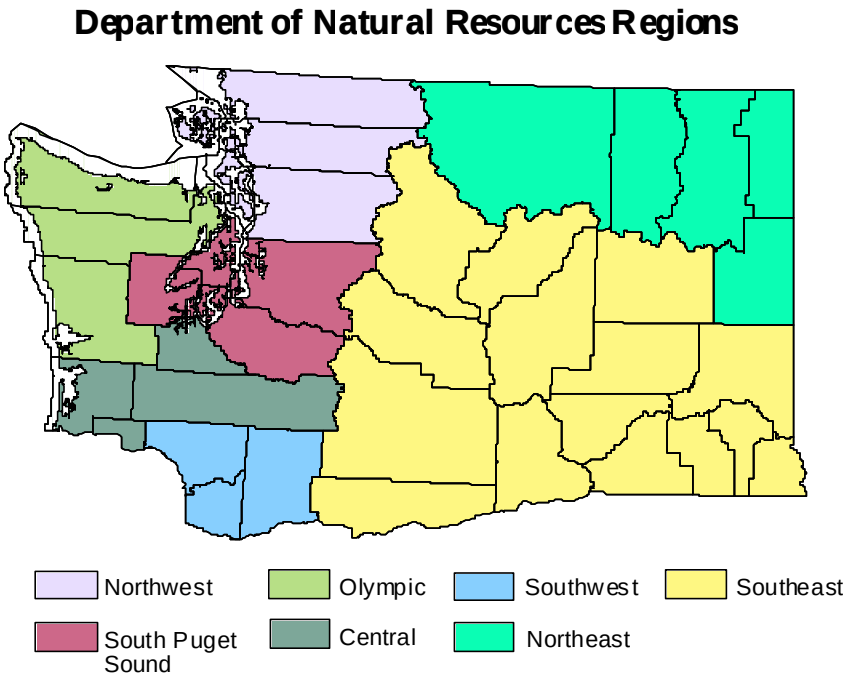
Do we see a trend here?

Why do we see this trend?

There are several forces at work here. Population growth and economic expansion are two of the leading causes. They are certainly the major causes in the Puget Sound area. Population increases have required more regulations regarding zoning, public health issues, floodplain management, endangered species protection and other governmental policies to protect people as well as natural resources. The rules, policies, and laws that have been developed to protect people as well as resources have restricted development but have not differentiated between farmland and forestland.

By looking at a regional approach one can get a better geographic idea of these land use changes. The Washington State Department of Natural Resources Regions are used here (Map 1) to focus on the areas where forestland conversion is occurring.

Map 1 Washington DNR Administrative Regions



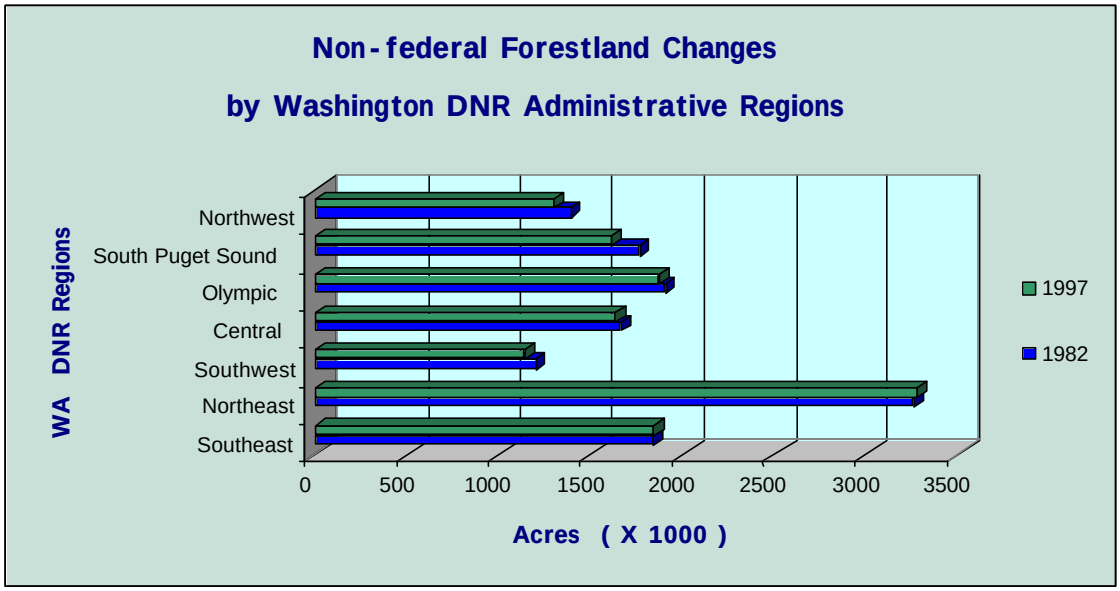
Source: Our Changing Nature

Chart 4, which follows on page 8, indicates that some regions are losing non-federal forestland and some regions are gaining non-federal forestland.

Virtually all of the low elevation forestland in western Washington is among the most productive in the world for softwood products and this is precisely the area where most of the forestland is being lost. Look for example, at the South Puget Sound Region changes in forestland.

The Northeast and Southeast DNR regions actually show gains in non-federal forestland. These two regions produce less timber volume per acre and the raw products are of less value in the marketplace but they are still important for Washington's economy.

Chart 4 Estimated Non-federal Forestland Changes by WA DNR Administrative Regions



Source: 1997 National Resource Inventory

Eastern Washington is gaining forestland for several reasons. Various Federal programs such as the Conservation Reserve Program (CRP) and the Wildlife Habitat Incentives Program (WHIP) encourage the maintenance and planting of trees. The Forestry Incentives Program (FIP) shares the cost of reforestation with landowners and the Service Forestry Program encourages landowners to plant trees on marginal pastureland and cropland.

Efforts by private industry to develop fiber plantations are also leading to increases in non-traditional forestland. A new player in the game is the effort to sequester carbon in trees and soil. Both Pacificorp and Tenaska have entered into agreements with the Upper Columbia Resource Conservation and Development district to have trees planted on about 6,000 acres as a way to sequester carbon. This carbon-offset program can provide funds to landowners to plant and manage trees on a long-term basis. In eastern Washington the first easements were for 80 years. Where landowners are willing to enter into long term agreements to plant and manage trees they can sell

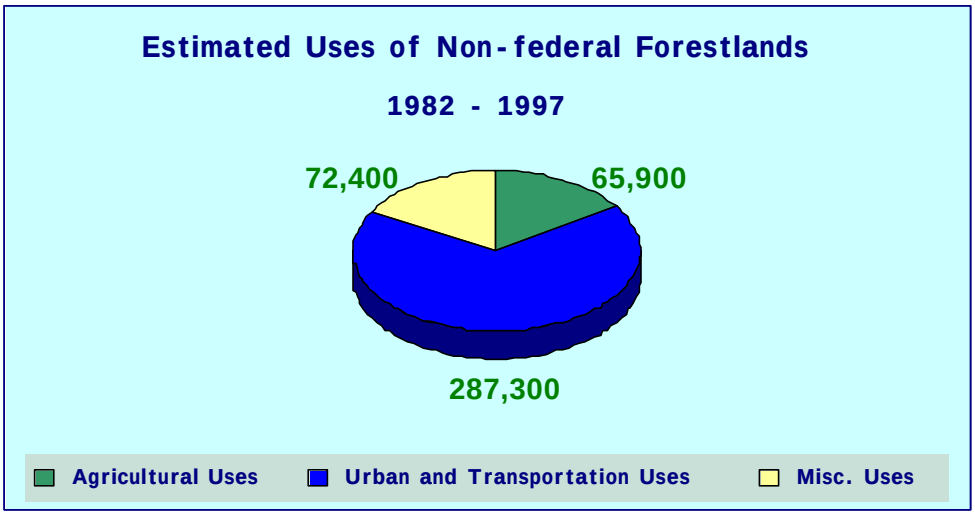
carbon sequestration credits to industry as an offset of carbon emissions. This can generate yearly rental payments as well as pay for the forestation effort. This may be the best answer so far to changing marginal cropland and pastureland to forested land uses. In addition, these programs have the added benefit of slowing mans contribution to global warming which is a concern to many folks. This private, market-based program just might lead to the largest tree planting program ever seen in Washington. Any program that puts cash in the hands of landowners, especially yearly payments, will tend to have a higher rate of success.

With the support of various private sector and federal programs, non-industrial private forestland owners (NIPF) in eastern Washington are currently increasing their forestland holdings. Western Washington NIPF landowners are either taking the opportunity to sell their holdings while prices are high or are being forced out of the forestry business for various reasons. With the exception of the carbon sequestration program, which is guaranteed by easements registered with the title in county records, some of the NIPF tree planting efforts might not be long-term commitments as landowners may change their goals. Therefore, we need to continue land use inventories as well as landowner surveys to monitor landuse changes.

Surveys, as well as inventories, tell us that folks in Washington change their minds and that changes in land use are sometimes the result. How dynamic are these land use changes? Two points in time have been picked to illustrate the results of individual landowner decisions.

As illustrated in Chart 5, between 1982 and 1997, an estimated 65,900 forested acres were converted to agricultural uses. An estimated 287,300 acres were converted to urban and transportation uses such as logging roads, rights-of-way, and transmission lines, etc. An estimated 72,400 acres were converted to the miscellaneous category.

Chart 5 Estimated Uses of Converted Non-federal Forestland

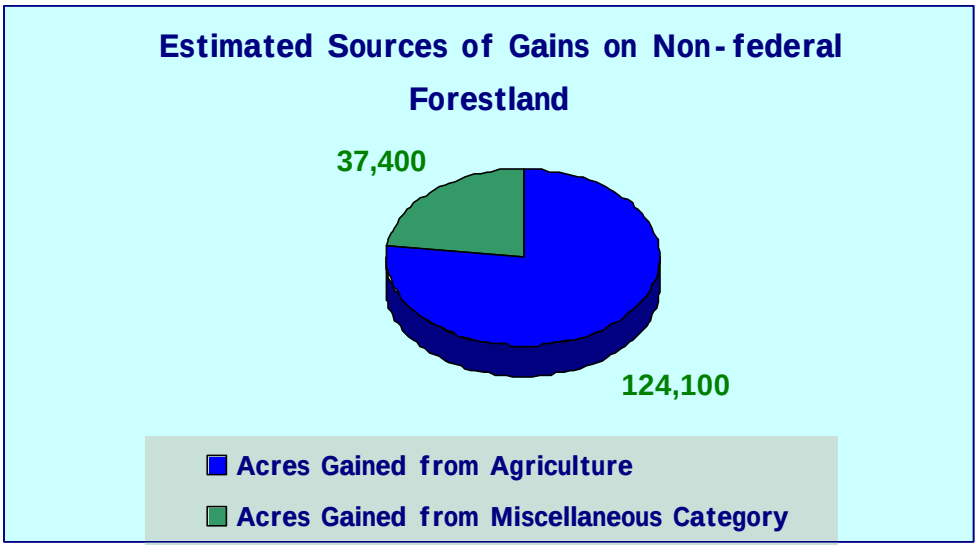


Source: 1997 National Resource Inventory

The forestland converted to agriculture was mostly for the production of forage for livestock. The urban and transportation uses were primarily for residential uses, commercial uses and the supporting infrastructure that goes along with this development. The miscellaneous category includes forested lands sold or traded to the federal government.

Chart 6 represents additions to forestland. An estimated 124,100 acres of land where the production of crops and forage was the primary use in 1982 is now being devoted to the production of commercial timber species. Some of these acres represent low-site cutover lands grazed by livestock that have been reclassified as grazed forestland because grazing has been reduced and forest canopy has increased. Some of these acres represent the conversion of brush fields to commercial species as a result of the Forestry Incentives Program. Certain minor uses including the exchange of land with the federal government has added another 37,400 acres of forestland.

Chart 6 Estimated Sources of Gains of Non-federal Forestland



Source: 1997 National Resource Inventory

The net change is a loss of about 264,100 acres of non-federal forestland. What is the net change in forest productivity? Are the acres that are being converted to forestland highly productive or are they simply the worst acres on a farm or ranch that is reverting to trees? Are the acres being converted to urban uses highly productive timber soils or are they the worst of the lot with operational restrictions?

A change in land use is not the whole story. There are several other parts of the forestry/land use puzzle that must also be addressed. The fragmentation of forestland so that landowners and operators are restricted in their opportunity to plant, tend, and harvest forest products needs to be reviewed. The amount of non-federal forestland that is reserved for uses other than commercial forestry should also be quantified. The timber productivity that has been converted to concrete and blacktop and what remains is another question. The effects of governmental regulations that are implemented to protect the public health or protect wildlife or other natural resources pose a whole set of additional questions and concerns.

The first issue to be addressed is the productivity loss of forestland. The NRI is longitudinal in design; this simply means we inventory the same areas and points in

each inventory cycle across the entire state based on a sample frame. The inventory is designed to monitor changes in land use using both ground sampling and remote sensing protocols and techniques. An example of a protocol would be that for an area where the land cover is trees it would have to meet defined standards so the trees in backyards or parks would not count as forestland, in other words land cover is not the same as land use.

In the NRI collection process the geographic coordinates of each of the inventory areas and inventory points are determined. Each non-federal forest soil has a productivity value associated with it. The soil map unit is determined from digital files, which in turn determines the general productivity at each inventory point. The productivity value is based on the yardstick of site index curves developed by James King, of Weyerhauser, Pat Cochran, of the US Forest Service and others depending on the species and is quantified in terms of cubic feet per acre per year of growth.

Table 1 Development by Productivity Class

Productivity Classes

Class	Cubic Foot Range *1	Midpoint *2	Site Index
I	186 - 250	218	126+
II	167 - 184	175	116-125
III	128 - 163	145	96-115
IV	90 - 125	107	75-95
V	30 - 88	60	< 75

*1 Productivity expressed in terms of cubic feet at the point where mean annual increment culminates

*2 Site index was used to identify the productivity class and then assigned each inventory point the midpoint of the cubic foot range to make productivity estimates.

Source: Culmination of Mean Annual Increment for Indicator Species in the State of Washington

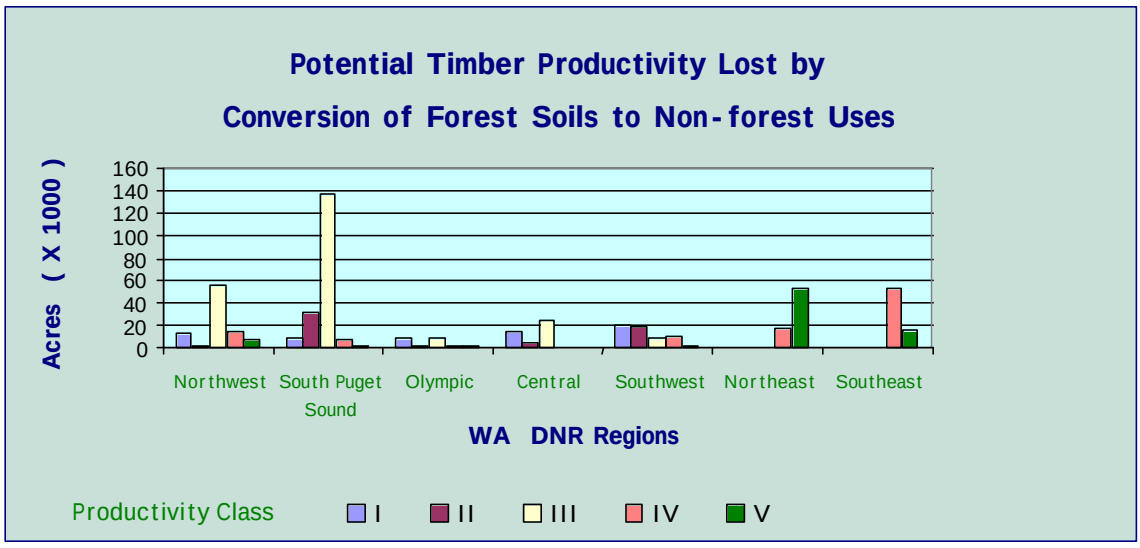
A tally of the number of inventory points converted from forestland to other uses such as urban can be assigned a forest productivity value. These assignments are based on

soil productivity at the inventory point. Each soil at each point is identified and statistical models are used to determine estimates of lost forest productivity.

Table 1 above simplifies the productivity estimates to some extent by determining which site class the site index falls into and then assigning each inventory point to the middle of the site class represented by that site index. The term productivity class relates the productivity of the major tree species to a single, simple, productivity class.

The majority of the correlation of tree species productivity to soils is based on the work carried out by the Washington Department of Natural Resources and the Natural Resources Conservation Service (formerly the Soil Conservation Service) for the Washington Department of Revenue for forest taxation purposes. Most of this work was done in the 1975 to 1980 period. Yield tables developed by Charles Chambers, Washington DNR, were used with the site index curves developed by James King to find CMAI for each Douglas-fir site index. The recommended site index curves and yield tables were used for all other species based on US Forest Service publications or in the case of western hemlock, Philip Wylie of Weyerhaeuser.

Chart 8 Potential Forest Productivity Lost by Conversion of Forest Soils to Non Forest Uses by DNR Administrative Region



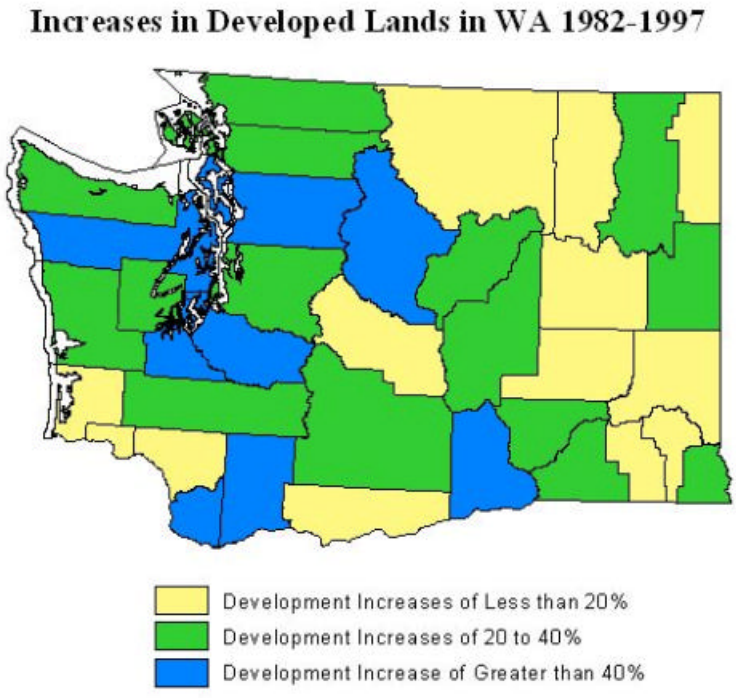
Source: 1997 National Resource Inventory

As illustrated above in Chart 8, in the South Puget Sound Region over 130,000 acres of forest soils in productivity class III have been converted from timber production.

The striking thing is that we are developing our most productive forestlands not those forestlands that are less productive. Most of the forestland in western Washington could be described as a high site class III for Douglas fir, so almost any acre removed from timber production represents a substantial loss in potential timber productivity.

Map 2 below illustrates the rate of developed lands in Washington. Most of the counties that have the majority of the urban development activities also have very productive forestland. Economic vitality, good job markets, high wages, and other pressures are pushing urban development onto forestland. Rapid land use conversion rates are occurring around small cities and towns in Washington as well as in the larger urban complexes.

Map 2 Increases in Developed Lands in Washington 1982 – 1997



Source: Our Changing Nature and the 1997 National Resources Inventory

In the case of forestland, there is a situation where the remaining forestlands are somewhat less productive, may have greater operability concerns, and certainly have transportation issues. A similar problem exists with cropland where the level, most fertile and well-watered fields are being turned into housing developments at an ever increasing rate.

Our Changing Nature by the Washington DNR contains the following statements. With a forecasted doubling of population in the next 45 years people will need places to live, play, and work. "They'll need fresh air, clean water, and places to find solitude and natural beauty." It is not meant that Washington does not need lands to produce products for society. It is simply that other attributes of land are needed as well. The land will have to be squeezed pretty hard to produce what society wants and needs. This has been made evident over and over as various interests compete for both non-game and huntable wildlife, wilderness, timber, grazing, snowmobile trails, skiing, mineral products, etc from federal and private lands.

Hope is that the citizens of Washington are addressing these issues soon enough. The people of Washington are the ones challenged to plan for all of this. We are the ones that must look back at what has been done and make the decisions today that will lead to healthy natural systems that will support us all. The practice of forestry has been an integral part of Washington's history and will continue to be for the foreseeable future but the land base must be available. Recent inventories indicate that maintaining the viability of private non-industrial forestry is becoming a problem, is industrial forestry headed the same direction? If the practice of forestry declines here, we must ask, if not in Washington, where we have many competitive advantages, fertile soils, adequate rainfall, and well adapted species, where can the practice of forestry on private lands be viable?

The Washington DNR's thought provoking and fact filled publication, Our Changing Nature, focuses on natural resource trends in Washington and the challenges for the future.

This publication described three factors that significantly threaten our natural resources.

1. The number and location of people living in our state,
2. The amount of resources we consume, and
3. The waste we produce.

Rural resource lands, including forestlands, are under siege. Highest and best use as determined by short-term economics just might turn out to be economic disaster in the long run. We hope this paper will be part of the solution as we take another look at stewardship and the wise use of Washington's natural resources.

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