## Study 4: Forest Land Conversion in Washington State

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## Introduction

Expanding exurban populations are placing increased development pressures on Washington's working forests and are changing these forested landscapes into non-forestry uses. Much of this change is from privately-owned forests converting into residential and commercial development, resulting in significant implications for Washington state, such as the potential decline in a readily available and sustainable timber supply for the forest products industry; a decrease in the quality and quantity of forests available for wildlife habitat, clean water production and storage, carbon sequestration and decreased recreation opportunities. The conversion of these forested areas also constrains much of the social, biological, and economic functions of the remaining forested areas.

As Washington's population continues to grow and place development pressures on its forestlands, it is becoming more important to fully understand where conversion from forestland to residential and commercial uses is occurring, what factors are associated with the conversion, and how the rate of conversion might be slowed through innovative landowner and institutional programs.

## Project Overview and Major Issues

In 2005, the Washington State Legislature appropriated funding for the preparation of a comprehensive report on the future of the state's forests. Based on the potential threat of forest land conversion to the future of the forestry industry and forest lands in Washington, the legislature specifically requested that a portion of the report address the trends and dynamics that commercial and residential development play in conversion of the state's forests to non-forestry uses.

The land conversion study provides insight into the factors which are related to forest land being converted to residential or commercial development and some factors and programs which could help to maintain working forest lands throughout Washington State.

This study intends to:

- Describe factors associated with forest land conversion;
- Identify various estimates of forest land conversion statewide;
- Describe forest land conversion patterns;
- Identify innovative approaches for valuing non-market forest outputs;
- Identify incentives and disincentives that alter the maintenance of working forests in areas susceptible to land conversion; and,
- Identify programs that could minimize conversion of forest lands.

The objectives of this project were two-fold: to respond to the state legislature's request for an assessment of forest land conversion in Washington state and to design a collaborative project, tapping into existing resources and knowledge bases as much as possible.

This study found that there are no data sets currently available that can accurately measure forest land conversion at a statewide or regional level in Washington. As a consequence, this report does not contain concrete numbers associated with forest land conversion, including current forest land baseline estimates, but rather presents examples of methods that could be expanded to more appropriately use the currently available data and help to frame a discussion for developing new data sources.

This report provides the reader with an overview of the patterns and factors associated with forest land conversion and current and potential programs to retain working forest land in Washington. While shedding light on the complex nature of measuring forest land conversion, this report also suggest a framework to help shape future work related to forest land uses and conversion,and the maintenance of working forest lands in Washington.

## Project Participants

This study was a collaborative effort in both the technical and review stages among the University of Washington's College of Forest Resources (UW CFR), land use planning experts, and land conservation groups. Land conservation groups and a local GIS consulting group allowed use of their data sources and technical expertise to analyze ownership patterns and other conversion influences in areas where forest land has changed to other non-forest uses.

Faculty and staff at the UW CFR shared the responsibilities of defining project goals and convening the appropriate groups to provide feedback and/or participate more directly in the research or analysis. The spatial analysis portion was performed collaboratively by geospatial staff at CFR and a sub-contracted GIS consulting group, CommEn Space (The Community and Environment Spatial Analysis Center). This group historically provided much of the spatially-related analysis of forest lands, commercial and residential development, and other resource land-related issues to many of the conservation groups in the area. Therefore, there was ample opportunity to take advantage of the wealth of already created information and to ensure that there was not a duplication of efforts.

Much of the background work on land conversion issues presented in this report was researched by a graduate student who came to CFR with much experience in the area of resource land use and conversion pressures. Additional staff members at CFR provided the background knowledge and research associated with current inventive programs and the feasibility of non-market valuation of forest land.

The Cascade Agenda Forestry Work Group activities, led by Cascade Land Conservancy (CLC), prepared the recommendations for item (g) of the legislative proviso. The objective of the Cascade Agenda Forestry Working Group was to develop consensus and recommendations on policies and programs to assist landowners and communities in developing and implementing innovative approaches to retaining traditional forestry and accommodating new uses that strengthen both economic and natural benefits of forest lands. These stakeholders included large and small forest landowners, community representatives, agency staff, tribes, and environmental advocates. The following people served on either one or both of the work groups during the duration of this project:

- Charley Bingham Co-Chair, Former Weyerhaeuser executive
- David Thorud Co-Chair, Dean Emeritus, College of Forest Resources, University of Washington
- Bill Pope, Owner Mazama Country Inn
- Bonnie Bunning, WA Department of Natural Resources
- Brian Boyle, Northwest Environmental Forum, College of Forest Resources, University of Washington
- Charlie Raines, Sierra Club
- Cindy Mitchell, Washington Forest Protection Association
- Clay Sprague, Washington Department of Natural Resources
- Colin Moseley, Green Diamond Resource Company
- Court Stanley, Port Blakely Timber
- Dennis Dart, International Forestry Consultants
- Heath Packard, Washington Audubon
- John Davis, Hancock Timber Resources
- John Ehrenreich, Washington Forest Protection Association
- Josh Weiss, Washington Forest Protection Association
- Ken Miller, Washington Farm Forestry Association
- Nina Carter, Washington Audubon
- Steve Sundquist, Cascade Agenda Executive Volunteer

The College of Forest Resources provided early results to the work group and utilized the members as an advisory resource for recommendations on details of study activities. For the purposes of this project, the Forestry Work group focused its initial discussions on the Cascade Foothills region in King, Pierce, and Snohomish counties.

The land conversion study's technical advisory group convened twice throughout the project and provided additional feedback to the overall study goals and objectives. Membership was determined based on expertise and experience with timberland ownership, Washington zoning and land use planning, land use change analysis, forest land development, and forest-related data stewardship. The following people served on the technical review board:

- Jim Nyberg, Real estate consultant
- Stephen Harmon, Washington DNR, Forest Practices Division, Data Steward
- Steve Gibbs, DNR, Resource Protection Division, Forest Stewardship Program Manager
- Tim Trohimovich, Planning Director, Futurewise
- Stefan Coe, Urban Planning, UW, Research Associate
- Miles Logsdon, School of Oceanography, UW, Assistant Professor
- Matt Stevenson, CommEn Space

Finally, the 150 participants of the Northwest Environmental Forum provided feedback to the researchers in the Forums of November 2005, September 2006, and November 2006.

## Methodology

### Data and Information Used

There is a wealth of both research and personal knowledge related to the changing nature of forest land in Washington and throughout the United States. Land use planners, forest land managers, investment companies, conservation groups, government agencies, just to name a few, all hold expertise, facts, figures, and assumptions about why, where, and how forest land is changing from working forest lands to residential and commercial lands and other non-working forest lands. One of the goals of this project was to provide a cohesive review and summary of the already existing literature and data sources for the Washington State Legislature and other interested parties in Washington.

To begin, a review of published literature (journal articles, books, conference proceedings, and more) related to forest land conversion was undertaken. To complement this information, non-structured interviews with local land managers (forest land, conservation districts, and more) and work from the previously instigated "Cascade Dialogues" by the Cascade Land Conservancy helped identify the potential factors related to forest land conversion in Washington state.

Another goal of the project was to identify areas in Washington state where land has converted from working forest to non-forestry uses. At the start of the project, it was assumed that there would be sufficient data to analyze, between the National Land Cover Database, the U.S. Forest Services' Forest Inventory Analysis (FIA) program, and a land use layer of western Washington. Unfortunately, as with many new research methods, none of these data sets were deemed appropriate or provided enough detail to accurately assess and compare forest land use and conversion rates over time, currently, or in the future.

This lack of data availability was a major hurdle of the research. The FIA program produces a vast amount of plot-based data for the entire United States, providing much valuable information about current forest and timberland statistics, comparable back to the early 1900s. Unfortunately, the relatively infrequent updates of these data and changing definitions and methodologies make current estimates inaccurate and difficult to compare across time periods. While plot-based sampling may be appropriate for homogeneous areas of land uses and ownership types, it may not always be appropriate when trying to assess the rate of parcelization and fragmentation of working forest lands to residential and commercial uses in heterogeneous landscapes typical of land conversion patterns. The FIA data, however, track general ownership patterns and—although the actual acreages may be less than perfect—the trends are useful in showing the changing nature of forest land ownership in Washington.

A second data set that was originally assumed could be used for the project was the National Land Cover Database (NLCD), a seamless nation-wide data set of different vegetation types produced by the United States Geologic Survey (USGS). The first version of the NLCD was produced for 1992 and is a valuable data layer for quantifying land cover throughout the United States. The data set, however, distinguishes neither land use (e.g., working forest land) nor ownership. It could be possible to use ancillary data to determine land cover by ownership, although that level of analysis was outside the scope of this project. At the start of this project, the second release of the NLCD was still in progress and it was assumed that the land cover categories would be comparable between the two time periods, allowing for at the very least a statewide assessment of forest cover change; combined with parcel information, these data could be a first-guess at actual rates of working forest land conversion. However, due to methodological changes and improvements, it is not possible to compare the 1992 and 2001 data sets. The USGS is currently in the process of producing a change data set, but its completion is still multiple years from now for Washington state.

The third data set that was originally going to be analyzed in conjunction with the FIA and NLCD data was a seamless spatial-data based land use data set for western Washington, produced by the Rural Technology Initiative under contract for the U.S. Forest Service Pacific Northwest Research Station in 2006. This data set was a first of its kind, combining satellite imagery with ancillary spatial data to determine land use (rather

than land cover) for a very large geographic region (all of western Washington). This data set allowed a rare glimpse into the heterogeneity of the landscape between the urban and rural areas that is normally aggregated as either "developed" or "undeveloped" in other large-area land use analyses. By using two scales of data and a series of geographically-based decision rules, land use for all of western Washington was produced. It was assumed that the methodology used to produce the land use data for western Washington would be easily replicable to produce a complementary data set for eastern Washington. Unfortunately, the methods did not translate easily to the very different landscape of eastern Washington. It is hoped that future work with this data set will provide a much needed source of information for land use change and a model for future researchers and land use researchers to gain a new level of insight into land use patterns.

A final data hurdle was parcel-level information for various counties in Washington state. In order to assess ownership changes of working forest land, historical and current parcel information is needed. At first, multiple examples of this level of data analysis were going to be produced throughout Washington to provide estimates of ownership changes in different regions. However, in the timeframe and scope of this project, this was not possible for multiple areas given the enormous task of digitizing and/or manually analyzing non-GIS-based historical parcel data. Therefore, it was decided to choose two counties—one in western and one in eastern Washington—to use as case studies. King and Spokane counties were chosen under the assumption that these two counties have undergone the most change in forest land ownership transition and conversion of working forest lands, allowing for examples of where other counties may follow if population and development needs continue to increase, and the availability of historical and current parcel data. Unfortunately, Spokane County lost all historical parcel data during a server crash some years ago, eliminating that county as a complementary case study. The King County data proved to be very difficult to assess ownership change over time given different formats from the different time periods.

Nevertheless, the wide variety of available data, albeit imperfect, was combined together to produce the best available estimates of forest land conversion in Washington. And, it is hoped that the methodology designed for this project can be further expanded as research in this field continues to increase and develop new methodologies.

### Forestry Work group

In the spring and fall of 2006, the Cascade Agenda Forestry Work group was convened to address land conversion strategies, based on the Cascade Agenda's early-action emphasis on stabilizing the region's land base. The work group included many members of the University of Washington's Northwest Environmental Forum, which has convened decision makers and stakeholders to bring scientific and policy information together to address the challenges to maintaining Washington's working forest land base.
The Cascade Agenda was tasked with identifying and recruiting the work group members and coordinating the meetings. One of the main goals of the work group was to build consensus among stakeholders and experts. By briefing the work group on the progress of the studies that are part of the Future of Washington Forests and Forestry Industries, as well as other the Cascade Agenda work groups, the forestry work group was able to identify potential opportunities for what they agreed was needed to retain an active forestry industry and improve ecosystem function.

The Work group identified the next steps for implementing the consensus recommendations and these finding and recommendations were reported to the full Northwest Environmental Forum in November 2007. The final recommendations were reported to the Department of Natural Resources in progress reports submitted in late 2007 and were incorporated into the findings and recommendations from the Northwest Environmental Forum. Lastly, the recommendations were reported to the Cascade Agenda Coalition and Leadership Team of community consensus on forest conservation measures and support was sought in implementing next steps.

In the spring of 2007, the Forestry Work group technical sub-groups discussed the viability of certain strategies for conserving working forest land. One sub-group was composed of large and small timber land

owners and managers and the second was composed of members of the environmental community. Both sub-groups heard from consultants who had been charged with looking at the following: the legal authority behind the strategies, how they could be documented; an analysis of valuing options; and interviews and surveys of landowner interest. The technical work groups met again to hear the final reports from the consultants and came to agreement regarding particular strategies. The strategies, input from the work group members, and their resulting conclusions are outlined in Section 6 of the Results of this report.

## Issues and Outcomes

This project produced a combination of summary discussions about various issues related to the dynamics of forest land conversion and analyses of currently available data sources used to assess the trends in forest land conversion. The following items were produced and are presented as separate sections:

Section 1: Impacts of forest land conversion to a viable forestry industry

Section 2: Factors that contribute to forest land conversion

Section 3: Environmental and resource valuation methods and current incentive programs to maintain forest land

Section 4: Current estimates of forest land conversion in Washington state

Section 5: A case study of forest land conversion at a local level

Section 6: A comprehensive report and appendices of future incentive programs to maintain forest land (produced by the Cascade Land Conservancy's Cascade Agenda Forestry Work group and subsequent analyses and discussions of CLC staff).

### Section 1: Impacts of forest land conversion to a viable forestry industry

The effects of urbanization on forests results in more than just losses to the forest land base, since forest management is impacted far beyond the urban boundary. Land within convenient driving distance of metropolitan areas generally has greater value in residential or commercial use than in forestry. In anticipation of future development, active forest management is sharply curtailed in areas adjacent to metropolitan areas (Munn et al. 2001) and occasionally premature harvesting occurs in anticipation of development (Munn et al. 2001 with references to Wear et al. 1999). Studies of Georgia's timberland (Harris and DeForest 1993) have found that metropolitan counties account for 17% of the state's timberland, but only 4% of the land is enrolled in government subsidized tree planting programs thought to be an indicator of active forest management.

Forest parcelization is also thought to affect the cost of forest management activities by reducing the size of forested tracts (Munn et al. 2001). As an example, Harris and DeForest (1993) found that harvesting costs are inversely related to tract size, escalating for stands less than 40 acres in size. This reduction in harvesting levels and increase in cost as parcels become smaller is further confounded by the steady decline in the average timberland parcel size (Mehmood and Zhang 2001).

Urbanization also directly reduces long-term timber availability as forested lands are lost to development. However, the total impacts of urbanization are far greater because timber management is influenced by the interaction of urban and forestry issues beyond the urban edge (Barlow et al. 1998). Studies in Alabama and Mississippi examined how timber harvesting is influenced by demographic and physical characteristics associated with the urbanization of forest lands. Barlow and others (Barlow et al. 1998) found that harvested plots have higher per acre volumes; tend to be privately owned; are farther than 3 miles from built-up areas than non-harvested plots; and are associated with lower population densities (37 people/square mile) than non-harvested plots (50 people/square mile).

As the distance to a truck-operable road increases, the probability of harvest also decreases. Alternatively, if urbanization results in greater infrastructure, which reduces distances to roads, harvesting could be increased.

However, more frequently, the proximity of urban uses negatively affects harvesting level as declines in harvesting activity are usually associated within a 1-mile radius of built up areas. (Barlow et al. 1998)

As more forest land on the urban fringe is converted to urban uses, the non-timber amenity value of the remaining forest land increases, resulting in less management for timber production and more management for non-timber values (Barlow et al. 1998). When a 1000-acre parcel is subdivided into 10 100-acre parcels and stays exactly the same physically, it is defined as parcelization. However, if a 100-acre parcel includes some form of development – roads, houses, pastures, fences, etc., then fragmentation of the forested landscape is taking place. Fragmentation of forest land has many well-documented impacts on the ecological and physical landscape, affecting stream health, wildlife habitat, water storage, and much more. It is outside the scope of this project to document those impacts, but there is a wealth of information in literature that documents impacts of forest fragmentation.

As shown in the other studies in the Future of Washington's Forests and Forestry Industries, the loss of forest land is a major obstacle in the continued survival, competitiveness, and economic contribution of the forest-based industries in the state. The unknown consequences or benefits of changing ownerships (traditional forest products companies owning large tracts of forest land compared to multiple owners owning smaller tracts with different management objectives) combined with an overall loss of forest land bodes for a very different forestry industry in the future.

## Section 2: Factors contributing to forest land conversion in Washington state

### *Overview*

Assessment of scientific literature and input from professionals representing Washington's forest industry and land conservation organizations and county resource managers indicate that the primary factors driving forest land conversion in Washington stem from the combined impacts of population growth and resulting urbanization and the improved economic conditions of the state. The close association of these factors combines to influence the value of forestland, which is increasingly becoming higher for urban or rural development instead of forestry uses. The higher value for development, however, alone does not lead to conversion. Combine HBU (higher and better) possibilities with conflicting values at the urban/rural interface, uncertainty of regulatory future, and changing timber market conditions, and more landowners may opt to sell their working forests.

Different land owners have additional pressures, accountability to shareholders and other company needs and directions, estate taxes, a lack of interest from family members, and more. All of these pressures, combined with the ability to realize immediate financial gains for the "higher and better use" of development, result in a high likelihood of working forest lands turning into residential or commercial development. This dynamic process is depicted in the following diagram, Figure 4.1, and each factor is discussed in more detail below.

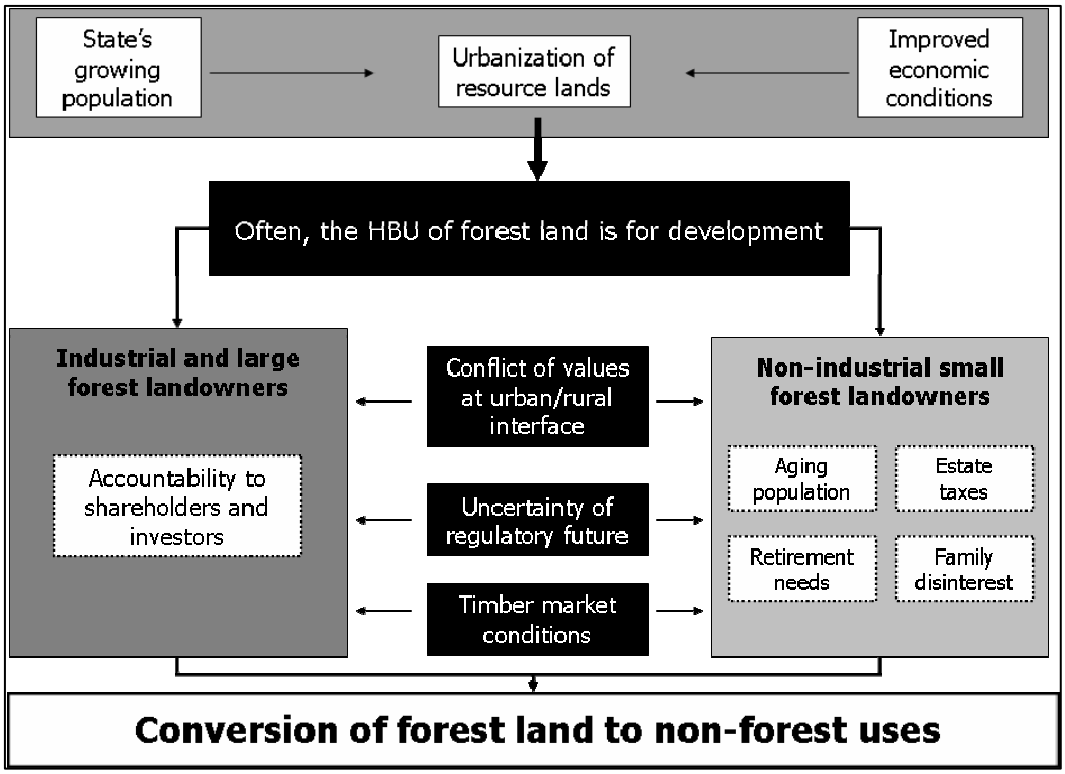


**Figure 4.1: Factors associated with forest land conversion in Washington State**

### *Population*

Wear and Newman's (2004) assessment of forestland values for the southern United States shows evidence that increased population densities and higher income levels have affect nearby resource lands. In Georgia, it was observed that in areas with populations with fewer than 150 people per square mile (ppsm) rural land uses remained dominant. A value of 200-350 ppsm represented a transitional zone between urban and rural influences on land values. However, in counties and areas beyond 350-400 ppsm, forest land values were such that long-term timber production was highly unlikely (Wear and Newman 2004). The study found that the amount of forest land valued for conversion rises in counties with higher population densities.

Washington's population rose by 21 percent between 1990 and 2000, placing the state as the tenth-fastest growing in the nation, with a growth rate much higher than the national average of 13.2 percent. According to the National Census Bureau, Washington's population was approximately 5.9 million in 2000; the state's population is expected to be more than 7.8 million by the year 2025 (Washington State OFM 2002). Nationally, both urban and rural populations have grown dramatically over the past two decades, causing some rural counties to triple their populations within that time span. This growth contributes some significant impacts to nearby forested landscapes (Alig and Plantinga 2004, WDNR 2004). According to McClinton and Lassiter (2002), Washington's population growth, coupled with economic expansion, are two of the leading causes of forest land conversion in Washington, particularly around the Puget Sound region.

### *Urbanization and zoning*

The value of forest land reflects the current use as well as the possible future use of the land. The growth of Washington's population has led to the increased need for housing which, in turn, has stimulated demand for buildable land. Much of this demand is being met from existing resource lands and thus has resulted in increasing the HBU value of forest land for development instead of timber production (Alig and Plantinga 2004, WDNR 2004, Wear and Newman 2004).

The availability of relatively affordable land outside of cities has led new residents and developers to build in rural areas. This urban to rural migration has caused the value of forest land to rise dramatically in response to the demand for residential property. According to Wadsworth (1999), in rural King County, land that has traditionally been worth roughly $1,000/acre for the production of forest products now sells for up to $15,000 - $20,000/acre for residential development. The rise in property value has motivated many traditional forest landowners, both non-industrial and industrial, to realize the economic potential of their lands and convert to urban and residential uses (Wadsworth 2006, Dart 2005, Alig and Plantinga 2004, CLC 2004).

While there is a trend of rising land values across the United States, the overall difference in value between forest land and urban lands is far greater in the Pacific Northwest. Alig and Plantinga (2004) assessed forest land values for 38 counties in western Oregon and Washington and found average land values to be $1,483/acre in forest use and $165,947/acre in urban use. Among 14 counties across western Oregon and Washington, they found that land values were as much as $200,000/acre in urban use and $2,000/acre in forest use. Comparatively, their assessment of counties in the Southeast U.S. found average forest land values to be $415/acre and $36,216/acre for urban use.

They concluded that areas with increasing shifts to urbanized land-use are determined primarily by changes in the relative profitability of alternative uses for forest land, such as development (Alig and Plantinga 2004). Complementary to their analysis are Wear and Newman's (2004) findings in the Southeastern U.S.: the sooner development is anticipated, the greater the value attached to the forest land. This is supportive of a strong incentive for conversion of forest land being economic since the potential for land development creates alternative land uses of higher value (Dart 2005, Xu 1998). Consequently, forestry-based use of land becomes less attractive in terms of the value to landowners compared to the value of development options.

### *Cost and complexity of harvest*

Rural communities are growing, resulting in an increase in new forest landowners with smaller-sized forest parcels, changing the complexion of private forest landowners in Washington (Creighton et al. 2004). Urbanization and the growing populations of communities have an impact on forest land management far beyond urban boundaries (Munn et al. 2002). The urban-rural interface is not only a geographic area where forest management meets urban development, but it is also a political arena where people holding different values for the forest interact (Vaux 1982). Urban migrants have attitudes, needs, and values that are often very different from those of long-term residents (Egan and Luloff 2000). New forest neighbors hold expectations that are at variance with the way their neighbors manage their forests (Shands 1991).

These differences can result in conflicts that are evidence of opposition to traditional forest management practices (Gabriel and Katz 2006, Bill 2005, Dart 2005, Dicks 2005, Dunning 2005, CLC 2004, Munn et al. 2002, Egan and Luloff 2000, Sampson and DeCoster 2000, Wadsworth 1999, Barlow et al. 1998, DeCoster 1998, Shands 1991). The typically cited conflict is that of new residents building homes in rural areas and then considering their neighbors' timber harvest practices a nuisance. This spurs concern by both non-industrial and industrial forest landowners that these new residents will influence the actions of decision makers who approve forest policies; such that they will face greater regulatory pressure from new ordinances for more restrictive forest management practices (Gabriel and Katz 2006, Creighton and Baumgartner 2005).

In order to ensure the provision of public goods from forest land, Washington has developed some of the most comprehensive sets of Forest Practice Rules (FPR) in the United States (Creighton and Baumgartner 2005). The intent of these provisions is to improve environmental conditions by regulating such forest practices as road building, harvesting methods, and the use of chemicals. However, these regulations could make forestry operations more costly, and could act as an incentive for non-industrial and industrial landowners to convert their forests to non-forestry uses (Nelson 2005, Zobrist 2003).

### *Landowner objectives and decision factors*

Concerns of industrial forest landowners

In Washington, approximately 21 percent of the state's total private forest land is owned by nearly 60 large private landowners (Erickson and Rinehart 2005, WFPA 2005). The effects of urbanization on resource lands and the HBU value of forest land for development uses are factors that industrial forest landowners are keenly aware of (Dart 2005, Dicks 2005, Nelson 2005, CLC 2004). Their fiduciary obligation to shareholders to maximize profit may dictate that they sell portions of their high-valued timberland holdings for even higher-valued development (Gabriel and Katz 2006, Dicks 2005, Dart 2005, CLC 2004).

Industrial owners of Washington forest land have indicated that they have chosen to sell their holdings in counties with high development pressure, to avoid the difficulties of conducting forest practices in an increasingly urban landscape (Gabriel and Katz 2006, CLC 2004). Concern over the perceived unpredictability of the regulatory climate of Washington is also a factor that weighs heavily in their decisions to retain forest land in rotation for timber harvest (Gabriel and Katz 2006). One example pertains to the current Forest and Fish practices under the FPR. While industrial forest landowners have invested time and finances to comply with these management practices, there is continued environmental pressure for additional species protection. With anticipation of such restrictions, they see limitations to their ability to meet the management objectives of their forests and their potential profitability (Gabriel and Katz 2006, Dart 2005, Dicks 2005). In response to increasing regulations, many industrial forest owners are selling their commercial tree farms at an increasing rate, replacing thousands of acres of contiguous forest with residential development lots ranging from 5- to 80-acres (Creighton and Baumgartner 2005). Most forest products companies now have real estate development divisions and are actively marketing properties (Wear and Newman 2004).

Considerations of family forest landowners

It is estimated that non-industrial family forest landowners own approximately 3.0 million acres of the state's forest land (FFF 2006), although the exact acreage is still unknown due to the difficulty in identifying and quantifying these landowners and their holdings. Many of the state's private non-industrial owners identify themselves as family foresters who feel a close tie to their land and see the implications of the conversion of surrounding forest land as a threat to their quality of life (Dart 2005, Dunning 2005, Stinson 2005).

The demographics of Washington and the nation's private non-industrial forest landowners, particularly family foresters, are shifting (Butler and Leatherberry 2004). As forest lands become increasingly parcelized the number of family forest owners is increasing in Washington and across the nation (Dart 2005, Butler and Leatherberry 2004, DeCoster 1998). The average age of family forest owners in the western United States is 62 (Butler and Leatherberry 2004) and survey findings for Washington State indicate the average age of family forest landowners is between 57 and 67 years old (Creighton et al. 2002). Nearly half (48%) of the land owned by Washington's family foresters is held by individuals 65 or older (Creighton et al. 2002).

Although family forest landowners have a close tie to their land and see it as an economic investment, many adult children lack interest in managing their parents' forest land (Dart 2005, Dunning 2005). Consequently, these older landowners often look to liquidate portions of or all of the forest land assets for retirement purposes or to cover other expenses (Dart 2005, Dunning 2005, Stinson 2005, Zhang et al. 2005, Xu 1998). In some instances, when family foresters do pass down land, the high value of the forest land—be it because of the quality of timber or its potential for development—can cause the landowner's heirs to subdivide the land in order to cover the cost of estate taxes (Stinson 2005).

Family foresters have expressed frustration with regulatory restrictions at the federal, state and county levels such that they feel that the respective governments and administering agencies lack trust in them to steward their forest lands under appropriate forest practices (Creighton and Baumgartner 2005, Dart 2005, Dunning 2005, Stinson 2005). Furthermore, increases in land-use regulations driven by environmental statutes and

litigation are reinforced by state government regulations that require forest landowners to absorb the costs of property improvements to protect environmental attributes (Creighton and Baumgartner 2005), such as stream improvements for salmon habitat.

Conversion can also be triggered out of frustration with the regulatory environment or uncertainty of the regulatory future (Dunning 2005, Stinson 2005, Xu 1998). At present, attention in Washington is directed at the Forest and Fish rules, where riparian buffer widths required by the Forest Practice Emergency Rules have had a disproportionate impact on small-scale family forests, than on industrial lands (Calhoun 2005, Creighton and Baumgartner 2005, Stinson 2005). The complex rules and approaches to riparian management require technical expertise to implement, which many of these landowners feel they cannot afford (Bill 2005, Dart 2005, Stinson 2005).

Given these conditions, the HBU of a landowner's holdings for development rather than timber production is often a reason to sell or convert their forest land to development (Dart 2005, Dunning 2005, Stinson 2005, Zhang et al. 2005, WDNR 2004, McClinton and Lassiter 2002, Xu 1998).

## Section 3: Current incentive programs to maintain forest land in Washington state

### *Overview*

Over the past decade, there has been a dramatic increase in incentive-based approaches to addressing issues of environmental sustainability and natural resource management. The emergence of socially- and environmentally-responsible businesses and investing, and the developing union between traditional timber companies, land conservation groups and environmental groups, demonstrate a growing recognition that a traditional regulatory approach aimed at preventing environmental damages may not achieve all of its intended goals and such goals may be better achieved if accompanied by incentives-based systems.

In order to understand how economic and policy incentives can be used to improve natural resource management, it may be helpful to understand how economic value is assigned to natural resources. Values for market goods such as timber and fiber can be easily assigned using existing price data. Capturing non-market values, such as those for habitat protection and clean air, is more difficult. However, in recent decades, environmental valuation has become a well-established sub-sector of economics (Freeman 2003).

We have not successfully integrated the true financial value of environmental goods and services into the economy, yet we know these non-market values can be quite high, as evidenced by governmental efforts to protect them. There are many examples of U.S. nascent markets for the services provided by the environment but these examples represent the disparate efforts of a few individuals and organizations. Internationally, there are greater examples of these markets.

This section is segmented into three parts. The first part will briefly review environmental valuation methods and the associated literature to understand how the value of non-market goods and services are quantified or estimated by economists. The second part will discuss innovative ideas and examples of bringing these goods and services to market and how forest landowners might benefit. The third part will look at incentives for landowners, including policy and economic tools. This section will focus primarily on opportunities for forest landowners.

### *Environmental and Resource Valuation: How is it Performed?*

Critical to understanding the economic value of environmental benefits and damages is the concept of Total Economic Value (TEV). TEV implies that both existence and use values must be incorporated into the true economic value of a good or service (NRC 2005). An existence value is the intrinsic value of an asset resource; a use value is the value of the use of an asset or resource. For example, the existence value of a standing tree is the value of simply knowing it exists; the same tree's use value is its value as a product. Market benefits, or use values, include products and services that can be bought and sold, such as timber and

non-timber forest products. These market benefits can be relatively easily priced by using existing market price data. In addition to existence and use values, there are additional benefits that are currently extra-market. These include services like clean air and water, carbon sequestration, aesthetics, habitat and biodiversity protection, and fire avoidance. Not surprisingly, pricing non-market benefits and services supplied by forests can be difficult because of their non-traded nature.

In valuing environmental benefits, standard methods include revealed and stated preference. Revealed preference methods obtain values by using directly-observed competitive market prices and indirectly-obtained market prices by using simulated market, household production functions, and general production functions. Stated preference surveys can be conducted using one or a combination of several methodologies and rely on eliciting consumers' preference for a change in one or more environmental attribute and estimating their willingness to pay (WTP) for an improvement in that amenity or their willingness to accept (WTA) a worsening of that amenity.

Production function methods use environmental attributes as factor inputs into the production function (Freeman 2003). For example, this might include the value of fish habitat as it affects catch and the fisheries industries. Household production functions use methods like the travel cost method or the hedonic method, which infer the value of environmental variables by measuring the value of transactions of other goods (Boardman 2001). The travel cost method relies on questions surrounding the cost of the consumer's travel to the destination of interest (Hotelling 1938). This methodology can be used to estimate the value of a park or recreational area, for example. The hedonic method uses the market value of goods and services to derive the value of an environmental good (Brown 1984). For example, the capitalized value of a house or the price of labor might be used. Property values can be used to estimate the value of air quality in a certain location. The price of labor, using either wage differential or valuation of risk to life, can be used to estimate the value of a project such as an environmental cleanup (Thaler and Rosen 1976).

Stated preference is a more recently developed estimation methodology that relies on surveys to elicit a willingness to pay (WTP) for an improvement in a particular attribute or a willingness to accept (WTA) a worsening of a particular amenity (Mitchell and Carson 1989). Stated preference methodologies must be carefully executed (Arrow et al 1993), and have been widely criticized for being too hypothetical, relying on consumers to state how much they would be willing to pay for or to accept something (Diamond and Hausman 1994). Where the price amount should be based on the marginal rate of substitution, it may in fact be based on a non-economic explanation. In some instances, respondents may have an ideological bias that affects their responses; for example, they may be experiencing what is referred to as the "warm glow" effect, which means their responses are affected by their feelings that they should be supporting a good cause (Nunes and Schokkaert 2003). Another problem is that there may be a marginal change in an individual's WTP or WTA (Diamond and Hausman 1994). For example, an individual may state that he or she is willing to pay the same amount per tree to save 100 trees as to save 200 trees. In all cases, there may be a difficulty in asking individuals to evaluate their real WTP.

Other methods include benefit transfers, which involve using an existing value estimate of one attribute and applying it to an entirely different attribute. Benefit transfers have been criticized as being a "second best" evaluative method generally used to estimate existence and recreation values (NRC 2005). Replacement cost methods are also a second best approach when no other valuation method is applicable. Replacement cost methods involve estimating the cost of replacement as a proxy (NRC 2005).

### *Ecosystem Services Markets: A Brief Introduction*

The methods described above are those most commonly used to estimate the benefits derived from ecosystem goods and services. Understanding the methods described above allow us insight into how one might successfully create a pricing system for ecosystem services. There is now a growing interest by many parties in developing a means of monetizing ecosystem services, particularly on behalf of private landowners.

The term "ecosystem services" refers to the (currently) non-market benefits provided by, for example, forest lands. Forest land ecosystem services include clean air, clean water, carbon sequestration, biodiversity and aesthetics. It is generally accepted that these services are being provided by landowners at low cost to consumers, but at great cost to landowners. Monetizing them would not only require consumers to pay for such services, but it could have secondary co-benefits, including public recognition of the value of the services provided by these lands and an economic incentive by lowering the cost incurred by landowners of maintaining these benefits.

A comprehensive review of examples of monetizing ecosystem services around the world, conducted by Landell-Mills and Porras (2002), provides an overview of markets as well as defines different forms of the market. In order to understand how to turn this concept of "ecosystem services" into commodities, it might be useful to review them. Biodiversity commoditization may take the form of biodiversity business shares, biodiversity credits/offsets, biodiversity-friendly products, conservation easements, debt-for-nature swaps, development rights, land lease/conservation concession, land acquisition, management contract, protected areas, or research permits. For the carbon market, Landell-Mills and Porras rely on the Kyoto Protocol's country-level targets, namely tradeable assigned amount units, emission reduction units, certified emission reductions and removal units generated through investment in carbon sinks. For water markets, commodities include best management practice contracts, ecolotree plantings, salinity-friendly products, salinity credits, salmon habitat restoration contracts, salmon habitat credits, salmon safe products, stream flow reduction licenses, transpiration credits, water rights, water quality credits, watershed leases, and watershed protection contracts. For aesthetics or forest beauty, the authors identify tourism services, management agreements, land acquisition, land leases, ecotourism concessions, and access rights/permits as commodities. The majority of examples are from markets outside the United States. For instance, only 1% of the biodiversity cases identified were within North America. However, of the 33 total commodities listed in the book, 18 are from the United States.

The National Research Council (NRC 2005) has published a review of domestic water market programs within the United States. Examples from this review include the New York City watershed payment scheme; groundwater provision in San Antonio; fish production in coastal wetlands and estuaries; flood control services by floodplain wetlands; a bundle of the latter three in the Columbia River Basin; the negative downstream economic impact of upstream dams; a bundle of food production, recreational fishing and drinking water from Lake Mendota in Wisconsin; the damages of the Exxon Valdez spill; and restoration of the Florida Everglades.

Ginn (2005) has compiled case studies of the Nature Conservancy's work around the world to: invest in conservation-based forest management, facilitate a debt-for-nature swap in Maine, establish a carbon sequestration and offset program in Bolivia, create a grassbanking project in New Mexico and Arizona, and use new market tax credits to fund conservation in Connecticut.

There are numerous web-based resources to obtain information on payments for ecosystem services. The Climate Trust, a Portland-based firm dedicated to linking buyers with willing sellers of carbon offsets, has descriptions of its offsets projects available at www.climatetrust.org. The Chicago Climate Exchange has a list of all its members at www.chicagoclimateex.org. Forest Trends is a useful resource for forest-based efforts; it can be found online at www.forest-trends.org. Ecosystem Marketplace is considered the Bloomberg of environmental service payments market information and can be found at www.ecosystemmarketplace.com Additional resources and projects are described in a white paper on ecosystem services markets produced for the 2005 Northwest Environmental Forum (Robbins 2005).

These cases provide us with numerous examples of international and domestic efforts to use incentives and market-based mechanisms to enhance forest conservation and to lower the management costs incurred by landowners involved. However, it should be noted that these examples do not truly form a cohesive

"market". Instead, they reflect a series of one-off deals negotiated individually. There are no established global or even domestic prices for these goods and services; the values are generally negotiated on a deal per deal basis.

### *Incentives and Disincentives for Landowners*

It is generally accepted that private forest lands in western Washington are under increasing threat of conversion to permanent, non-forest uses (NW Environmental Forum 2004). It has been projected that the region will experience a reduction of 1.9 million acres of forest land over the next 25 years (Alig and Plantiga 2004). The primary factor, as pointed out in Section 2 of this report, driving landowner decisions to divest forest land is highest and best use (HBU) value, found not in managing for timber, but selling land for its development or real estate values. These real estate or developed values can be as much as 111 times as the forest value (Alig and Plantiga 2004).

Currently, the market values derived from the rent-earning capacity of forest land, including timber and non-timber forest products, typically present the greatest incentive for owners of working timberlands (Aronow et al. 2004; Kline et al. 2004). According to Kline et al. (2004), a financial land-use hierarchy means that private forestry returns alone are unlikely to keep some land in forest when development is an option. However, there may be incentives, or combinations of incentives to motivate landowners to retain their lands in forest uses. This land use hierarchy may change over time, and every land owner has different motives for owning and operating their forest lands; consequently, they have different baselines below which they are not willing or able to operate.

The question then becomes how to provide these landowners with an incentive (or multiple incentives) to keep their land in forest use instead of selling it for it for its development or real estate value. The incentives need not be solely financial, but may involve a combination of economic and policy incentives. Although markets for ecosystem services are described above as potential long-term solutions, it may be more useful in the short term to look into existing incentives programs. Existing working solutions will provide the most relevant incentives to owners of working forest lands to keep their land as forests.

For the purpose of this report, incentives refer to measures or factors that create a motive for preferring one choice over another that might influence an individual (i.e., a landowner), to prefer a particular course of action (i.e., not selling his or her forest land). Disincentives can be distinguished by examining what motivates landowners to actually sell land.

In this context, we can identify six potential incentive types for maintaining working forest lands (shown in the text box to the right).

***Potential Incentives for Maintaining Working Forest lands***

- Direct Payments
  - Grants and Cost Share
  - Private Deals
- Regulatory Relief
- Tax Relief
- Social License
- Technical Assistance
- Opportunities for Market Innovation and Additionality

Direct payment programs offer payments directly to the landowner for adopting particular management regimes, providing conservation easements, or potential property rights for which the landowner is willing to forego in exchange of direct payments. Regulatory relief programs provide assurances to landowners that, as long as they adhere to particular management requirements, they may be considered exempt from current or future more stringent regulations. Tax relief offers relief from various taxes for landowners. Forest landowners have identified a diminishing "social license" to practice forestry as a reason that they (or their heirs) divest of forest lands, and improving public awareness may help increase the perceived social license. Technical assistance programs include educational programs aimed at teaching landowners how to implement new regulations, new technologies or development management plans. Opportunities for market innovation and additionality include mechanisms to bring ecosystem services (discussed above) to market and creating new sources of revenue by engaging in markets for services like carbon sequestration, clean water, and more.

Disincentives include HBUs, perceived tax burden, and perceived regulatory uncertainty. Disincentives are examined more closely in the Competitiveness Study of this project, so they were not dealt with extensively in this report. Each of the incentives listed in the previous paragraph, and the disincentives mentioned here, will be discussed in greater detail below.

*Direct Payment Programs*

We should distinguish between two types of direct payment programs. The first type includes those sponsored by federal, state or local government agencies. Some of the largest payment programs are implemented by the USDA and its subsidiaries in the form of the Farm Services Agency, the Natural Resource Conservation Service and the Forest Service. These will be referred to as grants and cost share programs, because they are essentially grants of money provided by the government to conserve forest lands. The second type includes payment programs made by private and non-profit organizations such as land trusts. These will be referred to as private deals and may include agreements such as conservation easements.

*a. Grants and Cost Share*

The Forest Legacy Program, implemented by the Forest Service, is intended to "support State efforts to protect environmentally sensitive forest lands" (U.S. Forest Service 2006) and provides funding up to 75% of a project cost, with at least 25% coming from private, state or local sources. Participation in the Forest Legacy Program is limited to private forest landowners. To qualify, landowners are required to prepare a multiple resource management plan as part of the conservation easement acquisition. In addition to gains associated with the sale or donation of property rights, many landowners also benefit from reduced taxes associated with limits placed on land use (thereby providing some tax relief). In Washington, this program is administered by the Department of Natural Resources. Since 1995, the Washington program has supported the payment of $6.2 million and nearly 15,000 acres (U.S. Forest Service 2006). Washington ranks 13th in overall number of acres protected through this program; Maine, New Hampshire, Vermont and New York combined make up 62% of the acres in the program. However it should be noted that program is not open to small landowners; the primary applicants are land trusts, conservation organizations and larger landowners (Hanson 2006).

The Conservation Reserve Enhancement Program (CREP), implemented by the Farm Services Agency, is intended for agricultural lands, but can apply to forest lands as it provides funds for reforesting riparian areas. According to the CREP, it is "a voluntary land retirement program that helps agricultural producers protect environmentally sensitive land, decrease erosion, restore wildlife habitat, and safeguard ground and surface water…CREP contracts require a 10- to 15-year commitment to keep lands out of agricultural production…A federal annual rental rate, including an FSA state committee-determined maintenance incentive payment, is offered, plus cost-share of up to 50 percent of the eligible costs to install the practice…[The] program generally offers a sign-up incentive for participants to install specific practices" (CREP 2006). In Washington, CREP is administered by the Washington State Conservation Commission and the Farm Services Agency. As of 2003, the CREP program in Washington State had enrolled nearly 8100 acres, expending more than $1.3 million (WA CREP 2006). This program has been difficult to access by forest landowners and more effort should be made to extend the program beyond agricultural landowners.

The Conservation Innovation Grants Program, implemented by the Natural Resource Conservation Service (NRCS), is intended "to stimulate the development and adoption of innovative conservation approaches and technologies while leveraging Federal investment in environmental enhancement and protection, in conjunction with agricultural production. CIG projects are expected to lead to the transfer of conservation technologies, management systems, and innovative approaches (such as market-based systems) into NRCS technical manuals or guides, or to the private sector" (NRCS 2006a). Although grants are available to individuals, the program is generally awarded to organizations or academic institutions. The program is administered both at a national level and at a state level. For 2006, up to $10 million was available for the

national Natural Resource Concerns component; $5 million was available for the Technology component. At the state level, there was an additional $150,000 available specifically within Washington state.

The Healthy Forests Reserve Program, administered by NRCS, is a voluntary easement program established for the purpose of restoring and enhancing forest ecosystems to promote the recovery of threatened and endangered species, improve biodiversity, and enhance carbon sequestration (NRCS 2006b). The Program offers three enrollment options, either a 10-year cost share agreement (plus 50% of the cost of the approved conservation practices, a 30-year easement (plus 75% of market value of land and 75% of the cost of the approved conservation practices), or a maximum 99-year easement (plus 75% of market value of land and 100% of the cost of the approved conservation practices). This program was approved as a pilot program in fiscal year 2006 for Arkansas, Maine and Mississippi; programs have not yet been established in Washington.

The Landowner Incentives Program, implemented by the Department of Fish and Wildlife, is designed to provide grants to establish or supplement landowner incentive programs that protect and restore habitats on private lands, to benefit federally listed, proposed or candidate species or other species determined to be at-risk, and provide technical and financial assistance to private landowners for habitat protection and restoration. This program was expected to have $21.7 million for fiscal year 2006 (U.S. FWS 2006a).

The Wildlife Habitat Incentives Program is administered by NRCS. This voluntary program "encourages creation of high quality wildlife habitats that support wildlife populations of significance" (NRCS 2006c) NRCS provides technical and financial assistance to landowners and others to develop upland, wetland, riparian and aquatic habitat areas on their property. In Washington, the program focuses on restoration of native vegetation and habitat restoration for threatened and endangered species. Since 1998, nearly 14,700 participants have enrolled more than 2.3 million acres in the program. NRCS provides cost-share payments to landowners under these agreements that are usually 5 to 10 years in duration, but greater cost share may be awarded for those who enroll for beyond 15 years.

The Environmental Quality Incentives Program (EQIP) offers contracts that provide payments and cost-shares to implement conservation practices. EQIP activities are carried out according to an environmental quality incentives program plan of operations developed in conjunction with landowners to identify appropriate conservation practices to address specific resource concerns. The local conservation district approves the plan. EQIP may cost-share up to 75 percent of the costs of certain conservation practices. Incentive payments may be provided for up to three years to encourage producers to carry out management practices they may not otherwise use without the incentive (EQIP 2006). An individual or entity may not receive, directly or indirectly, cost-share or incentive payments that, in the aggregate, exceed $450,000 for all EQIP contracts entered during the term of the Farm Bill.

The Family Forest Fish Passage Program is a cost-share program that helps small forest landowners correct or remove fish passage barriers on their forest lands. The program provides 75-100 percent of the cost of correcting a barrier; it also provides technical assistance. The program is implemented by three state agencies: the Small Forest Landowner Office at the Department of Natural Resources (DNR) the Washington Department of Fish and Wildlife (WDFW) and the Interagency Committee for Outdoor Recreation/Salmon Recovery Funding Board. From 2003 to 2005, the program spent $4.3 million to enable nearly 236 miles of stream to be opened (Hanson 2006).

The Forest Land Enhancement Program (FLEP) was part of Title VIII of the 2002 Farm Bill. FLEP replaces the Stewardship Incentives Program (SIP) and the Forestry Incentives Program (FIP). FLEP is optional in each state and is a voluntary program for non-industrial private forest (NIPF) landowners. It provides for technical, educational, and cost-share assistance to promote sustainability of the NIPF forests. Landowners must have a forest management plan to be eligible for cost-share. The practices to be cost-shared and the cost-share rate are determined at the state level. FLEP is available for all NIPF land owners. The cost-share

practices are limited to the treatment of 1,000 acres per year with an aggregate payment not to exceed $100,000 for the duration of the current Farm Bill (FLEP 2006). A waiver for the treatment of up to 5,000 acres is available if significant public benefit is shown. The waiver is granted through the State Forester and approved by the Regional Forester. There is no limit to the amount of forest land owned by an individual as long as the person qualifies as an NIPF owner.

The Partners for Fish and Wildlife Program "provides technical and financial assistance to private landowners and Tribes to meet the habitat needs of Federal Trust Species. Field biologists work with private landowners and other partners to plan, implement, and monitor projects. Partners Program field staff help landowners find other sources of funding and help them through the permitting process, as necessary. National priority ranking factors for the Partners Program are used to assign funding priority status to proposed projects that meet these conditions: improve habitat for Federal Trust Species; complement activities on National Wildlife Refuge System lands or contribute to the resolution of problems on refuges that are caused by off-refuge practices; address species and habitat priorities that have been identified through Service planning teams (with our partners), or in collaboration with state fish and wildlife agencies; reduce habitat fragmentation or serve as buffers for other important Federal or state conservation lands; result in self-sustaining systems that are not dependent on artificial structures" (U.S. FWS 2006c). For fiscal year 2006, the program estimated it would have about $25.5 million available for project funding. Generally, Partners for Fish and Wildlife program funding is limited to $25,000 or less per project. Any privately-owned land is potentially eligible for restoration. Most of the applicants are individual landowners.

The Riparian Open Space Program is funded by the Washington state legislature to provide options for landowners with timber within unconfined avulsing river channel migration zones. According to the program description, "qualifying landowners can apply to donate or sell their land and/or timber in designated forest land that exists along migrating stream channels. There are also options to sell the state permanent conservation easements covering the timber and/or forest land. The Riparian Open Space Program will help provide ecological protection and fisheries enhancement while compensating landowners prohibited under state Forests & Fish rules from harvesting timber on riparian land isolated by river channels that have migrated over time" (WA DNR 2006a). Between 2001 and 2005, 584 acres were enrolled in this program, providing $1.47 million in funds.

*b. Private Deals*

The Forestry Riparian Easement Program, administered by the Washington Department of Natural Resources, is a state program designed to compensate eligible small forest landowners in exchange for a 50-year easement on "qualifying timber." The program is a result of the implementation of more restrictive harvest practices along riparian areas. Landowners must own a minimum of 20 contiguous acres and can receive a minimum of 50 percent of the fair market stumpage value for the qualifying timber (WA DNR 2006b). Between 2001 and 2005, 1,813 acres were enrolled in the Riparian Easement program.

Conservation easements are a well-established means of procuring development rights in exchange for monetary payments to landowners. Organizations such as the Conservation Fund, Trust for Public Land, the Pacific Forest Trust and others have invested heavily in conservation easements, which provide the landowner with cash influx and/or tax breaks.

Transfer Development Rights (TDRs) enable a trading of zoning privileges from areas with low population needs, such as forest land, to areas of high development needs, such as urban core areas. Developers in urban core areas are allowed to purchase the development rights from a rural landowner in order to increase the number of developable units in the urban zone. From the landowner's perspective, a TDR is essentially a conservation easement. However, they differ from traditional conservation easements by providing developers within urban growth boundaries who are facing restricted development rights with an opportunity to trade money for the development rights held by the forest landowner.

King County has the largest program in the country and has protected over 92,000 acres of forest land through TDRs (Sollitto 2006). However, given the recent changes in Seattle zoning, allowing developers in the downtown core greater development rights, it is unlikely that there will be a dramatic increase in demand for TDRs. Other counties in Washington state, such as Snohomish, are currently experimenting with TDRs.

### *Regulatory Relief*

Many landowners, large and small, point to regulatory uncertainty as a driving disincentive to practicing forestry. Many are concerned that the regulations will become more stringent and they will become further hampered in their ability to conduct harvest activity. Although it is unlikely that any state official or agency will provide a blanket guarantee that the regulatory framework will remain constant, more effort may be exerted to enable landowners to enter into agreements such as the Safe Harbor Agreement. Making use of mutually agreed upon management plans and existing technical assistance may help ease the regulatory burden.

The Alternative Plans Process, implemented by the Washington DNR Small Forest Landowner Office, offers landowners the opportunity to develop alternate management plans to address site-specific issues. This is intended to allow a level of relief from the state's Forest and Fish Law as long as the plan provides adequate and equal protection to the resources. From 2000 to 2005, this program facilitated the development of 112 alternate plans.

Safe Harbor Agreements are voluntary arrangements between the U.S. Fish and Wildlife Service (FWS) or the National Oceanic and Atmospheric Administration and cooperating private landowners. The main purpose is "to promote voluntary management for listed species on non-Federal property while giving assurances to participating landowners that no additional future regulatory restrictions will be imposed" (U.S. FWS 2006b). Several of the cost share programs mentioned above contain regulatory relief components.

### *Tax Relief*

As mentioned above, conservation and other easements typically provide tax breaks to landowners. A person "donating" a qualified conservation interest may deduct the appraised value of the easement from their adjusted gross income, provided that the deduction does not exceed 30% of their adjusted gross income in the year of the gift. Any excess balance of the deduction may be carried over for up to five succeeding years, subject to the same annual 30% limitation. These tax breaks have come under scrutiny by Congress and may be revised.

There are additional ways in which forest landowners can benefit from tax relief. Forest lands are eligible to be classified under specific county land use designations, Under the heading "tax relief", another form of incentive is county landuse designations such as "designated forest land", "commercial forest land", "open space forest land," etc. These provide the lowest tax rate on a piece of property; however, many landowners either are unaware of these designations or find the classification process onerous (Hanson 2006).

New market tax credits were developed to encourage new investment in businesses, economic development and community facilities in low-income neighborhoods and rural areas, and have been used to develop new opportunities for forest product industries (Binkley et al 2006). These tax credits must be obtained by Community Development Entities (CDEs), and are not available to individuals; the CDEs are then able to issue equity interests to investors, who in turn may claim the credits, worth approximately 30 percent in present value terms (Williams 2001).

### *Social License to Practice Forestry*

Although clearly not a financial or even policy incentive, it has been pointed out on numerous occasions that family forest landowners feel a diminishing social license to practice forestry. Many family foresters view themselves as stewards of the land; however, given the negative image of the forestry industry that has

developed over the past twenty years, the negative image has also been projected onto owners of small, non-industrial properties.

### *Technical Assistance*

There are numerous technical assistance programs led by the federal government, state and non-profits. In the wake of the approval of the Forests and Fish Law, the Washington State Legislature created the Small Forest Landowner Office (SFLO) as "a resource and focal point for small forest landowner concerns and policies…[the SFLO has a] goal to improve the economic viability and environmental quality of small forest land holdings" (SFLO 2006).

Other regional programs include the Washington State University's extension programs, DNR's Forest Stewardship program and the Rural Technology Initiative, a collaborative effort by both the University of Washington and Washington State University.

Federal technical assistance programs include the Conservation Technical Assistance program; some of these programs may also link back with the grants and cost share programs discussed above. The Conservation Districts, located in each county in Washington, generally focus on providing education and technical assistance to local landowners.

### *Opportunities for Market Innovation and Additionality*

Bringing ecosystem services (described above) to market and creating new sources of revenue by engaging in markets, or at least deals, for services like carbon sequestration, clean water, etc., will be no small feat. Despite the growing literature and a growing interest on the part of landowners to provide a supply of these services, Washington has very few examples of these types of markets or deals. The Climate Trust has a carbon offset project with the Lummi Tribe, located outside of Mt. Vernon. Seattle City Utilities has made outright land acquisitions to protect their watersheds. To date, there have been no conservation banking projects. Access fees for recreation are in place on many lands, but on a large-scale there is little evidence of private landowners who encourage public use of their lands for recreation.

Many states (California, New Mexico and Illinois) and counties (King) are adopting regulations that either significantly restrict carbon dioxide emissions or commit public entities to reducing their greenhouse gas emissions. These types of policies will help create large markets for carbon sequestration credits.

The following table provides a snapshot of the programs mentioned in this section. At the time of this study, not all of the information was available for each program, thus the table does not reflect the entirety of the programs.

**Table 4.1: Current incentive programs available in Washington State**

| Program | Program Implementer | Type of Action | Benefits | Acres protected | Program support |
|---|---|---|---|---|---|
| Forest Legacy Program | U.S. Forest Service & Washington DNR | **Grant program** funds up to 75% of project costs, typically a CE | Private landowner | ~15,000, Washington ranks 13th overall in number of acres protected | $6.2 million |
| Conservation Reserve Enhancement Program | Farm Services Agency & Washington State Conservation Commission | **Cost share** covers up 50% of the eligible costs to reforest riparian areas | Private landowner | 8,100 | $1.3 million |
| Conservation Innovation Grants Program | Natural Resource Conservation Service (NRCS) | **Cost share** transfers conservation technologies, management systems, and innovative approaches (i.e. market-based systems) | Organizations or academic institutions | | |
| Healthy Forests Reserve Program | NRCS | **Cost share** funds 50-100% of the costs of voluntary easement program established to restore/enhance forest ecosystems & promote recovery of threatened and endangered species, enhance carbon sequestration | Private landowner | | Has not been established in Washington, was a pilot program in fiscal year 2006 for Arkansas, Maine and Mississippi |
| Landowner Incentive Program | Washington Department of Fish and Wildlife (WDFW) | **Grant program** supplements the protection & restoration of federally listed, proposed or candidate species on private lands | Private landowner | | Up to $50,000 for individual landowners |
| Wildlife Habitat Incentives Program | NRCS | **Cost share** provides technical and financial assistance to landowners to restore native vegetation and habitat for threatened and endangered species. | Private landowner | | |
| Forestry Riparian Easement Program | Washington DNR - Small Forest Landowner Office (SFLO) | **Grant program** compensates eligible small forest landowners in exchange for a 50-year easement on "qualifying timber" within riparian areas | Private landowner | 1,813 | $5.2 million |
| Family Forest Fish Passage Program | Washington DNR - SFLO, WDFW, Salmon Recovery Funding Board | **Cost share** provides 75-100% of the cost of correcting a barrier; also provides technical assistance | | 236 miles of stream opened | $4.3 million |

| Program | Program Implementer | Type of Action | Benefits | Acres protected | Program support |
|---|---|---|---|---|---|
| Forest Land Enhancement Program | U.S. Forest Service & Washington DNR | **Cost share** provides for technical, educational, and cost-share assistance to promote sustainability of non-industrial private forests | Private landowners (small) | | |
| Riparian Open Space Program | Washington DNR | **Grant program** qualifying landowners can donate or sell their land and/or timber in designated forest land that exists along migrating stream channels. There are also options to sell the state permanent conservation easements covering the timber and/or forest land provide | Private landowners | 584 | $1.47 million |
| Conservation Easements | Land conservation organizations, state agencies, counties | **Direct payment** voluntary legal agreement that restricts the development and future use of a piece of property, transfers those rights to qualified conservation organization or agency | Private landowners | | |
| Transfer Development Rights | King County, in development elsewhere in the state | **Direct payment** trading of zoning privileges from areas with low population needs, such as forest land, to areas of high development needs, such as urban core areas,. Typically includes a conservation easement on sending site | Private landowners | 92,000 | $22 million in value |

***Summary***

This section reviewed valuation methods for environmental goods and services, and discussed innovative ideas and examples of bringing these goods and services to market. Existing incentives for landowners aimed at providing assistance for landowners were described in order to better understand the basket of tools from which landowners may currently draw. However, while these programs have the potential to provide some significant relief to a great number of landowners, there are several ways in which they currently fall short of their intended goals.

Many of the incentives programs listed above require that the participating lands be home to threatened or endangered species and therefore do not apply to many landowners. Most of the federal and state programs are not well-funded enough to adequately support all interested landowners. In addition, information is incomplete and requires significant navigation of a bureaucratic system and not all landowners either have the time or energy to spare. Significant review of existing programs may be worthwhile in order to determine whether or not such programs merit increased funding, both to make greater funds available to landowners themselves and to enable program staff to increase their ability to conduct outreach to landowners.

Given our abundant forested resources in the Pacific Northwest, we may have the future ability to create significant markets for services such as carbon sequestration, biodiversity protection, watershed protection or hydrological services, and aesthetics. But such markets are in their infancy and much is still needed in the way of generating demand, in identifying and connecting buyers to sellers, as well as in developing the infrastructure to support verifiable transactions that will meet long-term additionality requirements. It will be

important to keep in mind that not all services will be available from all ecosystems and not all markets will be feasible everywhere, and as a result, not all landowners will benefit from bringing these services to the market. Landowners should not expect to rely on any single instrument as a panacea. Instead they should be imaginative and open to complex arrangements and bundles of policy- and financial-based incentives.

## Section 4: Current estimates of forest land conversion in Washington State

### *Overview*

There is a need to more fully understand both the current forest land base and what the future may hold for the forestry industry in regard to available land base, the amount of carbon stored and biomass available in Washington's forests, and the impact of parcelization and fragmentation of what was traditionally large, contiguous tracts of forest land.

Based on the currently available data, it can be estimated that anywhere from approximately 0.37% to 1.04% of the forest land base is converting into residential or commercial development per year. This wide-range of conversion rates are based on different data sets, one tracking "timberland" and the other one tracking general forest land use (which includes a variety of uses and land types, but is mainly forested or forestry-related). Depending on the desired issue, the total acreage of forest land in Washington will follow similar variable ranges. We can estimate that there are close to 20-21 million acres of forest land in Washington, approximately half of the total land base. However, as discussed in the following section, that 20-21 million acres can be broken up into many different types of forest land: working forests, forest cover, public forests, private forests, and more. The following section discusses two different types of data sets and a summary of potential ways to measure forest land conversion in the future.

### *Change in timberland*

Using data from published Forest Inventory Analysis (FIA) reports (Bolsinger et al. 1997, Grey et al. 2005 and 2006), it is possible to estimate the loss and changing ownership patterns of timberland acres. Timberland is a specific category of land that is capable of growing 20 cubic feet of timber per year. The most recent reports, which provide data as of 2001, were based on incomplete inventory data and until the inventory is finalized, these numbers are preliminary and should only be treated as estimates. The comparisons below include some unknown changes, given the changes in inventory methods and/or terminology.

From these reports, it can be estimated that timberland (not including National Forest land) declined at an average rate of 0.37% per year from 1978 to 2001 (from approximately 7.7 million acres to 7 million acres).[1] A minimal amount of this land was reclassified out of the FIA inventory into National Forest land, while the remaining loss was to either urban, right-of-ways, or agriculture land uses. The dominant pattern shown from these data is the transfer of ownership from forest industry companies to other private owners, followed by the subsequent conversion to non-timberland (right-of-way, urban, and agricultural lands) from the "other private" ownership group.

Recently released data from eastern Washington show an estimate of non-national forest timberland declining at an average rate of 0.35% per year from 1980 to 2002 (from approximately 4.3 million acres to 3.8 million acres), with a higher rate between 1970-1980 than 1980-2002.

The figures on the following pages show a summary of the net flow of timberland between other public, forest industry, and other private land owners, as well as into and out of timberland designation. As shown in the Figure 4.2 and Table 4.2, there is a larger amount of timberland transferring ownership from the

[1] Due to different sampling and calculation methods used by the report authors, as well as other FIA data, there will be slight variations in acres by owner and type reported in the other studies associated with the Future of Washington's Forests and Forestry Industries study.

traditional forest industry companies to the other private owner group (95K from 1978/79 to 1988/89, 281K from 1988/89 to 2001) than what is being immediately converted to non-timberland from the forest industry in western Washington. This large transfer of ownership, however, is followed by increased rates of timberland being converted to non-timberland from the other private owner groups (130K from 1978/79 to 1988/89, 198K from 1988/89 to 2001). The chart and table from eastern Washington do not show the same patterns of ownership transfer or timberland change, but rather a change in definitions of reserve land and land swaps with National Forest lands. The charts only show the changes in acreages larger than 20K; the tables following each figure include the complete data.

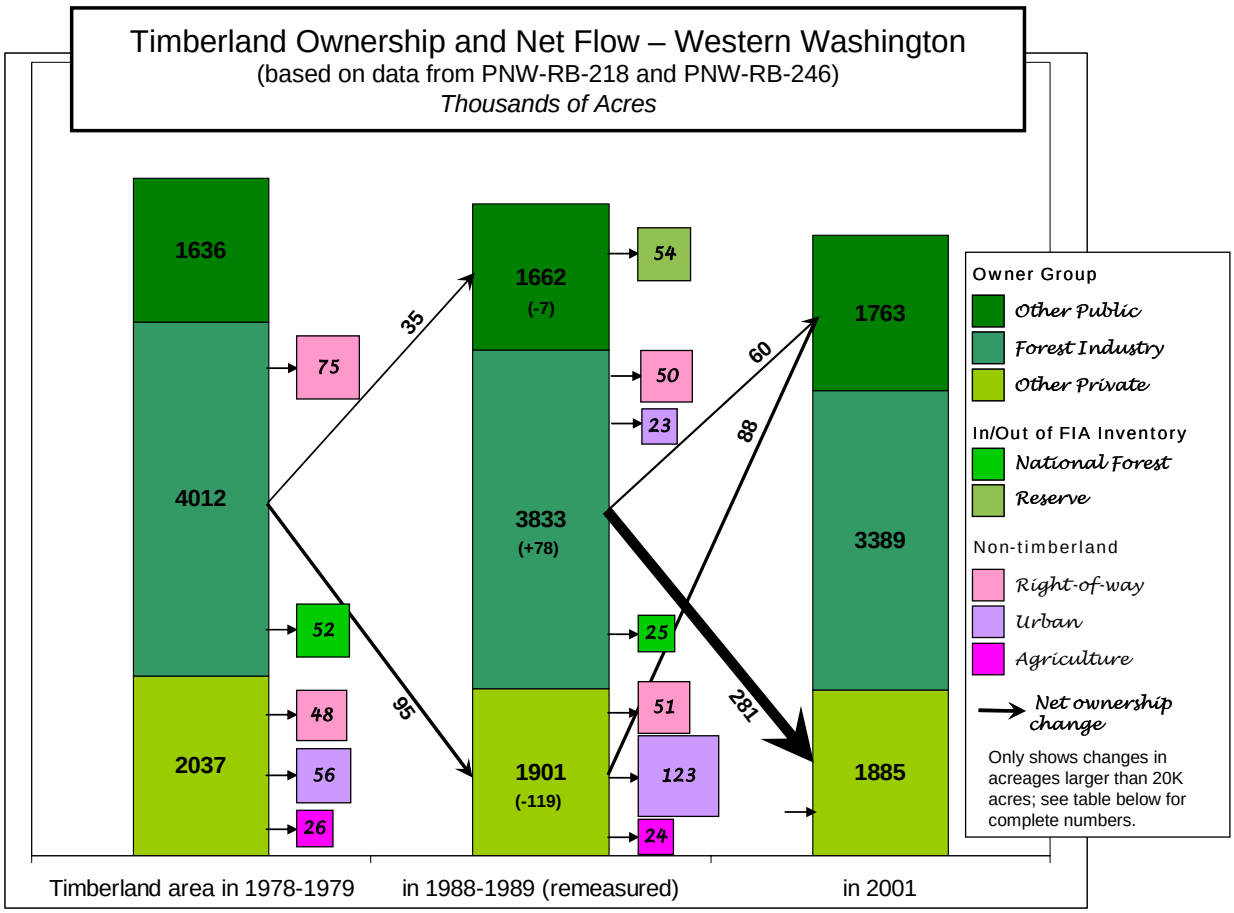


**Figure 4.2: Timberland ownership and net flow on non-national forest lands - western Washington**

## Table 4.2: Changes in timberland area outside of national forests by owner, western Washington

**Changes in timberland area outside National Forests by owner, western Washington (based on PNW-RB-218 Table 33W and PNW-RB-246 Table 25a)**

| | Other Public | Forest Industry | Other Private | All Owners | | Other Public | Forest Industry | Other Private | All Owners | SE (%) |
|---|---|---|---|---|---|---|---|---|---|---|
| | Thousand Acres | | | | | Thousand Acres | | | | |
| **Timberland area in 1978-1979** | **1636** | **4012** | **2037** | **7685** | **in 1988-1989** | **1662** | **3833** | **1901** | **7397** | |
| **Area change owing to** | | | | | **remeasured** | | | | | |
| *Changes in land class* | | | | | | | | | | |
| timberland to rights-of-way | | -75 | -48 | -123 | | | -50 | -51 | -100 | 35 |
| timberland to urban | | -7 | -56 | -63 | | | -23 | -123 | -146 | 28 |
| timberland to agriculture | | | -38 | -38 | | | | -24 | -24 | 71 |
| agriculture to timberland | | | 12 | 12 | | | | | | |
| christmas tree farm to timberland | | 6 | | 6 | | | | | | |
| **Net change** | | **-75** | **-130** | **-205** | | | **-72** | **-198** | **-270** | |
| *Changes in inventory and ownership* | | | | | | | | | | |
| to national forest | | -90 | | -90 | | | -45 | -12 | -56 | 9 |
| from national forest | 3 | 38 | 17 | 58 | | 7 | 20 | | 27 | 25 |
| to reserved | -5 | | | -5 | | -54 | -6 | | -60 | |
| from other public | -111 | 111 | | | | -95 | 95 | | | 36 |
| from forestry industry | 146 | -285 | 139 | | | 155 | -456 | 300 | | 16 |
| from other private | | 44 | -44 | | | 88 | 19 | -107 | | 35 |
| **Net change** | **33** | **-182** | **112** | **-37** | | **101** | **-373** | **181** | **-89** | |
| Timberland area in 1988-1989 | 1669 | 3755 | 2020 | 7443 | **in 2001** | **1763** | **3389** | **1885** | **7037** | |
| ***Unknown change from remeasured plots*** | ***7*** | ***-78*** | ***119*** | ***46*** | | | | | | |

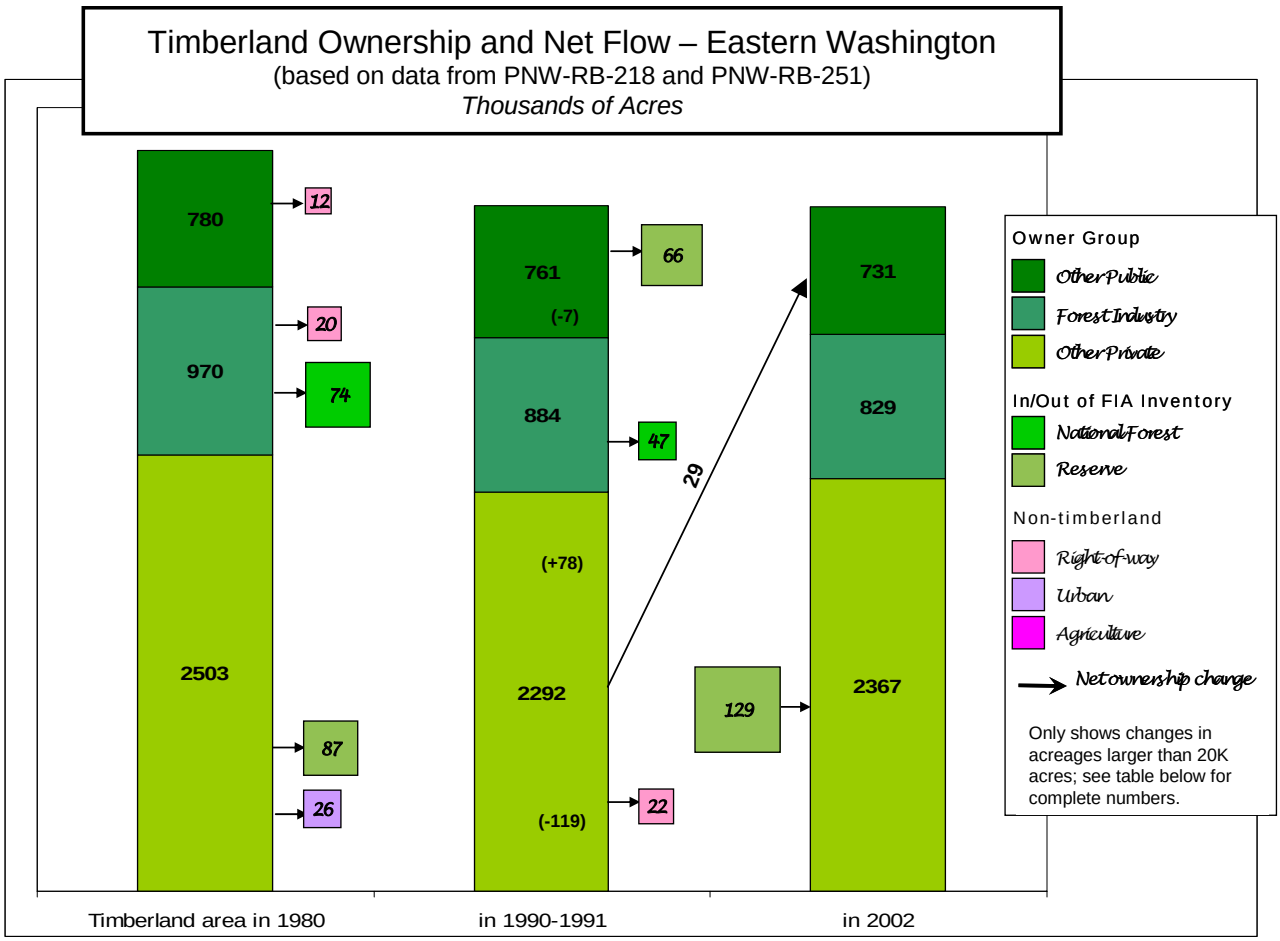


**Figure 4.3: Timberland ownership and net flow on non-national forest lands - eastern Washington**

## Table 4.3: Changes in timberland area outside of national forests by owner, eastern Washington

**Changes in timberland area outside National Forests by owner, eastern Washington (based on PNW-RB-218 Table 33W and PNW-RB-251 Table 25)**

| | Other Public | Forest Industry | Other Private | All Owners | | Other Public | Forest Industry | Other Private | All Owners | SE (%) |
|---|---|---|---|---|---|---|---|---|---|---|
| | Thousand Acres | | | | | Thousand Acres | | | | |
| **Timberland area in 1980** | **780** | **970** | **2503** | **4254** | **in 1990-1991** | **761** | **884** | **2292** | **3938** | |
| **Area change owing to** | | | | | **remeasured** | | | | | |
| *Changes caused by new reserve definition* | | | | | | -50 | 0 | 129 | 79 | |
| *Changes in land class* | | | | | | | | | | |
| timberland to rights-of-way | -12 | -20 | | -33 | | | | -22 | -22 | 71 |
| timberland to urban | | | -26 | -26 | | | | | | |
| timberland to agriculture | | | -15 | -15 | | | | | | |
| agriculture to timberland | | | | | | | | | | |
| christmas tree farm to timberland | | | | | | | | | | |
| **Net change** | **-12** | **-20** | **-41** | **-74** | | | | **-22** | **-22** | |
| *Changes in inventory and ownership* | | | | | | | | | | |
| to national forest | -11 | -74 | | -85 | | -4 | -53 | 0 | -57 | 28 |
| from national forest | | | | | | 0 | 6 | 0 | 6 | 77 |
| to reserved | | | -87 | -87 | | -16 | 0 | 0 | -16 | |
| from other public | -23 | 23 | | | | 0 | 0 | 0 | 0 | 0 |
| from forestry industry | 20 | -40 | 20 | | | 11 | -106 | 95 | 0 | 31 |
| from other private | 11 | 19 | -30 | | | 29 | 98 | -127 | 0 | 31 |
| **Net change** | **-3** | **-72** | **-97** | **-172** | | **20** | **-55** | **-32** | **-67** | |
| Timberland area in 1990-1991 | 764 | 878 | 2366 | 4008 | **in 2002** | **731** | **829** | **2367** | **3927** | |
| | | | | | se for total % | 6 | 8 | 4 | 2 | |
| ***Unknown change from remeasured plots*** | ***3*** | ***-6*** | ***74*** | ***70*** | | | | | | |

### *Changes in forest land use*

Currently, the only available data for a statewide assessment of forest land by different ownerships is through the FIA. Unfortunately, The grid system employed by the FIA is very suitable for relatively homogenous

areas, but may not be the best sampling scheme for areas with increasing heterogeneity of land uses, such as in the changing landscapes of western Washington. There is a small chance of an inventory point falling in an area experiencing the highest rates of forest land conversion. While the FIA data are an excellent source for timberland volume, ownership patterns in rapidly changing forested landscapes may be better captured using alternative sources,

Therefore, this project attempted to use an additional data source for a more comprehensive view of forest land conversion to other uses. Data were extracted and further analyzed from a project completed for the U.S. Forest Service's Pacific Northwest Research Station, a regional assessment of land use change on non-federal lands in western Washington using Landsat satellite imagery and a series of spatial overlay analyses in a geographic information system (GIS). Since federal lands rarely, if ever, are converted from forest land uses to developed lands, only non-federal lands were included in this analysis.

The data and maps available from the land use change assessment are a first generation attempt of analyzing land use for such a large area using remotely sensed data. Therefore, the accuracy and uses of the data are still being tested and results should only be treated as estimates. However, the methodology employed for this project was a first step toward more accurately tracking and assessing land use trends and will be built upon as better data and methods are developed. It was originally thought that this study would provide an opportunity to produce similar data from eastern Washington; however, given the very different landscapes in eastern Washington, the methodology did not translate easily enough to perform the analysis within the time and scope of this project.

Land use designations were based on the following methods, also shown in Figure 4.4, and assumptions. Two segmentation levels were used to differentiate between large areas of relatively homogeneous land cover and small areas of development. This resulted in two different land cover classifications: a general land cover classification (i.e. forest or irrigated lands) and a developed (i.e. concrete, rooftops) land cover classification. Land cover is the biophysical characteristics of the landscape, while land use is made up of multiple land cover types. In order to determine land use, rather than land cover, a series of analyses were performed to determine land use from the land cover classification, based on neighboring cover characteristics, size of area, homo/heterogeneity of the area, and percent developed.

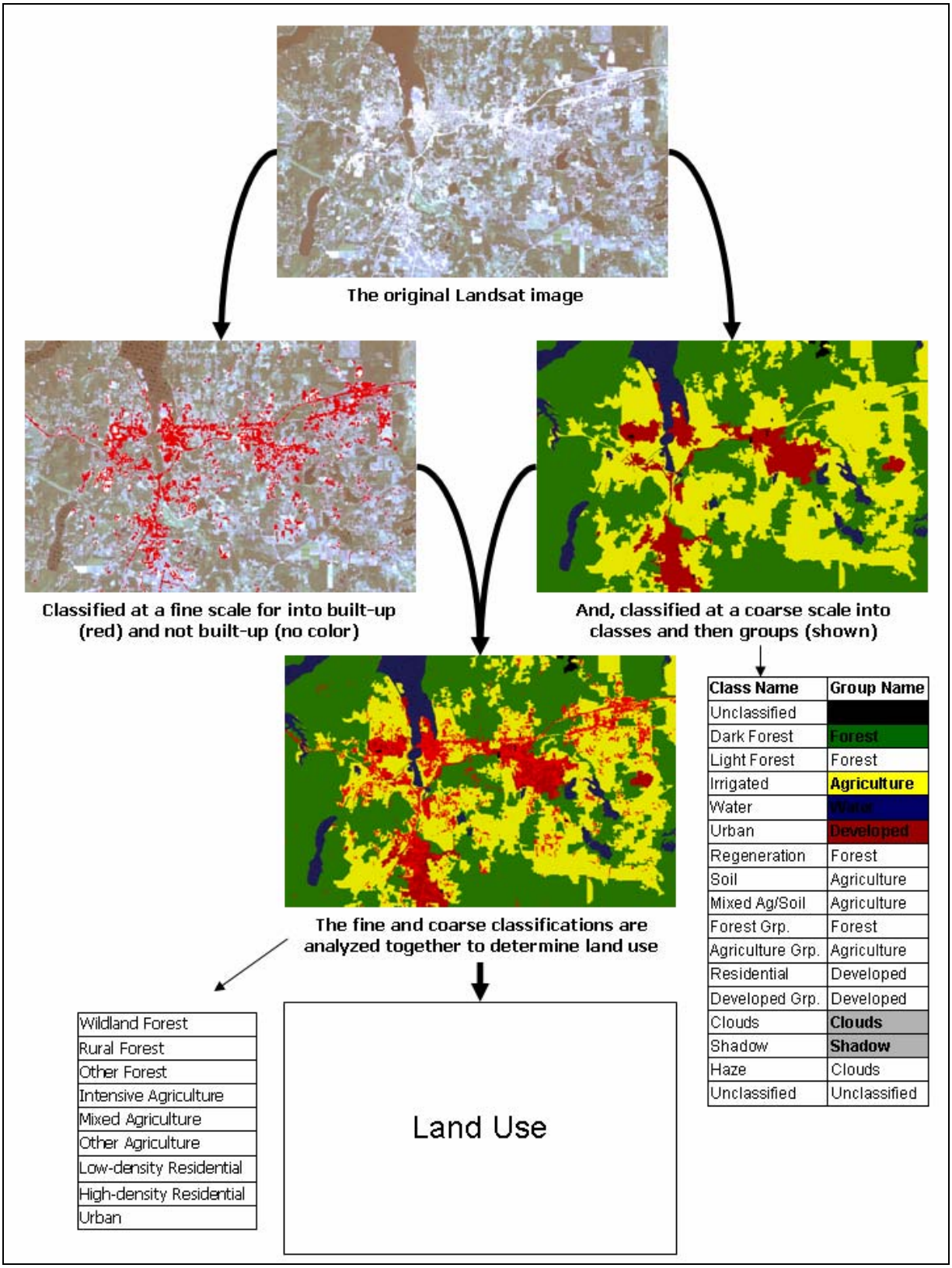


**Figure 4.4: Process used to classify land use change in western Washington**

### *Land Cover Classifications*

Two segmentation levels were used to differentiate between large areas of relatively homogeneous land cover and small areas of development. This resulted in two different land cover classifications: a coarse, general land cover classification (i.e. forest or irrigated lands) and a fine land cover classification of only built-up (concrete, rooftops, roads) properties. The classification scheme used in this project was based on a similar classification employed by the FIA program and the Oregon Department of Forestry for land use determination based on aerial photo interpretation for western Oregon (Azuma et al. 2002). The following table, Table 4.4, describes both the coarse and fine classifications.

**Table 4.4: Land cover classifications**

| **Coarse-scale land cover classifications** | |
|---|---|
| Dark Forest | Mature evergreen forest cover |
| Light Forest | Sub-mature and deciduous forest cover with increasing likelihood away from floodplains and in higher elevations |
| Regeneration | Bare or nearly bare soil with increasing likelihood away from floodplains and in higher elevations |
| Irrigated | Irrigated agricultural lands with increasing likelihood in or near floodplains and in lower elevations |
| Soil | Bare soil with increasing likelihood in or near floodplains and in lower elevations |
| Mixed Ag/Soil | Heterogeneous lands with some irrigated agricultural and bare soil often with some dispersed development |
| Residential | Low to medium density residential developments including rural developments and large-lot urban residential areas |
| Urban | Dense residential developments, urban centers and industrial lands |
| Water | Oceans, lakes, streams, reservoirs, etc. |
| Haze | Clouds partially blocking view of earth surface |
| Clouds | Clouds completely blocking view of earth surface |
| Shadow | Dark areas adjacent to clouds |
| Unclassified | Spectrally indistinguishable areas which cannot be classified |
| **Fine-scale land cover classification** | |
| Built-up | Impervious surfaces, such as concrete, rooftops, gravel |

The following land cover classifications were grouped into larger classes (groups, shown in italics) in order to calculate contiguous land cover characteristics.

- Dark Forest, Light Forest and Regeneration land cover classes ⇨ **Forest**
- Irrigated, Soil and Mixed/Ag Soil land cover classes ⇨**Agriculture**
- Residential and Urban land cover classes ⇨**Developed**
- Cloud land cover class ⇨**Clouds**
- Shadow land cover class ⇨**Shadow**
- Unclassified land cover class ⇨**Unclassified**

The built-up land cover classification was not grouped into the land cover groups; rather, it was used to calculate percent developed and development density within the larger land cover groups.

- Built-up ⇨**Percent developed and development density**

### *Land Use Determination*

The land cover classifications were further analyzed to determine land use. The table below, Table 4.5, shows the spatial rules used to determine land use from the classified land cover data; the text following the table describes the land use classes in more detail.

**Table 4.5: Spatial rules used to determine land use**

| Land Use | Land Cover Class/Group | Contiguous Acres | Percent Developed | Developed Clusters | Other |
|---|---|---|---|---|---|
| **Wildland Forest** | Forest (group) | ≥ 640 | ≤ 5% | ≤ 4 | |
| **Rural Forest** | | ≥ 640 | ≤ 20% | 4 < x < 8 | Not Wildland Forest |
| | | < 640 | 0% | | |
| | | > 640 | ≤ 5% | | |
| **Other Forest** | | | | | Not Wildland Forest, Not Rural Forest |
| **Intensive Ag** | Irrigated or Soil (classes) | < 640 | < 1% | | |
| | | ≥ 640 | ≤ 5% | ≤ 9 | |
| | Mixed (class) or Agriculture (group) | | < 1% | | |
| **Mixed Ag** | Agriculture (group) | ≥ 640 | ≤ 20% | ≤ 12 | Not Intensive Agriculture |
| **Other Ag** | | | | | Not Intensive Agriculture, Not Mixed Agriculture |
| **Low-density Residential** | Forest or Agriculture (groups) | ≥ 40 | 20% < x < 50% | | |
| **High-density Residential** | Developed (group) | | < 50% | | |
| | | < 40 | > 50% | | |
| | Any non-developed group | ≥ 40 | > 50% | | |
| **Urban** | Developed (group) | ≥ 40 | > 50% | | |

- Wildland Forest
  a. Description: Industrial and non-industrial forest lands, parks, municipal watersheds and other forested lands that have very few paved roads or residential developments.
  b. Definition: At least 640 contiguous forest group acres and no more than 5% developed with a development density of 4 per square mile or less. The land use polygon must be in a forest land cover classification group.
- Rural Forest
  a. Description: A mix of forest land types with some dispersed residences.
  b. Definition: At least 640 contiguous forest group acres and no more than 20% developed with a development density of between 4 and 8 per square mile. Contiguous forest group acres less than 640

and no developments or the land use polygon is greater than 640 acres and no more than 5% developed. The land use polygon must be in a forest land cover classification group.

- Other Forest:
  a. Description: Areas that are primarily forest but have too many developments to be considered rural forest.
  b. Definition: Any remaining land use polygons that are in a forest land cover classification group and not wildland forest or rural forest.
- Intensive Agriculture:
  a. Description: Agricultural and livestock lands dominated by irrigated crops or grassland, bare soil and dispersed farm buildings.
  b. Definition: At least 640 contiguous irrigated or soil acres and no more than 5% developed with a development density of 9 per square mile or less. Contiguous irrigated or soil class acres less than 640 and less than 1% developed or mixed ag/soil land cover classification and less than 1% developed.
- Mixed Agriculture:
  a. Description: A mix of agricultural and livestock lands with some additional residences unrelated to agriculture and an occasional small development. Often includes non-irrigated and cleared lands and occasional industrial buildings.
  b. Definition: At least 640 contiguous class acres in an agricultural land cover group and no more than 20% developed with a development density of 12 per square mile or less.
- Other Agriculture:
  a. Description: Agricultural and cleared lands that have a development density equated to 20 or 40 acre parcels that may be single-family residences, hobby farms or small agricultural operations.
  b. Definition: Any remaining land use polygons that are in an agriculture land cover classification group and not intensive agriculture or mixed agriculture.
- Low-Density Residential:
  a. Description: Large areas of development in suburban and rural settings where parcel sizes are large and the landscape is dominated by roads, homes and commercial buildings.
  b. Definition: At least 40 contiguous class acres that are in a forest or agricultural land cover classification group and are between 20% and 50% developed.
- High-Density Residential:
  a. Description: Large areas of development in dense urban settings or in large rural developments. Small parcel sizes. Around 50% of the land surface is impervious surface like roads, roofs, sidewalks and driveways.
  b. Definition: Land use polygons that are in the developed land cover classification group and less than 50% developed or less than 40 contiguous class acres and greater than 50% developed or in a non-developed land cover classification group and greater than 50% developed.
- Urban:
  a. Description: Dense urban development. Over 50% of the land surface is impervious surface with little vegetation. Airports, industrial parks, urban centers, multi-family residential and very high density residential development.
  b. Definition: At least 40 contiguous class acres that are in a developed land cover classification group and greater than 50% developed.
- Water:
  a. Description: Oceans, lakes, reservoirs and streams.
  b. Definition: Any land use polygon in a water land cover classification group.
- Unknown:
  a. Description: Any land cover that could not be classified due to spectral ambiguity, cloud cover, haze or shadow.

b. Definition: Any land use polygon in an unknown land cover classification group.

### *Land Use Change*

As can be expected with multiple land use classes, the number of possible changes (forest to urban, forest to agriculture, agriculture to forest, etc.) could be quite large. For simplicity, a one-way trajectory of change was assumed (shown in Figure 4.5): a land use can only become more developed, not less developed.

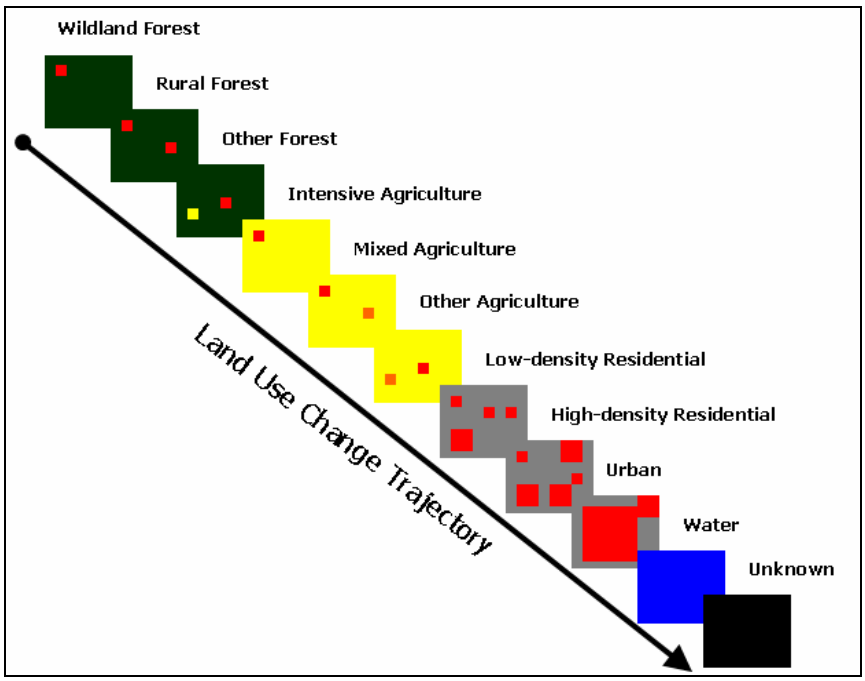


**Figure 4.5: Land Use Change Trajectory**

An accuracy assessment of the final land use classifications, using high-resolution aerial photography for 94 stratified random points through western Washington, resulted in an overall accuracy of 84% (Table 4.6). This result is consistent with many other land cover and land use classifications. The largest sources of error were distinguishing between transitional and rural, mixed agricultural lands common in areas undergoing scattered conversion of forest land to rural hobby farms and pastures.

**Table 4.6: Land use classification accuracy matrix**

| Accuracy Matrix | | Classified | | | | | |
|---|---|---|---|---|---|---|---|
| | | Forest | Agriculture | Built-up | Water | Total | Percent Correct |
| Photo-Interpreted | Forest | **28** | 6 | | | 34 | 82.4 |
| | Ag | 4 | **20** | 4 | | 28 | 71.4 |
| | Built-up | 1 | | **24** | | 25 | 96.0 |
| | Water | | | | **7** | 7 | 100.0 |
| | Total | 33 | 26 | 28 | 7 | **94** | |
| | Percent Correct | 84.8 | 76.9 | 85.7 | 100.0 | | **84.0** |

### *Results*

This forest land use data show a much steeper rate of change than the FIA timberland data. From approximately 1988 to 2004, forest land outside of federal ownership in western Washington was converted

to non-forest land uses at an estimated rate of 1.04% per year. It is estimated that from 1988 through 2004, 9% of western Washington's non-federal land in a forest land use was converted to agriculture/mixed-rural land uses, while 5% was converted to residential or urban land uses. An additional 3% was converted to either other uses or was unclassified in the data. The remaining 83% of the land in forest land use in 1988 remained in the same in 2004.

The difference in the rates of forest land use and timberland change can be attributed to many things. As described above, areas classified as forest land use are made up of mainly forest cover, but include scatterings of residential homes, roads, and other uses. The FIA data, on the other hand, classify timberland based first on aerial photographs to determine if the point is forested and then actual plot measurements of the forest land to determine if the area is capable of growing 20 cubic feet or more per acres of industrial wood and if the land is not withdrawn from timber utilization by statute, ordinance, or administrative order. If an FIA timberland point falls in a relatively low-density forested area, the entire area may be classified as timberland. Comparatively, the land use data may classify the same area (not based on a point, but rather surrounding spatial information and characteristics) as a non-forest land use due to fragmentation of the larger forested tracts (meaning smaller areas of contiguous forest).

The forest land use data, albeit coarse, appear to be capturing the changing nature of forest land in Washington: the large, uninterrupted tracts of forested lands are changing into a mixture of rural agricultural land uses, residential and urban lands uses, and smaller areas of forest land use.

Although the FIA data may not be capturing the extent of forest land conversion, it is clear that the pattern of industrial forest land transferring to other private ownership and then into urban lands is apparent, as shown in the earlier figures of net ownership and timberland transfer. Between 1978/1979 and 1988/1989, 95k acres of timberland transferred to other private owners; this pattern almost doubled between 1988/89 and 2001, with 281k acres transferred. Likewise, the amount of timberland in other private ownership converting to urban uses increased from 56k to 123k in the same time periods. If this trend continues, uninterrupted, western Washington's industrial forest lands could be facing a significant decrease in acreages, with much of the land transferring to other private owners and then into urban and residential land uses.

The maps shown in figures 4.6, 4.7, and 4.8 are based on the data from the land use change analysis. The light brown colors are the federal lands not included in the analysis. As evident from these preliminary maps, the amount of developed lands (high- and low-density residential and urban lands) has increased from 1988 to 2004. As a note, the amount of agricultural lands appears to be increasing; this is due to the difficulty in distinguishing the typical rural developments common throughout western Washington (hobby farms and large lots cleared of trees) from many of the pastures and fields used for agricultural purposes.

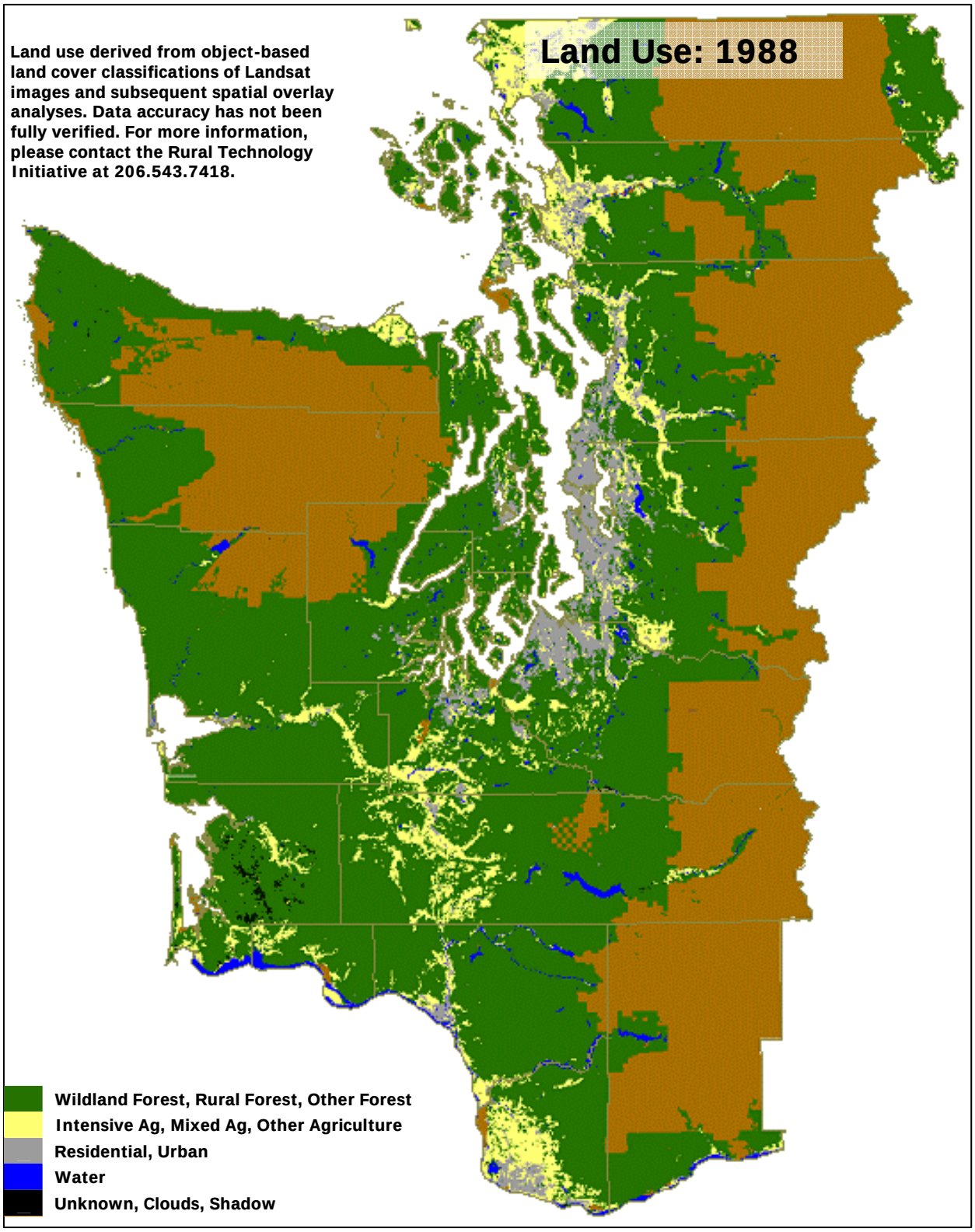


**Figure 4.6: Land use in western Washington, 1988**

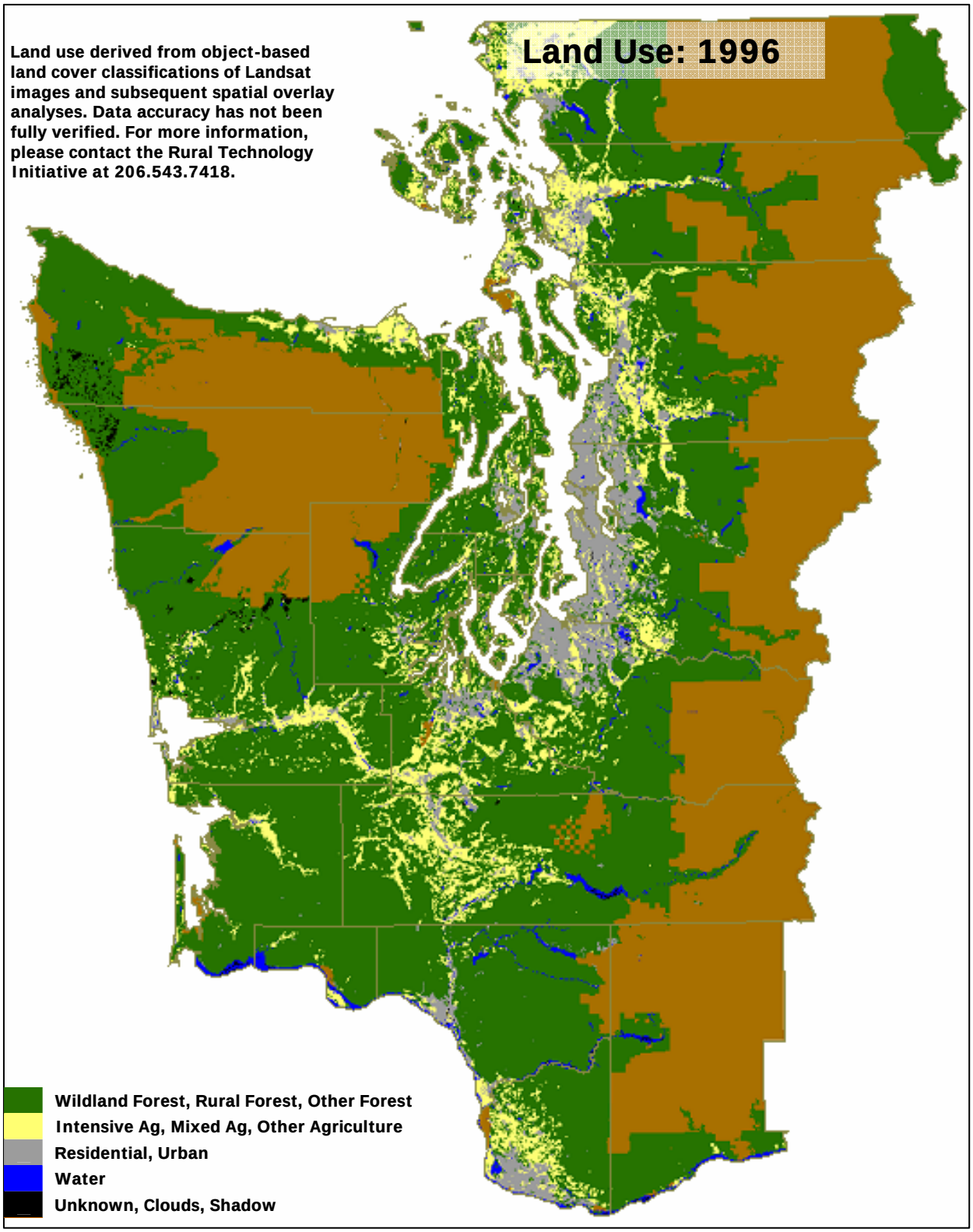


**Figure 4.7: Land use in western Washington, 1996**

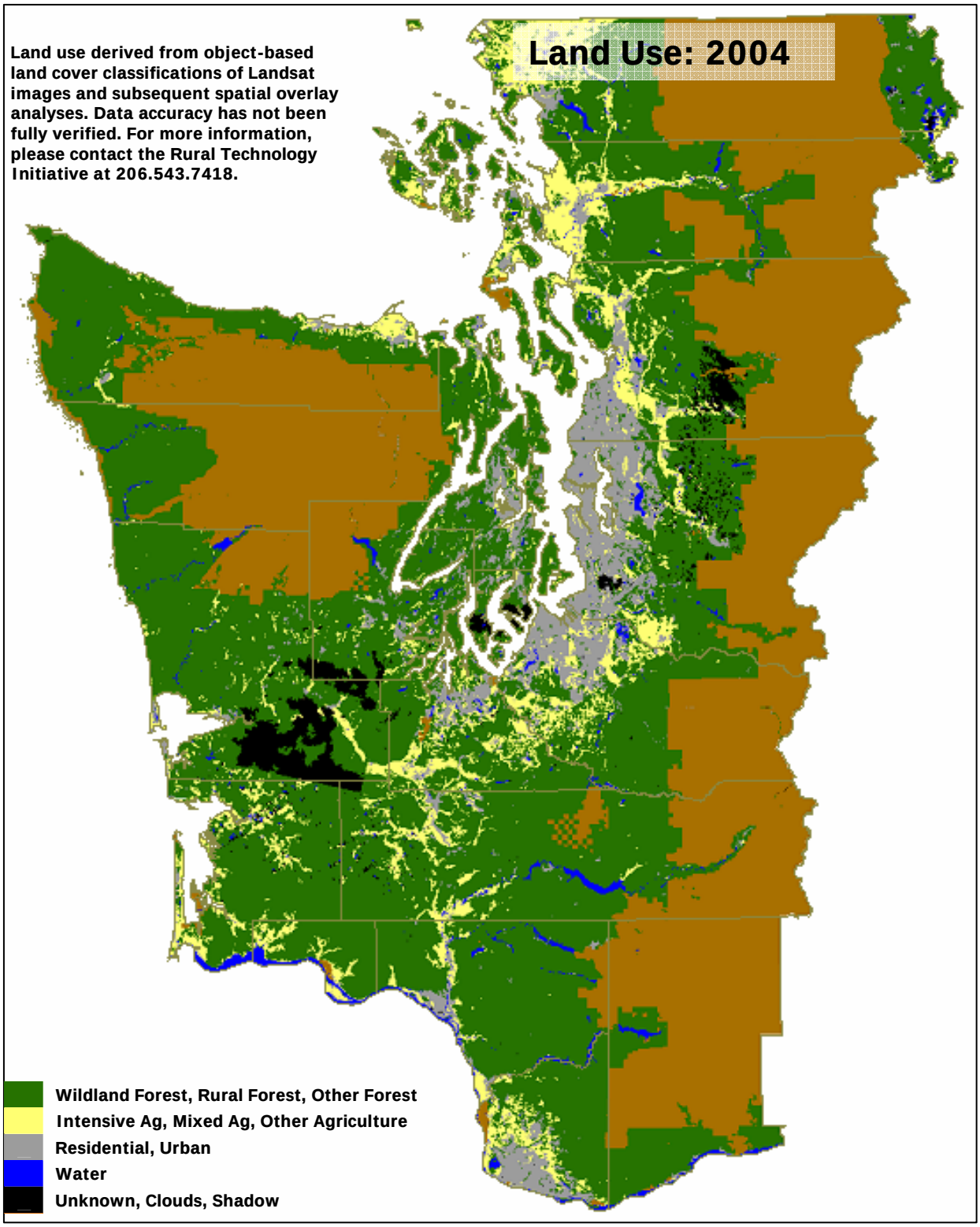


**Figure 4.8: Land use in western Washington, 2004**

### *Where is conversion taking place*

The conversion of forest land to development is influenced significantly in many cases by location (Alig and Plantinga 2004). Unlike Oregon, where much of the forest land is buffered from development by its geographic isolation, steep slopes of the coastal mountains and poor accessibility (Kline and Alig 2005);

Washington's forestland is in areas experiencing urban growth. The low-elevation forests of western Washington are among the most productive in the world for softwood products (McClinton and Lassiter 2002) and these are the areas where most of the state's forestland is predicted to be lost. Forestlands around the state that are susceptible to development pressure are those nearby urbanizing areas with roads and transportation infrastructure to support population expansion (Dicks 2005, Kline and Alig 2005, Munn et al. 2002, Barlow et al. 1998).

According to Washington's forest industry, land conservation organizations and county resource managers, forestland along the I-5 corridor will likely undergo the most conversion. For the westside of the Cascades, they identified Clark, King, Pierce, Snohomish and Thurston counties as those likely to see the greatest change (Bill 2005, Dart 2005, Dicks 2005, Dunning 2005, Stinson 2005). They also foresee that Grays Harbor, Jefferson, Kitsap, and Mason counties will undergo forestland conversion (Gabriel and Katz 2006, Dart 2005, Dicks 2005). In eastern Washington, they anticipate that Kittitas, Spokane and Stevens counties are likely to undergo the most conversion of forestland (Dart 2005, Dunning 2005).

Forestlands in other regions in Washington are also at risk for conversion, while Stein et al. (2005) reported in The Forests on the Edge report that areas in Whatcom and Skagit counties are likely to have housing densities increase by 20-40 percent on private forestlands, Dart (2005) has indicated that most of Whatcom County's timberland is rugged and mountainous and not suitable for development. Largely, Dart (2005) reports that the lands likely to be converted for development are rural agricultural lands.

### *Future steps in forest land use analysis*

This section presented a broad overview of different estimates of timberland and forest land use change and a methodology that could be used to analyze future land use estimates and change. However, this field of work is emerging and the methodology for accurately and efficiently measuring land use change is still developing. Defining the desired category of land use (e.g., forest land, timberland, working forests, and industrial forest lands) is absolutely necessary before embarking on any future land use estimates. Once the desired category of land use is identified and defined, acquiring the correct baseline data will be much easier to ensure. Simple questions—such as, "how much working forest land is in a certain county or region?"—are still not able to be answered, even with complex spatial land use analyses, such as those presented in this section, or from the FIA timberland data.

As more people and organizations become increasingly concerned about the rate and implications of forest land conversion, the production and storage of clean water, the use of biomass for energy sources, carbon sequestration, and more, the demand for accurate and appropriate data will continue to increase. The data briefly presented in this section, both the FIA data and alternative measurements of land use, contain a wealth of available information that will require more in-depth analysis specific to the question asked, e.g., net loss of forests for carbon storage or the implications of forestland ownership patterns. Accurately defining the questions and objectives is essential before any detailed analysis or assumptions can be made about the acreages and implications of forest land conversion.

## Section 5: A case study of forest land conversion at a local level

### *Overview*

Quantifying forest land conversion is highly complex, especially at the statewide level. Relying on statewide or regional data to analyze patterns of parcelization and fragmentation are often inappropriate and miss crucial linkages between ownership and parcel size. Therefore, the next step of this study was to attempt to map the pattern of forest land conversion based on theorized and anecdotal patterns expressed in interviews and other literature. Specifically, we were interested if there were measurable patterns of forest land conversion that could help predict which areas were more likely to face conversion pressures in the future and if there were certain areas that could warrant immediate attention for increased incentive programs. Using a combination of data sources, this analysis was able to quantify, in unincorporated King County, the

pattern of private landowners filing for forest practice applications with the intention to convert the land from forestry uses, the parcelization of that land, and the eventual development of the land into residential or commercial uses. The analysis shows that while the majority of new parcels were in areas where the general land use changed from forest to non-forest uses, the number of development permits issued was much higher on areas of other land uses, most likely already cleared and subdivided large residential lots.

### *Analysis*

Originally, two counties, Spokane and King County, were both going to be used as case studies to 1) see if the land use data presented in the previous section was accurately capturing the parcelization and conversion of forest lands and 2) to depict the patterns of forest land conversion at a local, more detailed scale. Unfortunately, Spokane County's historical parcel data was lost a few years ago and were unable to be included in this analysis.

By overlaying three categories of the forest land use data (areas that changed to non-forest use, areas that stayed as forest land use, and areas that stayed as other land uses) with historical Class IV General Forest Practice Applications (required if a landowner is going to harvest with the intention of converting out of forestry uses in the near future), new parcels, and development permits, it was possible to quantify the amount of land undergoing one of these steps towards conversion out of forest land and into residential or commercial development. Specifically, the following data were used:

- Class IV General FPAs (1996 through 2004) – from the WA DNR Forest Practices Division
- Parcels (1997 and 2003) – from King County Assessor's Office
- Development permits (1996 through 2004) – collected by the Puget Sound Regional Council

The following illustration shows an example of how these data were organized and analyzed in relationship to the forest land use categories. The light grey in the background of each image are areas that changed from forest land use to other uses between 1996 and 2004 (as represented by the land use data from western Washington), while the light brown areas stayed in forest land use between 1996 and 2004. The first box shows the geographic location of forest practice applications in the image, the second box shows the parcels in 1997 (the dark grey lines) alongside the parcels in 2003 (the red lines), and the third box shows the development permits filed sometime between 1996 and 2004 for the same area.

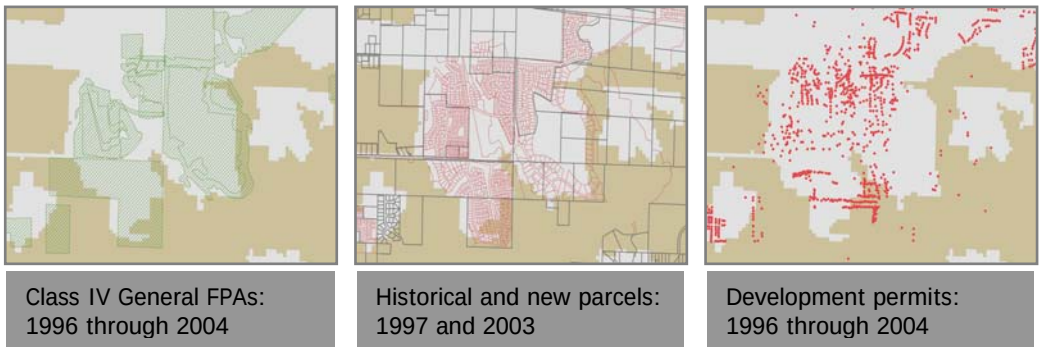


**Figure 4.9: Illustration of forest land conversion at the local level**

### *Results*

Forest Practice Change: The highest number of Class IV General FPAs (229 out of 569) that were filed between 1996 and 2004 were in areas classified as non-forest land uses (other uses). However, the highest number of acres (4,618 out of 10,472) filed under the same permits were in areas that changed from forest land use to other uses in the same time period.

Parcels: Most often, the next step in forest land conversion, after the Class IV General FPA has been filed, is the subdivision of the parcel (or parcelization). Although the areas that changed from forest land use to other uses were only 7% of the total study area, 70% of the new parcels were in those areas of unincorporated King County. Most likely, the areas of other land use, which only accounted for 23% of the new parcels, were already subdivided before 1996 and were now in the stages of either developing the land or clearing the land for development.

Development Permits: Areas that changed out of forest land use to other uses included 34% of the new development permits, while areas that were already in other land uses prior to 1996 included 49% of the development permits granted between 1996 and 2004. This low number of development permits in the areas that changed out of forest land use is most likely due to the recent parcelization of the area (as shown by the parcel analysis of 70% of the new parcels), but are yet to be fully developed areas. There is however, enough development taking place in those areas to classify the area out of forest land use, but does not yet show the development potential that lies in the future. If the land base that changed from forest land use to other uses accounts for 70% of the permits, but only 34% of the development permits, it can be assumed that the potential for future development is fairly high. Alternatively, the areas that were already in other land uses showed relatively few new parcels, compared to areas that were originally in forest land use, but a large number of development permits. This pattern is likely due to areas already parcelized before 1996 and development took place between 1996 and 2004.

The figures on the following pages, figures 4.10, 4.11, and 4.12, show this information spatially, with the number of FPAs, permits, and parcels depicted on a gradient from dark green (for none) to red (for the most). As expected, the areas that had no or low numbers of these items were areas that stayed as forest land use between 1996 and 2004. Table 4.7 shows the numerical data associated with this analysis.

**Table 4.7: Intent to convert, parcelization, and development in unincorprated King County, ~ 1996 - 2004**

| **Class IV General FPAs** | **Count (Acres)** | **Percent (% of Acres)** |
|---|---|---|
| Changed to **non-forest** land use | 211 (4,618) | 38% (44%) |
| Stayed in **forest land** use | 122 (2,228) | 22% (21%) |
| Stayed in **other land** uses | 229 (3,626) | 41% (35%) |
| *Total* | *562 (10,472)* | |
| **New Parcels** | **Count** | **%** |
| Changed to **non-forest** land use | 4,463 | 70% |
| Stayed in **forest land** use | 478 | 7% |
| Stayed in **other land** uses | 1,454 | 23% |
| *Total* | *6,395* | |
| **Development Permits** | **Count** | **%** |
| Changed to **non-forest** land use | 9,057 | 34% |
| Stayed in **forest land** use | 4,697 | 18% |
| Stayed in **other land** uses | 13,063 | 49% |
| *Total* | *26,817* | |

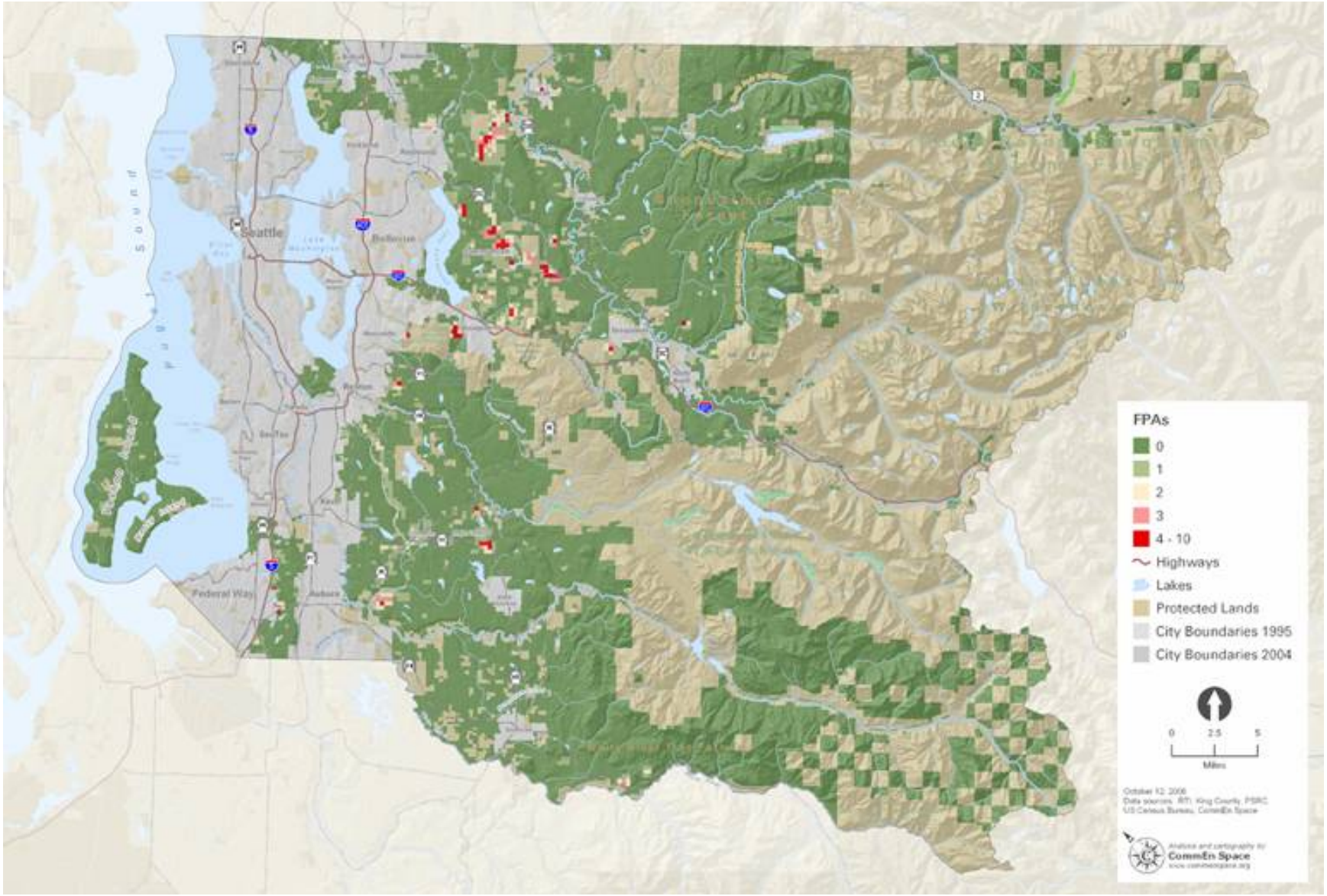


**Figure 4.10: Density of Class IV General FPAs in unincorporated King County by ¼ grid: 1996-2004**

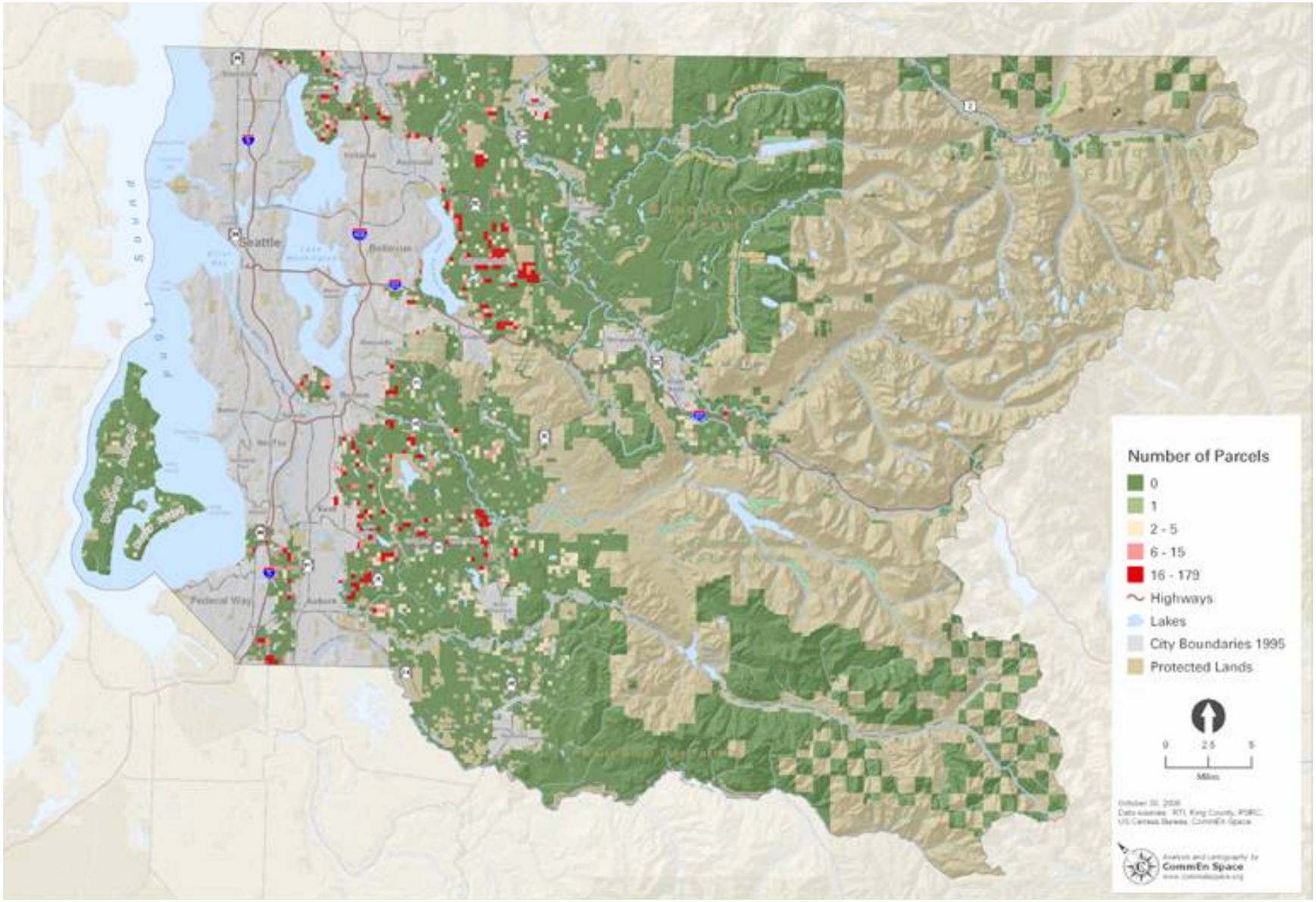


**Figure 4.11: Density of additional parcels in unincorporated King County by ¼ grid: 1997-2003**

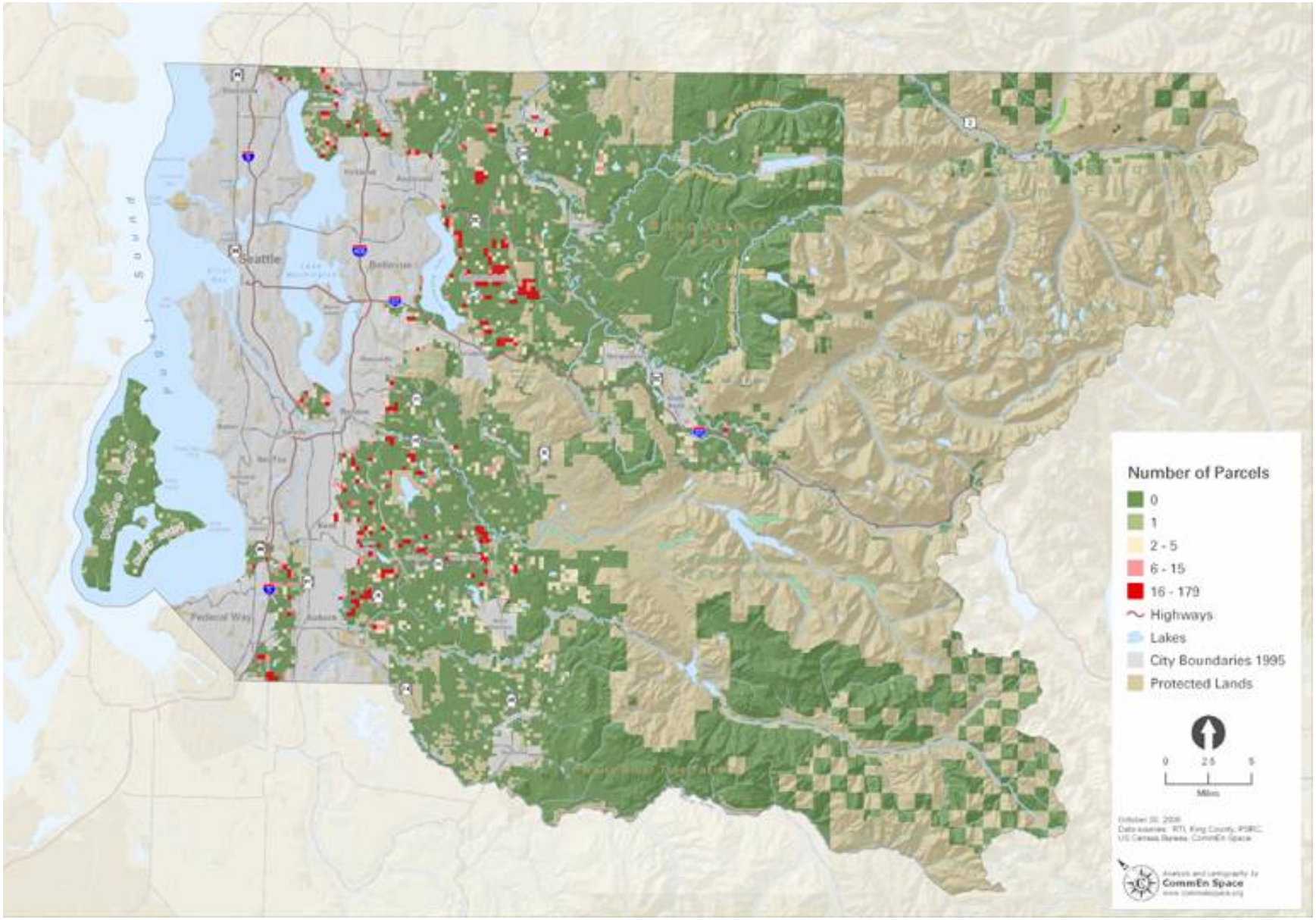


**Figure 4.12: Density of development permits in unincorporated King County by ¼ grid: 1996-2004**

## Section 6: Future incentive programs to maintain forest land in Washington State

***This section is a product of the Cascade Land Conservancy, in their consultant role to the Future of Washington Forests research.***

### *Overview*

In the next 100 years, the population of the Central Cascade region is expected to at least double, dramatically increasing the region's demand for housing and economic development. This will put enormous pressure on our forests and farmlands to convert to other uses. As a response to this situation, Cascade Land Conservancy initiated a far reaching action plan for conservation in the Central Cascades – *The Cascade Agenda*. One key objective of The Agenda is conservation of working forest lands in the Cascade Foothills. Outright purchase of all of these lands for preservation is cost prohibitive. Without continuing timber production, it would also have significant negative impacts on the region's economy and quality of life for local communities. Therefore, *The Cascade Agenda* recommends that the most appropriate and most feasible way to conserve the foothills land base is through maintaining working forests and the viability of the forestry industry in the region.

*Cascade Agenda* staff, in partnership with the University of Washington, embarked on a study to assess the tools and policy levers that influence the rate of conversion and retention of working forests, and provide policy recommendations for these tools. CLC convened The Cascade Agenda Forestry Work Group (*Attachment A and B; please contact Cascade Land Conservancy for a copy of all attachments referenced in this section.*). The Work Group was composed of a range of stakeholders including large and small forest land owners, community representatives, agency staff, and environmental advocates. The Cascade Agenda Forestry Work Group was responsible for developing consensus and recommendations on policies and programs to assist landowners and communities in developing and implementing innovative approaches to retaining traditional forestry and accommodating new uses that strengthen both economic and natural benefits of forest lands.

The first Work Group session took place in the spring and summer of 2006 and discussed ways of addressing escalating real estate value on private forest lands, streamlining regulatory complexity and creating financing options for small forest landowners. The second session took place in the spring of 2007, and discussed additional ideas as well as their viability for implementation. Conclusions were as follows:

**Regulatory Streamlining:** Many landowners expressed discouragement by the increasing complexity of Washington's regulations, and stated this as an incentive to convert their land. To combat this, the Work Group agreed to support the proposal brought forward by the Washington Farm Forestry Association for a 15-year management permit for small forest landowners.

**Addressing Real Estate Value**: In many areas, the timberland value for development significantly exceeds its value as working timberland. This makes conversion an attractive option for the landowner. The Work Group helped develop recommendations for a Transfer of Development Rights policy. This work helped support the passage of the regional TDR marketplace bill in 2007.

**Create Financing Options to Reduce Conversions:** The Work Group reviewed the concept of creating conservation financing options. The group developed a list of potential private and public financing options that could be beneficial for preventing conversion.

**Additional Strategies**: The second work group session discussed additional strategies for preventing conversion such as the lease of development rights, the lease of development rights with the option to purchase, the lease of ecosystem services, and a repurchase option to be used in conjunction with a transfer or purchase of development rights program. Of these strategies, the group agreed to continue forward with

the lease of development rights with an option to purchase and the repurchase of development rights strategies. The other strategies will not be pursued at this time.

One strategy the group discussed was the development of a transfer of development rights (TDR) program that would help address these problems. *See Attachment D for a further explanation of TDR*. The work completed by this group helped to pass the Regional TDR Marketplace bill in the spring of 2007.

Through their analysis and discussion, the Work Group discovered that landowners were hesitant to participate in a TDR program due to its permanent nature. Typically, a transfer of development rights transaction is permanent and irreversible, and landowners were concerned they might be faced with seller's remorse. To combat this, members identified a few additional strategies that could be utilized to conserve forest land that addressed this concern. The Work Group reconvened for a second session in the spring of 2007 to discuss these additional ideas, as well as their viability for implementation. Those discussions resulted in the identification of two strategies appropriate for further development. Following are the two reports explaining the results of each of the two Work Group sessions.

## *Session 1 – Spring 2006*

### Context And Purpose Of Report

The Cascade Agenda is a 100-year vision and strategy to conserve 1.3 million acres of resource and natural lands in the Central Cascade region. The Agenda relies on strong community leadership and private/public partnerships to provide the expertise and collaboration necessary to engender vital communities, a strong economy and a healthy environment.

The spring 2006 Cascade Agenda work groups, including the Forest Conservation Work Group, addressed land conversion strategies, based on The Cascade Agenda's early-action emphasis on stabilizing the land base. In the future, the program will seek to bring the same collaborative market-based approach to creating new markets (e.g. carbon sequestration or water recharge) and improving existing markets (e.g. branding Washington wood or increasing consumption of local farm produce) for products from Washington farms and forests, as well as enhancing stewardship and optimizing ecological outputs of both resource and natural lands. The rationale for this sequencing is based on alarm over the rapid rate of conversion and the dauntingly high real estate value of these lands, tempered by the recognition that conservation of this land base will depend on the prospect of a long-term economic future for landowners and significant public benefits for the community.

The Cascade Agenda Forest Conservation Work Group includes many members of the University of Washington's Northwest Environmental Forum. The Forum has convened decision makers and stakeholders to bring scientific and policy information together to address the challenges to maintaining Washington's working forest land base.

The Work Group will report its findings to both the Forum and the Cascade Agenda Coalition. These groups and members of these groups will then make independent decisions on appropriate actions to take in response to the Forest Conservation Work Group's findings.

### The Challenge

In the next 100 years, the population of the Central Cascade region is expected to at least double, dramatically increasing the region's demand for housing and economic development. These changes along with other factors affecting the timber industry and farming are increasing pressure on undeveloped working and natural properties located in rural and resource zoned areas. The Forest Conservation Work Group identified three areas of concern:

1. Regulatory complexity and uncertainty

2. High real estate value
3. Immediate land conversion risk

While global economic trends have lowered the value of local wood products many forest owners, especially family land owners, are discouraged by increasing regulatory complexity and, as a consequence, are often persuaded to convert their land. Commonly, the timberland's value for development significantly exceeds its value as working timberland. This makes conversion an attractive option for both industrial and family landowners. For investors interested in timber, the conversion value of those resource and rural zoned forest land makes financing of land through timber production alone infeasible.

Reduction in service and infrastructure costs were driving factors under Growth Management negotiations that resulted in large lot zoning in rural and resource land areas, with less attention given to economic, ecological and social objectives. Under Growth Management, while rural zoning was intended to encourage low density development, large lot zoning was intended to discourage development of rural and resource lands, and provide sufficient land base to maintain traditional rural and resource economic activities. Growth Management planning typically looks forward in 20 year increments. Assuming limited consumption of lots in rural and resource zones, this strategy might be successful. However, when conservative growth projections are coupled with current development trends, there is a clear threat of potential conversion for nearly every buildable lot in the Central Cascade region over the next century. The timing and magnitude of risk varies in other parts of the Cascade foothills and state, but similar concerns have been echoed by stakeholders at recent Northwest Environmental Forums.

Looking at the landscape today, participants in the Cascade Dialogues process and participants in the Northwest Environmental Forum discussions identified large lot conversion as a grave source of economic, ecological, and social consequences. From an economic standpoint, the fragmentation created by converting the non-urban landscape impairs the functionality of resource operations and reduces the land base available to support necessary business infrastructure ranging from mills, to timber operators, to truck drivers. Conversion also has negative ecological impacts. These lands are in the middle reaches of the region's already troubled watersheds. Additional impervious surfaces reduce water storage and infiltration and exempt wells present grave threats to ground water resources. Fragmentation of these lands also impacts habitat resources for plants and animals, by reducing important matrix lands between protected areas, which is particularly problematic in lower elevation habitats. From a social standpoint, fragmentation has both fine and course grain impacts. Long distance commutes limit time with family, involvement in community activities and attention to personal health. Sprawl could cause our region to lose the character and appeal that attracts business and inspires residents.

At the same time, landowners want options to realize the potential real estate value of their properties and regional debates over property rights initiatives demonstrate little appetite in rural areas for additional regulation or down zoning. Participants in the Northwest Environmental Forum have repeatedly warned that Washington's timber industry is on fragile economic footing in the world-wide marketplace. Landowners caution that additional layers of regulatory restraints or perceived risks to property value will only increase the speed of conversion and threaten to collapse the state's remaining timber infrastructure. This conundrum has driven the Cascade Agenda to seek market-based, voluntary strategies to address the long-term growth of our region with equal emphasis on providing market-rate housing and maintaining our natural and resource land base.

**Near-term Strategies**

To address these factors the Cascade Agenda work groups, including the Forest Conservation Work Group, have identified several near-term strategies with potential to address aspects of these challenges.

1. **Regulatory Streamlining:** To address regulatory streamlining the group has reviewed a plan developed by the Washington Farm Forestry Association to allow 15 year permitting for small forest landowners.
2. **Addressing Real Estate Value:** In order to manage increasing real estate values the group has developed a set of landowner recommendations for Transfer of Development Rights (TDR) policy and have reviewed the Cascade Agenda plans for creating TDR markets through density incentives for cities, towns and rural villages.
3. **Create Financing Options to Reduce Conversions:** The Forest Conservation Work Group has also reviewed financing strategies for acquiring lands at immediate risk of conversion.

While this summary focuses on specific actionable items addressed by the Work Group, members also discussed a variety of other topics, such as King County's decision to join the Chicago Climate Exchange and the implications of Initiative 933, which will continue to receive attention as the Cascade Agenda implementation proceeds.

The work group members agree that while there are other important opportunities to address the challenges to maintaining Washington's working forests, the strategies discussed in this summary have potential to contribute to conservation of the forest land base, maintaining or improving existing ecological resources, and supporting the viability of the timber industry.

## Regulatory Streamlining

The Washington Farm Forestry Association (WFFA) has been working with environmental stakeholders and regulators to develop a proposal for a 15-year management permit for small forest landowners. This would allow adaptive management, streamlined processes for management and continued resource protection at existing levels. The proposal is on the schedule for review by the Forest Practice Board this fall. *For more information see attachment C.* This is an excellent opportunity for action this fall by The Cascade Agenda Coalition and should be considered for support by members of the Northwest Environmental Forum. WFFA is already advancing this strategy and would value the Work Group's review, approval and support with implementation. The Work Group discussed this proposal following a presentation by WFFA. Work Group members came to consensus that the overall goals of this proposal have merit. Forest landowners thought that reduction of regulatory complexity would encourage landowners to remain in forestry, as they would see immediate cost-savings and have greater confidence that investments and land management practices would pay off in the long term. Environmental representatives were generally supportive, on condition that the final proposal ensures that there would be no reduction of resource protection and that there would be proper oversight of management actions.

### *Next Steps*

Cascade Agenda Staff will track the proposal's progress, in anticipation of review by the Forest Practices Board this fall. The Work Group will review the plan to ensure that it meets the group's objectives for resource protection and effectiveness in removing barriers to ongoing forest management. As necessary, members will engage in dialogue with WFFA about the plan's efficacy in addressing the group's objectives. If members reach consensus that the plan is sound, the Work Group will consider recommending specific supportive actions to members of the Northwest Environmental Forum and to the Cascade Agenda Coalition. These groups and members of these groups will then make independent decisions on appropriate actions to take based on the Forest Conservation Work Group's findings.

## Addressing Real Estate Value

The work group recognized skyrocketing real estate value as a major concern for the increasing rate of forest land conversion to other uses. In order to address this issue, several strategies were discussed at length, including establishing a TDR market, exploring the long term lease of development rights, and examining ways to support healthy community and urban forests.

***Establish effective and vibrant Transfer of Development Right (TDR) markets***
A TDR program is a process by which a development right can be moved from a sending site, a site of rural or resource land, into a receiving site, such as a city or town, where development is more appropriate. A TDR permits the landowner to realize the real estate value without converting their land.

The Forest Conservation Work Group focused on developing a set of recommendations for criteria to identify TDR sending sites, purchase/sale mechanisms, and strategies for addressing potential landowner concerns with TDR programs. Members also reviewed and provided input where they felt appropriate on the products of other Work Groups regarding potential actions to create vibrant TDR receiving markets by encouraging cities to accept density and an emerging concept for accommodating non-urban development in "rural villages".

***TDR Pilot programs in Pierce and Snohomish Counties***
The 2006 legislature provided pilot project funding to advance TDR programs in Pierce and Snohomish counties, which was expanded by the 2007 legislature. Cascade Agenda staff are offering input to the counties as they create necessary ordinances and implement these programs. The recommendations created by the Forest Conservation Work Group regarding TDR sending site criteria, purchase/sale mechanisms, and strategies for addressing potential landowner concerns will be used by Cascade Agenda staff as they provide input to these pilot programs. The group came to consensus about this set of recommendations. The group's focus regarding these pilot projects was on program management, land conservation prioritization, conserved land management and development right values. *For more information see attachment D.* The finished set of recommendations in *attachment D* reflects the group's overall concerns and comments about creating an effective program. Several work group members had additional comments and concerns. Some landowners were concerned about separating the development rights from forest land because of risks related to reduction of options for the future. They recognize development rights as a safety net to fall back on in the event that timber is no longer viable. The recommendation paper offers a few potential strategies for addressing those concerns that should be considered as jurisdictions adopt TDR ordinances. Both conservationists and representatives for DNR strongly recommended that DNR lands with high real estate value be eligible to participate in local TDR programs. As the Cascade Agenda report recognizes, DNR trust beneficiaries have revenue expectations from trust lands. DNR land eligibility could be limited to lands meeting a set of conversion-risk criteria, ensuring that the TDR market would not be flooded by state-owned property. Members expressed a range of opinions regarding the desirability of prioritizing sending sites. Most members thought prioritization necessary in order to achieve the most effective conservation and get the most bang for the TDR buck. Other members were concerned that TDR sending area criteria would add a layer of bureaucracy that would dilute the ability of the market to drive the process at a landscape scale. The recommendation paper identifies that these advantages and disadvantages be given serious consideration when TDR programs are crafted.

***Next Steps***
Cascade Agenda staff and Coalition members will promote these recommendations and seek to ensure effective implementation of the TDR programs in Pierce and Snohomish counties. Forest conservation interests need to participate in the creation of these programs through public engagement and leadership input. Current community concern in both counties is focused almost exclusively on protection of farmland. Representatives from the Forum and from the Cascade Agenda Coalition should consider investing resources in engaging with local decision makers and stakeholders on the significant changes in the forest landscape that are taking place. One strategy for engaging and educating decision makers would be organizing forest tours for leaders and stakeholders to visit the forest lands in their county; see what has been lost, and what is at risk. This would hopefully encourage TDR programs that are inclusive of forestland and fair to landowners. Cascade Land Conservancy is working with Cascade Agenda Coalition members to host forest tours with decision makers and opinion leaders in the coming year.

**Encouraging cities to adopt TDR programs and create strong markets**

Developing and implementing an effective TDR program is a complex process with distinct challenges. In particular, while there tends to be an adequate supply of available Development Rights (DR), creating the demand that is necessary to carry the market is difficult. Cities are reluctant to accept additional density because of the associated infrastructure demands and perceived impacts to existing neighborhoods. *For more information see attachment E* and also *The Washington Realtors Infrastructure Report at http://www.warealtor.com/images/local_inf_study_exec.pdf***.** Resources are needed to assist cities in improving infrastructure and providing neighborhood amenities to accommodate additional growth. These resources could be allocated as an incentive to cities that accommodate additional growth through TDR. Providing state or county funding for these incentives is logical because consolidating development via TDR has demonstrated reductions in costs associated with infrastructure and service provision in non-urban areas.

***Next Steps***

Cascade Agenda staff helped gain an expanded TDR package in the 2007 legislative session that will focus on creating incentives for cities and towns to accept density, thus driving the market for development rights. Cascade Agenda staff will report back to the Work Group, the Northwest Environmental Forum and the Cascade Agenda Coalition on the next steps of this incentives package. These groups and members of these groups will then make independent decisions on appropriate actions to take based on the Forest Conservation Work Group's findings.

**Obtain legislative authority for Rural Village demonstration projects, as receiving sites for development rights**

The Rethinking Rural Growth Work Group has identified rural villages as an innovative way to address growth in non-urban areas. Legislative authority under the Growth Management Act is required for demonstration projects to test the effectiveness of rural villages in conserving rural and resource lands while maintaining rural character, ecological function, and economic viability of rural communities. *For more information see attachment F.*

***Next Steps***

Cascade Agenda staff are currently presenting the idea to a wide range of stakeholders to gain feedback and assess interest in the concept. Cascade Agenda staff will report back to the Work Group, the Northwest Environmental Forum and the Cascade Agenda Coalition on the potential components and outcomes of stakeholder engagement about the rural village concept. These groups and members of these groups will then make independent decisions on appropriate actions to take based on the Forest Conservation Work Group's findings.

**Long term leasing of development rights**

Several group members recommended exploration of the possibility of long term leasing of development rights as a way to prevent conversion by providing landowners with cash flow and allow more time for other conservation strategies to take root. Others expressed concern that this merely provides the landowner with a windfall of real estate value when the leases expire, while not providing permanent conservation. Furthermore, if standard appraisal approaches are relied upon long term payments would likely nearly equal the purchase value of the DRs, while leaving potential conversion in place. Since other conservation investments would assume these lands are protected, landscape conservation strategies may be misguided. From a practical standpoint, only limited amounts of funds are currently available for land acquisition, so a new funding stream would need to be secured to implement such a program. The Work Group anticipates examining this strategy in order to explore options for balancing cash-flow and flexibility with public benefit.

**Forests of long-term community significance**

Several group members recommended expanding state support for community and urban forest programs within local jurisdictions. This could provide a direct nexus to attracting density, and provide incentives to cities to establish receiving areas that have ready access to urban forests for recreation and improved quality of life, air and water. The Work Group anticipated examining ways to support healthy community and urban forests.

**Create Financing Options To Reduce Conversions**

The Forest Conservation Work Group has reviewed the concept of creating conservation financing options and provided a number of comments. With these concerns addressed, the group was in consensus that creating a range of financing options would be a beneficial strategy for preventing conversion. The options included private and public financing strategies, community forest bonds and public development authorities.

**Private Financing**

The Innovative Finance Work Group and the Forest Conservation Work Group have identified the need for immediate private financing strategies to acquire at-risk forest lands. Thousands of acres of private timberland are expected to come on the market in the next decade, creating a great need and opportunity for conservation. The Innovative Finance Work Group has developed a concept for a Conservation Timber Fund. This would be a private investment fund for the acquisition of timberland and management of that land for investor returns. Under fund management, development rights ideally would be removed from the property or if necessary realized on site in constrained "conservation development" projects, to optimize conservation of properties for working forestry. *For more information see attachment G*.

***Next Steps***

Cascade Agenda Staff will advance the fund concept in three ways over the next year:
Staff will seek a means to fill revenue gaps in order to make the fund viable. Forest Conservation Work Group members suggested that staff explore philanthropic or public funding to fill those gaps, as well as acquisition of a balanced portfolio of stand ages across several properties. Staff will explore potential partnerships with existing funds and/or fund managers. To further explore the creation of a new fund, staff will seek legal support on structuring the fund and will work with financial community on the best means for soliciting investments.

**Public Financing Strategies**

Members of both the Innovative Finance and Forest Conservation Work Groups cautioned that there was insufficient private capital readily available to address the rapid turnover and subdivision of large-tract working forests, ranging in size from 2,000-100,000+ acres. Furthermore, the Innovative Finance Work Group identified a challenge in obtaining necessary proprietary information to raise private capital and structure "finessed" conservation strategies for properties, when landowners are moving quickly to liquidate ownerships. In order to address this concern, members of the Innovative Finance Work Group recommended seeking access to interim, large-scale "triage" financing from public sources. Recognizing that there is insufficient capital funding available, the Innovative Finance Work Group has recommended that staff explore the viability of revenue-backed public financing.

During the fall work session, the Forest Conservation Work Group and Staff will monitor local interest in public revenue-backed financing, and seek to inform local entities of the group's recommendations. Several strategies for securing public revenue-backed financing are currently being explored, and will be continued to be tracked by the Forest Conservation Work Group this fall.

**Community Forest Bonds**

The Forest Conservation Work Group and Innovative Finance Group were briefed on the current legislative status of the Evergreen Forest Trust's efforts to obtain Congressional Authority for nonprofits to issue tax exempt Community Forest Bonds. Current House leadership does not support this legislation. However, there may be opportunities in upcoming sessions, and the Washington State delegation is willing to bring forward the concept again at an appropriate time. Cascade Agenda staff will monitor and report back to the Work Group if there is a change in the current holding pattern on this federal legislation. *For more information see the following link* *http://72.14.209.104/search?q=cache:wHEcQtd9nUoJ:www.masonbruce.com/wfe/2002Program/02-tuchman.ppt+evergreen+forest+trust&hl=en&gl=us&ct=clnk&cd=19*.

**Locally issued revenue-backed financing (general concept)**

Many local entities have sufficient debt capacity to provide full faith and credit to locally issued revenue-backed financing. Revenue bonds could be issued by a local PDA (details below) or by one of State's Finance Commissions on behalf of local jurisdiction. Local entities have an interesting opportunity to create TDR programs that address a property's real estate value or authorize conservation development options on site. This capacity increases financing certainty and would help optimize conservation outcomes. Development options on or offsite are anticipated to be completed by a private party who purchases the development potential at fair-market value from the public entity.

***Next Steps***

Cascade Agenda Staff are exploring the interest of local jurisdictions in Public Development Authorities as a means for municipal participation in forest conservation (see discussion below).

**Public Development Authority (PDA) for Forests**

A PDA for forest would be similar to a PDA for a hospital or other public project. The PDA would be authorized by a local municipality to issue revenue bonds to acquire timber lands. Those bonds would then be repaid through timber harvest on those lands. It would allow the conservation of important at-risk lands without spending tax dollars or subjecting state or local governments to liability. *For more information see attachment H.* Cascade Agenda Staff are exploring jurisdiction interests in creating local PDAs. Staff will update the Work Group on interest in this concept, and seek input on refinements or specific implementation strategies, depending on progress with local jurisdictions.

**State Credit Enhancement for locally issued revenue-backed financing**

Washington State could provide credit enhancement to locally issued revenue-backed financing by committing to fill cash flow gaps to service debt. State funds could be granted or loaned with repayment through future revenue from property. If granted, the state could receive some property interest, such as back up enforcement rights to a conservation easement, in exchange. If loaned, the state could utilize repayment of funds to establish long-term revolving account. Feasibility will depend on identification of a modest revenue stream (needed amount requires additional analysis) to support State participation. Revenue stream could be capped with either a dollar figure or a future time-certain. Cascade Agenda Staff are exploring feasibility of State-issued credit enhancement to support locally issued revenue-backed financing.

**Work Group Response**

Workgroup members raised specific issues regarding these strategies. While long term productivity in foothills forests may be high, the current harvestable volume is frequently very low. Thus, the revenue stream from timber harvest on these lands is often not sufficient in the near term to provide a positive return to investors. This is a problem that the Innovative Finance Work Group identified and the Forest Conservation Work Group confirmed as the very reason why timber companies are not acquiring these lands. Timber owners on the Forest Conservation Work Group were also concerned that this fund would put

conservation in direct competition with timber companies for land. Staff suggested that once the development value was removed through TDR the lands could be put back on the market for purchase by timber companies. This opportunity intrigued long term timber managers as it would make additional forest land available in the marketplace at prices appropriate for long-term forest management. This type of financing could offer an additional potential benefit to private timber owners who participate in conservation easements. Such funds could serve as an interim buyer of "last resort" for conservation easement properties. The funds could make it a priority to pay appraised fair market value for conservation easement properties and take on the task of recruiting a private buyer, if the seller finds it difficult to market the property. This could be one way to address concerns landowners have expressed about the risks of giving up development potential on their properties.

**Conclusion And Legislative Outcomes**

The topics discussed in this paper were further explored throughout 2006, and the findings were reported by CLC to the Northwest Environmental Forum in the fall. CLC will continue to seek advice and feedback from the Forum, The Cascade Agenda Work Groups and The Cascade Agenda coalition as development of these strategies continues.

***TDR pilots in Pierce and Snohomish***

The Department of Community Trade and Economic Development received $250,000 in 2006 to test Transfer of Development Rights pilot programs in Pierce and Snohomish Counties. Pierce County contracted with CLC to assist them in developing their program. Over the past year, CLC has met with hundreds of stakeholders to gather their input, and has developed an ordinance to enact a TDR program in Pierce County. CLC and Pierce County Planning presented the ordinance to Pierce County's Planning Commission in June of 2007. Upon the Planning Commission's approval, the ordinance will go before the Pierce County Council for a final vote in September of 2007. Outreach and educational work continues in Snohomish County.

***TDR marketplace***

The TDR Marketplace received overwhelming bipartisan support in the Legislature and was signed into law by Gov. Chris Gregoire at the Cascade Land Conservancy Conservation Awards Breakfast on May 15, 2007. This fall, The Department of Community Trade and Economic Development will convene a group of stakeholders and government agencies to develop a program that:

- Supports and enhances the effectiveness of existing and emerging TDR programs
- Makes it easy for all counties and cities to adopt locally appropriate TDR programs
- Creates economically sound means for cities and counties to create TDR programs that can operate more broadly to address regional conservation and growth opportunities
- Provides the infrastructure resources cities need to participate in a TDR program
- Promotes efficient and fair transactions that meet needs of buyers, sellers and the public
- Directs CTED to manage the process according to specific criteria
- Asks the Puget Sound Regional Council to evaluate the proposal and give recommendations

This process may result in legislation that will increase the viability of the TDR concept.

***15 Year Permitting***

The rule to allow 15 year permitting for small landowners has been written and reviewed by the Forest Practices Board. The accompanying board manual is in draft stage, with the goal of finalizing it by July. Supplemental funding to support this project passed the legislature in the 2007 session with CLC testifying in support. 15 year permitting for small forest landowners should be a reality by the end of this year.

***Rural Village Demonstration Projects***
CLC pursued legislation to permit three Rural Village demonstration projects during the 2007 legislative session. Although the bill fell just short on time and did not pass this year, tremendous gains have been made through outreach and education and we will continue to seek legislative support in 2008. The Rural Village bill would authorize three Rural Village demonstration projects that will test the ways to stop sprawl by transferring development rights off nearby rural and resource lands and clustering that development in old-fashioned rural neighborhoods of modest homes on small lots, built with new green technologies and designs. The rural villages would provide the same amount of growth currently allowed in the rural areas, but use 98% less land and 80% less water than the status quo. Each rural village could permanently conserve thousands of acres of working farms, forests, and natural lands.

***Cascade Conservation Timber Investment Fund***
A Conservation Timber Investment Fund would acquire selected properties and partner with an established forest land manager to manage the lands in active forestry. It is expected that most target properties will have low standing volume, but relatively high conversion potential. This makes the initial ten years financially difficult but will present long term potential of high earnings if the development pressure is removed. CCTIF will use innovative tools such as TDR, conservation development and tax benefits to defray costs, thereby making sustainable timber management an economically viable alternative to conversion to non-forest uses. Once the development rights are removed, the property could be sold with dividends returned to investors or reinvested in other properties. CLC has spent the past year exploring the viability of implementing this strategy. We have been developing financing options and a business plan, and have been considering seriously various projects that the CCTIF could finance. The $180,000 total initial funds required to launch this program are currently a roadblock for implementation, and CLC is exploring funding options to cover this expense.

***Revenue Backed Financing***
CLC will continue exploration of legislative authorization and funding continues for a state-wide revolving loan fund in the 2008 legislative session. This fund would allow government bodies, including counties, cities, state agencies, water districts and other local government bodies, to access low or no-interest loans for transactions that would permanently keep land in working farms or forests, providing multiple public benefits for habitat, water quality and quantity protection, recreation and scenic character. This fund would provide the bridge financing necessary for revenue-negative years, such as when trees are too young to be harvested. Were these lands to be held without access to supplemental funds, the land would surely be converted to other uses. The lands could be returned to the private market once development rights are removed.

***Community Forest bonds***
Senators Patty Murray (D-WA) and Gordon Smith (R-OR) have been the two biggest advocates for forestry conservation bonds in the United States Senate. In past years, they have introduced legislation that would allow local governments to issue community forestry bonds on behalf of non-profit organizations to purchase working forestland. The non-profit organization would then service the bond debt through continued harvest of the land under a sustainable management plan that protects sensitive areas. An independent third party would hold a permanent conservation easement on the property. The effort began in 1999 with the introduction of the Community Forestry Conservation Act, which successfully passed the Senate, but died in the House, as it was in subsequent years. As appropriate, CLC will support ongoing efforts to get this important piece of legislation passed.

***Public Development Authority for Conservation (Public Conservation Authority)***
CLC is exploring the viability of a Public Conservation Authority (PCA) for purchasing high risk forest and farm land. Applying this model, counties would set up the PCA to purchase forest and farm land through issuance of public bonds, tailoring the transaction to optimize lands conserved and meet landowner needs. Bonds would be repaid from revenues generated by farming and forestry, through the sale of the development rights from those lands or from the sale of those lands once the development rights have been

removed. These revenue sources could also provide additional capital to invest in additional resource land conservation. CLC is currently in the exploratory stage of developing a PCA in Pierce County. We hope to have a program fully implemented by 2009.

## *Session 2 – Spring 2007*

**Context And Purpose Of Report**

To continue our part of a University of Washington College of Forest Resources study, Cascade Land Conservancy brought together groups of technical experts to investigate innovative tools for conserving forest lands. The first work group session took place in the spring and summer of 2006 and discussed ways of addressing escalating real estate value on private forest lands, streamlining regulatory complexity and creating financing options for small forest landowners. This group discussed ways to develop a transfer of development rights (TDR) program that would help address these problems. Through their analysis and discussion, they discovered that landowners were hesitant to participate in such a program because of its permanent nature. Members identified a few additional strategies that could be utilized to conserve forest land that address this issue of perpetuity. Work groups this session discussed these additional ideas, as well as the viability for implementation. This is the second of two reports written by Cascade Land Conservancy for this study.

On April 23rd, 2007, two technical work groups met to discuss the viability of certain strategies for conserving working forest land. The first work group was composed of timber land owners and managers both large and small. The second meeting was composed of members of the environmental community. Both work groups heard from three consultants who had each been charged with looking at different aspects of the development of these strategies. Konrad Liegel of K&L Gates reported on the legal authority behind these strategies, and how they could be documented. Anthony Gibbons, an appraiser, analyzed valuing options and Ann Forest Burns conducted interviews and surveys to explore landowner interest. On May 22nd, 2007, the technical work groups met again to hear the finalized reports from our three consultants and come to agreement regarding particular strategies. The strategies, input from the work group members, and their resulting conclusions are outlined in this paper.

**Strategies**

The strategies included in this discussion are the lease of development rights (LDR), the lease of development rights with the option to buy, the lease of ecosystem services, and an option to repurchase development rights within a broader TDR program. A LDR program is the skeleton strategy from which the other strategies in this report are based.

***Leasing of Development Rights***

*Description:*
Leasing of development rights is a potential alternative to the transfer of development rights when TDR is not desirable. Conceptually, this method could be useful for conserving larger quantities of land temporarily with the same limited initial investment as a TDR program. It could also be used with landowners who are unwilling to relinquish their development rights in perpetuity. Since it would only restrict the level of development on a property, a development right lease would not interfere with normal resource management. The term could vary from a few to several years.

*Analysis and Work Group Discussion:*
K&L Gates determined that the legal authority is available to implement this type of market (*for more information see attachment I and J*). A development right is real property that can be sold, transferred or leased. Currently, although leasing development rights is conceptually legal, the specific legal construct for a LDR program does not exist anywhere else in the nation. This lack of precedent may result in difficulty finding funding for the program. There are sources of funding that could be stretched to include a lease of

this type, but most funding sources are targeted for land acquisition and / or restoration projects on the property once it has been acquired.

Anthony Gibbons presented a summary of the valuation of leasing development rights (*for more information see attachment K*). He compared two hypothetical examples that had distinctly different development potential. The first example was a property close to urban areas with a high development potential (within 5 years). The second was a more remote property whose development potential was more speculative (greater than 20 years). He determined that after 30 years, the total lease payments on the properties with high development potential would come close to 70% of the total value of the property, while lease payments on a more speculative property would total about 20% of the total value of the property.

Anthony reported that the use of the development right has a value. However, since the leasing entity is unable to use the development right in the form of transferring it for development, it has no value to them other than the non-monetary value of preventing an undesirable activity from occurring. The development rights do have use (and therefore value) to the landowner, who will therefore expect to be compensated for the loss of that right represented by the lease. The lease payment would need to pay for the risk of not selling or developing the property. Also, the lease nature means that the value of the lease itself diminishes from the day of signing onward. Anthony likened it to a car that you can't drive – not only does it depreciate but you can't actually use the right that you're leasing.

Ann Forest Burns conducted a series of landowner interviews to determine the interest level in the various strategies (*for more information see attachment L*). The landowners she interviewed had two very different reactions to the leasing of development rights strategy. First was a general impression that landowners are tending to shy away from these things that we perceive as opportunities for them. The biggest barrier to a family landowner is whether their land will be financially viable for them or future generations. They don't want a cloud on the title that will prevent options in the future. A lease of development rights as well as a transfer or purchase of development rights and conservation easements were all considered undesirable clouds. She found with these landowners in general, simpler agreements are better received, but people will not agree to terms that increase their restrictions.

The work group tended to agree with the other half of Ann's interviewees. They saw clear benefits of this strategy for the landowner. The landowner is paid annually to forgo development on their property and the ability to harvest and manage timber is not encumbered. Agreeing to a lease also eliminates the fear of "seller's remorse" that may accompany a transfer, sale or donation of a development right. LDR provides an option for landowners whose business is no longer viable. The landowner can opt to terminate the lease and sell the property with the development rights intact. Landowners involved in the work group stated that they would be willing to lease development rights from their lands. The work group thought that Ann's findings were most likely based on landowners who make decisions regarding their land based primarily on the financial benefits.

The benefits of a lease of development rights program are less clear for conservation. In general, goals for conservation are forever and by definition this strategy does not fit. Valuation is also a barrier to this strategy. One landowner stated that although he might be willing to lease out his development rights, he couldn't imagine that anyone would want to pay for them. Although a lease might be less expensive than an outright purchase, administrative and monitoring costs of the program may be too onerous for the program to be effective. The lease price will likely be difficult to appraise because as the lease term increases the lease payments approach the value of the purchase. Although leasing is an excellent way to avoid seller's remorse, there is no guarantee that the property will remain conserved after the lease term has ended. Landowners could easily agree to a lease and use the lease payments and time to gather permits for development once the term has ended. Forgoing development for a period of time while the value of the development right increases would be a financial benefit to landowners. The only way to make leasing development rights a fiscally more attractive option than development would be if the lease price were higher than the rate of

value increase for the development right. Setting the lease payment at that level would presumably make it unaffordable for a prudent the leasing entity. The group agreed that although it may be attractive to the landowner, leasing development rights makes little sense monetarily for the leasing entity.

The exception in this case is that a lease might be a prudent decision for the leasing entity if the value of the lease were calculated to include non-financial values. A leasing entity might be willing to lose money in the short term for the longer term gain of conserving a specific piece of property. This would be used with a landowner who values keeping their land in forestry, but would require additional cash flow to stay in business. The property might be in a more rural area, with a slower increase in development potential that is part of a broader landscape conservation strategy. A lease might be a good option to help keep a small, privately owned, family forest in business whose profit margin is small enough to encourage sale of the property. The money could be used for improvements to the property such as replacing culverts. Engaging in a lease of development rights agreement in this case might assist the landowner in continuing to invest in his property as working land, and might encourage the continuation of practicing forestry.

Another exception is the Department of Natural Resources' Trust Land Transfer lease program. This is decidedly different from leasing on private lands, in part because of the perpetual fiduciary nature of trust lands as established by the legislature, the state constitution and the federal enabling act. Under this scenario, DNR would lease the development rights on those trust lands appropriate for this type of leasing (primarily trust land suitable for long term forest management) for an extended period of time up to 50 years. DNR would also hold the leases, paying for them with funds appropriated by the legislature. This would work very much like the existing trust land transfer, with the funds ultimately going to the trust beneficiary.

*Conclusion:*
Members of the work group agreed that although a lease program might be attractive to the landowner, it is not a viable long term solution for conserving quantities of forest land. Given limited resources, one of the more viable strategies outlined later in this report should be developed instead.

***Lease with an option to purchase***

*Description:*
Lease with an option to purchase is a more viable variation of a lease of development rights program. The agreement would be a straight forward lease with an option to purchase the development rights or the property at or before the end of the lease term. The development right would be leased on a temporary basis until sufficient funds were located to purchase them.

*Analysis and Work Group Discussion:*
This strategy achieves the benefits of long term conservation with a smaller initial investment. It provides the landowner an exit strategy to ward off seller's remorse, while simultaneously providing for a greater chance of permanent conservation than a straight lease program would. It also allows the lessee additional time to pursue funding.

Although this strategy poses a more positive financial option for the leasing entity, it comes with its own set of major considerations. The leasing entity would need to exercise care when using public funds to minimize the risk that the moneys were not wasted if the option were not exercised. The funds grantor would need to be convinced that public funds were not wasted during the lease period. Conversely, some punitive action would need to be written into the agreement should the landowner choose to break the lease prior to the end of the lease term by selling the property to development. One solution would be to include in the agreement a provision that upon breaking the lease the landowner agrees to pay back all lease payments as well as a percentage of the increased value of the property or the development rights during the term of the lease. These funds would then be used to invest in further conservation, and the landowner would still realize profit from the sale of his lands.

The group identified a slight variation on this strategy. The agreement could be legally arranged like a lease to own, where a certain amount of each lease payment would count toward the purchase price of the property or development right. The lease becomes a purchase right with monetary value, similar to a reverse mortgage. The investment of both parties would need to be legally recognized in the agreement. Again, should the landowner default on the agreement, the punitive actions outlined above would apply as the leasing entity would need to be bought out of his accrued right.

A final variation identified by the group would be to purchase the development rights on an installment plan (e.g., a certain number of the total each year). This strategy produces the benefits that the buyer need not locate full funding all at once, and the seller realizes financial value immediately. In this case, the sale of each development right is permanent. Should the landowner choose to terminate the agreement early then he is left with the remaining development rights on the property but has no further claim to those already sold.

*Conclusion:*
All of these variations seem to be of interest to landowners, and result positively in long term conservation goals. The group reached consensus that leasing development rights with the option to purchase is a viable strategy for conserving forest lands, and should be pursued further. With the advice and guidance of the Northwest Environmental Forum and The Cascade Agenda Work Groups, CLC will be further exploring this strategy.

***Lease of Ecosystem Services***

*Description:*
Leasing of ecosystem services, such as wildlife habitat, recreation or water quality has been suggested as a means to provide income to a land owner. Since leasing of ecosystem services would preclude most types of development, such a lease would need to remove the development rights as well. Leasing of ecosystem services would be an additional lease payment to a development right lease and would provide compensation for positive ecosystem services provided by practicing forestry. For our purposes here, carbon sequestration was not included as an ecosystem services as it will be studied separately at a later date.

*Analysis and Work Group Discussion:*
It is generally agreed upon that the regulatory framework that guides forestry in Washington State is one of the most restrictive in the nation. These regulations are intended to protect resources that all citizens of Washington value, such as wildlife, clean air and clean water. Yet the burden imposed by these regulations falls disproportionately on private forest landowners. Members of our group held dichotomous views on this imbalance. One view is that landowners should not be compensated for public benefits that are naturally or incidentally provided as part of practicing forestry under current regulations. Another view is that these resources are a positive result of the land remaining in forestry (as opposed to development) and that a landowner might be more amenable to managing for these benefits or keeping their land in forestry if they were compensated for the loss of income these restrictions present or all or a portion of public benefits provided.

If a lease of an ecosystem service were undertaken, the landowner and leasing entity would need to agree on a quantifiable level of action. If that level is set at the regulatory baseline, then people are being paid to do what they are already required to do. There is little appetite for this kind of lease for several reasons. It would be very difficult to choose who qualifies for the program since each landowner is performing at an identical regulatory level. Currently, adequate funds do not exist to lease services from all landowners equally. Also, if the landowner is currently required by law to perform at that level, then provided the property is not converted to development, no real conservation has been gained by paying them. Members of our Environmental Advisory group stated that they would be unwilling to fund this type of lease.

On the other hand, if we set the quantifiable level above current regulatory baseline to increase the quality or quantity of an ecosystem service from a particular piece of property (called "additionality"), then the interest level of the landowners interviewed by Ann Forest Burns decreases substantially. To many forest landowners, adhering to the regulations is difficult enough and performing at an increased level would be financially undesirable or unrealistic, removing the viability of an ecosystem services lease program. One work group member stated that it was unlikely that the lease payments for an ecosystem service could offset the increased management costs and loss of revenue additionality represents. For the leasing entity, the cost to offset the reduced or deferred income from delaying cutting the trees would make the program costly, and perhaps beyond their willingness to invest. As was mentioned above, it was suggested in the meeting that the landowners Ann interviewed may not represent the group as a whole due to their tendency to think of their land more financially. Other landowners who feel a more emotional connection to their property might be willing to increase the actions they perform on their lands to provide an additional level of ecosystem services if a lease were undertaken. Landowners tended to think of these payments as a way the public can provide recognition and appreciation for the benefits provided by working forestland, rather than a viable income source.

*Conclusion:*
Although this program might provide a few landowners with some additional operating money, given limited resources the work group agreed that a more viable strategy should be developed. CLC may support further exploration of the idea of leasing ecosystem services as resources become available in the future.

***Conservation Easement with Terms or the Repurchase of Development Rights***

*Description:*
A purchase or transfer of development rights agreement could include language to allow an escape should the property cease to be viable as working land. A standard transfer of development rights agreement would begin the process; however under this alternative only a portion of the development rights conveyed off of the sending site would be transferred to a receiving site. The rest would remain frozen in a TDR bank. If financial circumstances change for the landowner and the land is no longer viable as working land, the landowner would have the option to repurchase those remaining development rights at current market value in order to make use of or sell the property to a developer. The agreement would include granting the surrounding community first right to purchase the property for open space rather than see it developed. The landowner and the community would negotiate the purchase price.

*Analysis and Work Group Discussion:*
One reason Cascade Land Conservancy has actively pursued the transfer of development rights as a strategy for conservation is because it provides some revenue to the landowner for the sacrifice of their development rights. This is in contrast to a conservation easement which is typically donated by the landowner to a non-profit organization. What these two strategies have in common is they are intended to be solutions for permanent conservation, and so are irreversible. This idea of "forever" frightens most landowners because it's difficult to predict the future regulatory framework or the condition of neighboring properties. There is a genuine reluctance to permanently encumber the property, and landowners typically want to keep every right that is currently theirs.

Traditional TDR agreements come with stipulations stating that a buy back is not possible. A landowner cannot simply go to a TDR bank and repurchase development rights once they have sold theirs. Typically a site is either a sending area or a receiving area, but does not switch between the two. The idea of allowing a repurchase of development rights is an innovative idea not currently being utilized anywhere else in the country. Due to this, CLC has chosen to investigate a program in which a landowner is able to repurchase some of their own development rights, but not general development rights from a bank.

One example of the loss of viability is if development encroaches on the property. If, through time all neighboring lands to a piece of forested property become developed and the landowner loses the social

license to practice forestry, then he can no longer rely on that property for income and has in effect financed a public park from which he receives no financial benefit. A second scenario would be a larger piece of property distanced from timber infrastructure. If a mill closes and selling timber is no longer profitable, the land cannot be sold for timber. Members of the Forest Advisory group pointed out that we haven't achieved our goal of conserving a working forest if the property cannot remain economically viable.

There are a few solutions to this concern. One is if the landowner keeps one or more of the development rights and only sells a portion of them. This way, if forestry is no longer viable, the landowner retains the option to sell the property with fewer development rights to those wanting a forested estate. This solution is not optimal because it does not fully guarantee conservation of the property as development is still possible.

Another solution is this idea of providing an escape clause in the conservation easement or the development right transfer contract. Konrad Liegel, of K&L Gates, presented his language for repurchasing development rights (*for more information see attachment M*). Our difficulty with the tools currently used for land conservation is the landowners' reluctance to permanently encumber their property. An ability to repurchase certain development rights could potentially eliminate this reluctance. In this example, a landowner would sell their development rights to a 3rd party, such as a land trust, local government, developer, TDR bank or others. All sold development rights would then be conveyed, and would no longer be available for use by the landowner. However, after the conveyance, only a portion of them would be transferred or sold to a developer. The remaining rights would be frozen by the bank. Should the property become non-viable as working land, the landowner could then buy back the frozen development rights at current market value.

The holder of the easement would need to take careful precautions to ensure the property had in fact lost all viability as working land. A third party would need to be commissioned by the landowner to validate that the terms to ensure the property is no longer viable, carefully and thoroughly crafted in the contract, had in fact been met. If these terms are verified as having been met, the community would have the first right to purchase the property for public open space at a mutually agreed upon price. Should the public decline to exercise that right, the landowner would then pay full present value to return some of his original development rights to the property. Money from the transfer would be used to conserve additional lands. This ensures that conservation value and the quality of conserved forest land are maintained.

One concern the work group had for this strategy was how to address the valuation issue. Is the whole worth more than the sum of its parts? If the landowner repurchases development rights at current market value, will his property then be worth more on the market than the sum of the land value with out development rights and the cost of repurchasing the rights? Even if the whole is worth only the sum of its parts, the benefit in marketability might make the transaction worth while. That is, the property might not be worth more as a whole than the sum of its parts, but it might be easier to find a willing buyer. This marketability might make a repurchase program attractive. However, if this agreement is an arduous process, then the landowner will simply refuse to sell the development rights to begin with.

A second issue brought up by the work group was the inability of the landowner to purchase development rights directly from a bank themselves. If a developer can go to a bank and purchase a development right, why can't a landowner? The answer to this question lies in the definition of a sending site and a receiving site for a transfer of development rights program. A sending site is typically a site of ecological or economical importance, such as a working farm or forest or a protected wetland. A receiving site is an area more suited to accept development, such as a city. By definition, a site is one or the other but does not traditionally switch between the two. A TDR market would not allow for a site that had transferred off its development rights to repurchase them. The question then remains that if a site were no longer viable as working land, would their situation have changed enough to warrant re-classifying the site as a receiving area rather than a sending area? We will look into the possibility of creating a TDR agreement that might allow for such a reclassification and therefore a purchase of a development right from a TDR bank.

Another issue brought up by our Environmental Advisory group is that a repurchase represents a failure for conservation. The property that we have invested time and money in has not been conserved in perpetuity. However, this strategy would be arranged such that the repurchase would occur at current market value, allowing the 3rd party holder to purchase additional development rights as replacements. These replacement rights would come from appropriate sending sites, and would result in additional conservation. In this way, even though a conserved property has been lost to development, the total conservation value of the investment has been maintained. The program's escape clause might encourage landowners to participate who wouldn't typically consider entering into a TDR program because of fear of seller's remorse. Not all of these landowners will choose to exercise the option to repurchase, resulting in net conservation gain.

*Conclusion:*
The work group agreed that this is a good, creative solution that should be pursued, but there are issues that need to be addressed. With the advice and guidance of the Northwest Environmental Forum and The Cascade Agenda Work Group, CLC will be pursuing this strategy and researching potential solutions for these issues.

**Methodology**

A few methods for determining available properties and funding programs were briefly discussed with this group. It is desirable that these strategies be market based so that they are self funding.

***Request for Proposal***

*Description:*
This strategy is a process by which landowners submit bids to a public or private entity for prices they would accept for their development rights.

*Analysis and Work Group Discussion:*
This strategy is beneficial because it gives land trusts or agencies access to lands we wouldn't otherwise know about or have access to. A potential downside is that the resulting conservation may be compromised because the lowest bidders may also be the lowest conservation value. The criteria set out would need to be very well defined making this a labor intensive process for the conservation organization. Landowners will not want to waste time developing a proposal if their land does not qualify. However, creating a more clearly defined set of criteria that will help ensure quality conservation projects result from the process may allow us to control the type and geography of the property as well as other specifics, such as wetland and timber characteristics, real estate value, size and development potential.

*Conclusion:*
The Forest Advisory Group agreed that the request for proposal process would be a viable strategy for conserving well defined, specific forest land and should be pursued further. CLC will be exploring the technical aspect of defining these criteria with our consultants. Unfortunately, this topic was not discussed at length with the Environmental Advisory Group.

***Annuity***

*Description*
When a developer purchases a development right credit from a bank, the funds could be used to purchase an annuity, whose earnings could then be used to perpetuate any of the above strategies. This is a way of making these programs self-funding, and therefore economically viable.

Use of an annuity will be researched further to determine its viability.

**Conclusion**

The ideas and strategies for conserving forest land in our region seem to be endless. The work group had many good suggestions during both last year's and this year's sessions. In the end, Cascade Land Conservancy needed to whittle down these ideas into which were the most feasible given limited time and resources. Each strategy might be viable in a particular circumstance; however, we will need large scale conservation strategies to save our region's working forests. We also wanted to develop strategies that would be possible to implement across the region, rather than only in our own contracts. We have chosen only the most promising strategies to actively pursue.

A straight lease of development rights is an attractive solution for the landowner. Landowners might be willing to receive payments in order to refrain from developing, but there appears to be no financial incentive for the leasing entity. There may be limited circumstances in which other incentives than financial ones would make a lease a viable option. One such example is more remote lands that are part of a coordinated landscape conservation effort, where a lease from a family forester may be the right tool. There might be more value to the leasing entity if we consider the non-monetary values, but all things considered the money could be better used on other strategies. The Work Group recommended not actively pursuing a straight lease of development rights as a strategy for conserving forest land.

Lease with an option to purchase seemed to have interest in the group. This strategy better addresses the need for permanent conservation techniques than a straight lease. There was some concern expressed by the work group regarding the risk that the purchase money might not be raised in time for the end of lease term. But there is nothing like a deadline to help raise money. The work group determined that this strategy is worth continued exploration, and with the advice and guidance of the Northwest Environmental Forum and The Cascade Agenda Work Group, CLC will be actively pursuing a lease of development rights with the option to purchase as a strategy for conserving forest land.

Leasing ecosystem services has a similar result as a straight LDR program. The idea of payments to landowners to meet existing regulatory baselines was opposed by our Environmental Advisory group. The landowners interviewed were disinclined to agree to additionality, as they felt additional regulations might incur costs that would largely offset the lease payments. Because this strategy may be very complicated and difficult to arrange, the available philanthropic and public money for forest land conservation could be better spent on a different strategy. The Work Group recommended not actively pursuing leasing of ecosystem services as a strategy for conserving forest land at this time.

Repurchase of development rights is an interesting strategy that the group agrees has potential. However, the economics of such a transaction would need to be further explored. If the property is worth no more with repurchased development rights intact than the cost of the development right plus the value of the property with out the development rights, than landowners are likely to view this as an arduous process with little benefit. However, if these valuation issues can be addressed, this could be an excellent method of addressing the problem of "seller's remorse". With the advice and guidance of the Northwest Environmental Forum and The Cascade Agenda Work Group, CLC will be exploring the valuation issues over the coming months, and will actively pursue the repurchase of development rights as a strategy for conserving forest land if appropriate.

In addition to comments on these strategies, each group expressed the concern that there may be a greater underlying issue that these strategies are not addressing. The Forest Advisory group was most concerned with the long term viability of the forestry industry in Washington state. Regulatory and development pressure coupled with declining timber infrastructure are strongly encouraging timber land owners to sell and convert. Many of the people present agreed that these strategies may be helpful, but that we should also consider encouraging timber infrastructure to remain available, such as mills and labor forces.

The Environmental Advisory group expressed concern that the conversion of forest land may be driven by inappropriate zoning. Whatcom County was listed as an example of an area which does not allow incompatible uses, such as development on lands zoned for commercial forestry. Also that the good work outlined by these strategies may be overridden by county governments agreeing to upzones. For example, if developers can gain development rights for free through upzones, there is no incentive to purchase those rights through a TDR program. CLC believes downzoning is not the answer to the issue of inappropriate zoning, and hopes instead to solve these issues through the use of the market. In order to prevent further upzoning and therefore encourage the use of TDR, educational outreach to county governments needs to be ongoing, as elected officials are temporary. CLC is currently formulating an outreach strategy for county elected officials to actively promote the use of market based strategies for managing growth.

Members of the work group suggested that once the strategies have been developed, lands will need to be identified for conservation. Excellent suggestions were made to assist us in this identification process. The first suggestion was that we look at lands currently connected to existing timber infrastructure. These are lands that are the most likely to remain in forestry, and so will be a successful conservation of a working forest. One approach would be to identify lands within 50 miles of a mill or lands contiguous with public forest. Another approach is to use wildlife corridors and other ecological factors to map potential properties. This would ensure maximum conservation value for our investment. Another suggestion was that CLC concentrate on quantities of land, prioritizing either larger single tracts of land or concentrating on creating strategies that will be most attractive to the most landowners. CLC will look into incorporating these guides into our lands selection.

Cascade Land Conservancy will continue to work with these strategies throughout the year to develop and implement the ones with promise. We will continue to actively seek input and advice from the Northwest Environmental Forum as well as from our Work Group members, and to solicit their involvement in the implementation process.

## Project Summary

This project provided a qualitative overview of the impacts of forest land conversion on the overall forestry industry by summarizing research related to parcel size and harvesting levels, as well as the impacts of forest land conversion on the urban fringe. Factors such as growing population, improved economic conditions, and an increased need for buildable lands, combined with the economic and social pressures that affect different forest land owners, were presented as possible conditions that lead to some forest land having higher and better uses for development than for forestry and subsequent forest land conversion. As population continues to increase in Washington state, the pressures felt by different landowners are likely to increase, potentially resulting in increased instances of forest land being offered for sale for non-forest uses.

Although this project originally aimed to provide quantitative data surrounding the relationship between residential and commercial development and the conversion of forest land in Washington, in the end, the available data sets and current methodologies did not allow for this type of analyses. However, using the best available data, the pattern of transfer of timberland from industrial forestry companies to other private owners and the subsequent conversion of these lands to other non-timberland uses was documented. As the Forest Inventory Analysis data are completed in the next few years, this pattern can be further verified and analyzed for the entire state. These data were also compared to innovative forest land use data produced for western Washington, which is assumed to be providing one of the only recent insights into the conversion of working forest lands to smaller parcel sizes with increased development of forested lands in the urban-rural interface. It is hoped that these data will continue to be analyzed at more local scales and be refined to more accurately capture the changing landscape of forest lands in the urban-rural interface, as well as use the King County case study as a starting block to further investigate the potential use of and wealth of data stored in this data set.

It is hoped that the overview of the economic valuation of environmental and natural resources methods will be useful in discussing the feasibility of bringing these values to an active ecosystem services market. It is clear from the discussion of existing incentive programs and methods, that Washington state forest landowners have multiple opportunities from which to draw. Nevertheless, while these programs have the potential to provide some significant relief to a great number of landowners, there are several ways in which they currently fall short of their intended goals, including inadequate funding and staffing levels and complexity of some of the programs.

The Cascade Agenda provided detailed information regarding potential future incentive programs, mainly the transfer or leasing of development rights, with a realistic assessment of program utility, based on consensus-based discussions and reviews with forestry work group members. This project was a unique opportunity to work collaboratively between the academic community and local conservation groups and stakeholders. The complexity of measuring actual rates and quantities of forest land conversion to non-forestry uses is well documented in this report. As more people and organizations begin to identify incentive programs to maintain forest land in forestry uses, it will be increasingly important to develop data sets and methods to properly identify the lands that are currently in forest land status and document the changing sizes, ownership, and use of these forested lands, especially as new and innovative programs are developed and implemented to control the rate of forest land conversion in Washington State.

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