RTI News

Newsletter of the Rural Technology Initiative

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An Examination of Potential Economic Impacts of RMAPs and Required Road Upgrades on Small Forest Landowners

Washington's Forests and Fish Rules include significant new requirements for forest roads. All forest landowners are currently required to prepare a Road Maintenance and Abandonment Plan (RMAP) that outlines how their forest roads will be brought into compliance with the new regulations. Landowners must submit an RMAP before harvesting timber, and all landowners must submit an RMAP by 2005. Any road upgrades prescribed by the RMAP must be completed by 2015.

Road upgrade cost estimates from the Small Business Economic Impact Statement (summarized in RTI Fact Sheet #4) indicate that compliance with the new requirements could be very expensive. While legislative efforts are underway to modify the requirements, the economic problems posed by roads cannot be ignored, so it is important that we better understand these impacts. Road upgrade costs can cause economic hardship in two ways. The road upgrade costs may significantly reduce a landowner's return on his or her forestry investment. This is reflected by a reduced net present value (NPV) to the investment in forest management. The road upgrade requirements may also pose a cash flow problem. Forest management is a unique enterprise because of the periodic, long-term nature of the income it yields. Because of the periodic nature of timber sales, landowners may not have adequate cash available at the time the road is required to be upgraded. This event may force some landowners to harvest their forests sooner or to harvest more than they otherwise would. Landowners without sufficient timber liquidity to raise the cash necessary for the road upgrades may have to borrow money and pay back the costs of the upgrades plus interest out of future timber revenues. For some the option may be to convert the lands to other uses.

The extent of economic hardship depends on several factors, such as the size of the property, the cost of the road upgrades, and when in the harvest cycle these costs are incurred. This article will draw from analysis recently published in RTI Fact Sheets 11 and 12 (available for download from the web http://www.ruraltech.org/pubs/fact_sheets/ or by mail upon request) to examine potential severity of economic impacts to both west and east side forest landowners. Since forest management practices and owner circumstances vary considerably depending on which side of the Cascades the tree farm is located, we've presented both west and east side demonstrations of potential economic impacts associated with road upgrade compliance.

Simulations presented here do not include assistance that may be available from governmental compensation and incentive programs. For more information about possible assistance with road upgrade costs contact your local USDA-NRCS or Soil Conservation District, http://www.nacdnet.org/resources/WA.htm.

Example 1
Westside Landowner with 50-year harvest cycle

To get an idea of economic impact to a west side landowner, we've assigned a spectrum of possible road grade costs on a per acre basis to be charged against the timber harvest revenues. If the landowner borrows money against future harvest revenue then the total cost must include the interest paid on the loan. Naturally the longer the loan must be carried before harvest revenue is available the more expensive the total upgrade cost becomes. Landowners with young forests, therefore experience the greatest economic impacts. The examples are for a theoretical western Washington landowner on Site Index 120 lands, managed on a 50-year rotation or harvest cycle. The analysis was done using a real interest rate of 5%. Other assumptions include a $239/acre planting cost at the beginning of the rotation, a $75/acre pre-commercial thin cost at year 15, $1000/acre of net commercial thin revenue at year 35, $14,000/acre of net revenue from final harvest year 50, and $12/acre/year of annual administrative costs. All figures are pre-tax and assume no land rent costs.

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RTI Director's Notes

Managing forests so that they provide the environmental protection called for by regulations while maintaining the economic viability of the landowner is complex from a scientific standpoint and may be impossible from a political standpoint. It seems like wishful thinking that a state government with record deficits would increase their allocation of money enough to compensate all of the small forest owners for their losses under riparian regulations. But the costs of riparian buffers are real and the estimated number of streams requiring buffers keeps going up. Economic losses to small forest landowners may provide the motivation to convert the land to non-forest uses. Many small owners are located at the urban-rural interface where the need for forest protection is most critical yet the pressure to convert is the greatest. Lawmakers recognized this unintended consequence and created the opportunity for forest landowners to create "alternate plans" that are customized strategies to provide environmental protection while conserving landowner asset values.

The current process for allowing owners to develop alternative plans, while in its infancy, does not seem to be acknowledging that economics are of critical importance to achieving ecological goals. The Rural Technology Initiative has provided case studies on the costs of the riparian buffers mandated by the regulations (see www.ruraltech.org). We are now conducting an investigation of landowners seeking approval of alternative plans to lower costs while still providing necessary environmental protections.

In this issue, we focus more attention on the cost of road improvements. All private forest landowners in Washington State are required to submit a Road Maintenance and Abandonment Plan (RMAP) that precedes investments in road upgrades required by new regulations.

Our first estimate of compliance costs to small owners (RTI Fact Sheet #4, available from our website or by mail upon request) has been quoted many times. Based on these cost estimates and the justifiable complaints that rural landowners have registered, Governor Locke and Public Lands Commissioner Sutherland have called upon the legislature to provide relief. Additionally, the federal government has expanded the Farm Bill of 2002 to include financial assistance for road upgrades through the Environmental Quality Incentives Program (EQIP, http://www.nrcs.usda.gov/programs/eqip/).

An analysis of the economic impact on small forestland owners as dependent upon the ultimate cost of road improvements is our featured article. The hope is that the more we understand these impacts, the greater chance there is for a successful implementation of new policies and practices.

In a second article, we investigate issues raised by the changing competitiveness of northwest wood products and what that might mean to Western Washington landowners. Historically, the region has been able to command price premiums for Douglas fir, but that may not be true in the future. Landowners may want to consider mixing species such as alder and cedar where appropriate when replanting. The cardinal rule for investors is diversification. A mix of species should reduce some of the biological risk as well as the portfolio risk caused by price volatility and market timing.

In the final article, we are reporting on an early effort that holds promise for raising the value of special forest products. Little value from forest floor species gets back to the landowner unless their value is enhanced. While it may sound more like something out of a James Bond movie, the potential for a hand-held tanylzer to grade the quality of floral and medicinal species in the field is real. You read it first here and we can only hope that it moves on to reality.

And last but perhaps most importantly we would like to share our newfound bragging rights. While we have not yet reached our third anniversary, we are proud to acknowledge that we won our first national achievement award. the Rural Technology Initiative received the NIPF Education Award for 2002 from the National Association of Professional Forestry Schools and Colleges and the National Woodland Owners Association. The award was presented at the recent Society of American Foresters Annual Meeting in North Carolina. I would like to take this opportunity to acknowledge the hard work of faculty, staff, and students at both the University of Washington and Washington State University that have contributed to the successful development of our technology transfer program.

Bruce Lippke, Director
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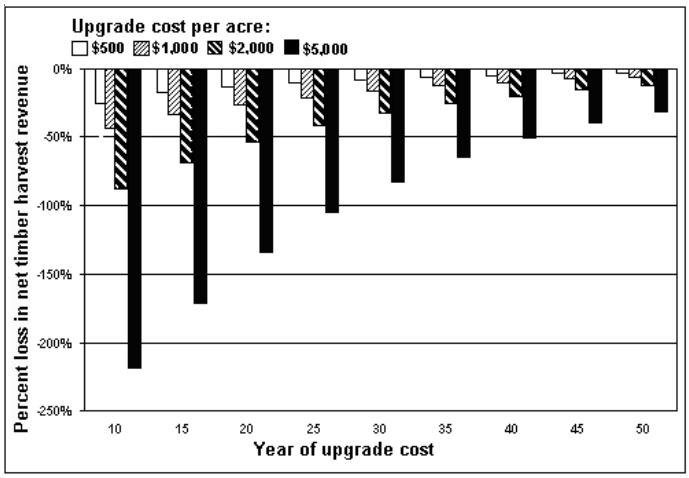
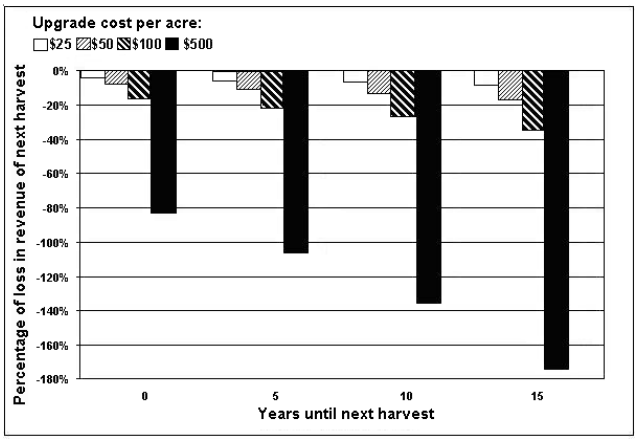


road upgrade costs are different for Eastside landowners compared to the Westside. Stream density is lower on the Eastside, and ownership size tends to be larger. Thus, road upgrade costs per acre will generally be lower on the Eastside although the total upgrade expenditure for an individual ownership may still be quite high.

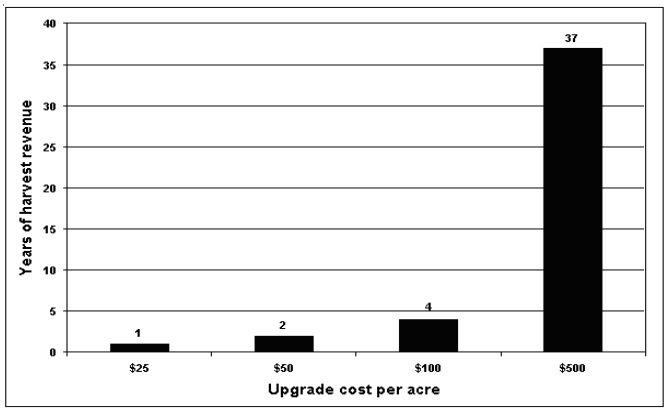
Multiple-aged forest management is the typical practice in Eastside forests, with landowners doing periodic, light selective harvests. Because of this, it is difficult to evaluate economic impacts in terms of reduced investment returns at a specific point in time. However, cash flow impacts are readily apparent. Periodic revenues from harvest activities are low and landowners may not have adequate cash on hand to cover road upgrade costs. Smaller acreage landowners who harvest sporadically may have to harvest sooner than they had intended or borrow against future harvests in order to finance expensive road upgrades. Larger acreage landowners who can sustain an annual harvest may also have to borrow against future harvests if road upgrade costs exceed a given year's harvest revenue.

To demonstrate the potential economic impacts of RMAP compliance on both smaller and larger Eastside acreages, consider two hypothetical examples. Landowner 2 has 100 acres, which is harvested every 20 years. Landowner 3 has 1,000 acres, which is large enough to support a sustainable annual harvest of 50 acres. Both cases assume a selective-harvest yield of 3 Mbf/acre at a stumpage value of $200/Mbf for total periodic revenue of $600 per harvested acre.

Example 2
Eastside Landowner with 100 acres
This landowner with 100 acres who only harvests every 20 years may have to borrow money to finance road upgrade costs and pay it back with interest out of revenues from the next harvest. Figure 2 below shows the impact on harvest revenues from borrowing money at a real interest rate of 5% to cover road upgrade costs of $25, $50, $100, and $500 per acre, representing a total cost of $2,500, $5,000, $10,000, and $50,000 respectively.



Example 3
Eastside Landowner with 1,000 acres
Our example landowner with 1,000 acres has the advantage of an annual cash flow of $30,000 (based on revenues of $600/acre with 50 acres harvested/year) to apply towards road upgrades. However, in some cases this cash flow may be inadequate to cover the costs of road upgrades, so the landowner may also have to borrow funds against future harvests. In this case, the landowner may forfeit several years' harvest revenue to pay for the road upgrades plus interest. Figure 3 below shows the number of years of sustainable harvest it would take to pay for road upgrade costs of $25, $50, $100, and $500 per acre, representing a total cost of $25,000, $50,000, $100,000, and $500,000 respectively. A 5% real interest rate is assumed.



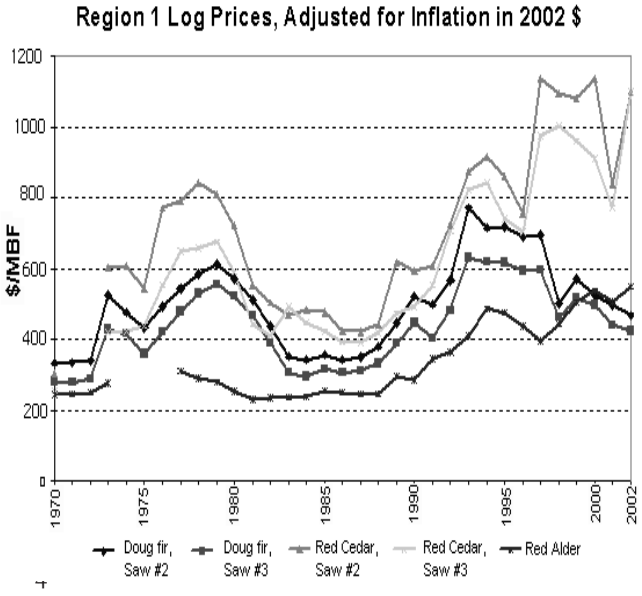
Economic impacts to different landowners will vary considerably; some may experience little impact at all but for others the combined impacts of riparian buffers and RMAP compliance could be substantial. These impacts may reduce the attractiveness of forestry as both an enterprise and an investment, which is significant given current concerns about the rate of non-industrial private forestland conversion to commercial and residential land uses in Washington. The Department of Natural Resources estimates that forestlands in Washington are being converted at a rate of 100 acres/day (Our Changing Nature, 1999).

Kevin Zobrist, RTI Economist

After Decades of Investment in Douglas Fir Plantations, is it Time for Forest Landowners to Consider Planting Alder and Cedar?

The Pacific Northwest (PNW) has always been famous for its Douglas fir timber. But gone now are Douglas fir large log harvests. During the 1990's, political decisions to stop harvesting from federal lands coincided with completion of original growth harvests on private lands. Abrupt regional timber manufacturing infrastructure adjustments followed. From 1989 to 1993, 242 mills shut down (Ehinger et al., 1994). High quality Douglas fir lumber markets, long dominated by the PNW, shifted to other regions or were served by product alternatives. By 1998, lumber exports dropped to 25% of 1989 levels (US Dept of Commerce, Census Bureau Data). Surviving sawmills retooled for lumber production from small diameter logs available from private land commercial thinnings. Large log price premiums disappeared. Today, in much of the region, fir saw logs over 24" on the big end are now discounted $100 - $150/mbf. In response, landowners have shortened Douglas fir rotations to maximize net present value.

Traditionally, economists have watched the lumber market as an indicator of national economic health. In bad economic times consumers stop buying houses and a "pent up" demand results that is triggered with the onset of recovery. As home sales increase so do housing starts and the resulting increase in demand for building materials pushes up lumber prices. Historically, increases in log prices have been soon to follow. But today, even with low interest rates and high housing starts, Douglas fir log and lumber prices are low. This paradigm shift may be particularly threatening to the PNW lumber producers, as this region has high production costs that limit competitiveness when compared against other regions (PWC, R.E. Taylor & Assoc., 2002).

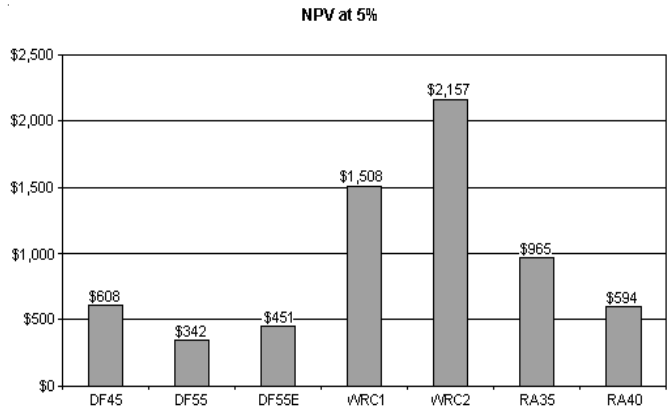


Price Index

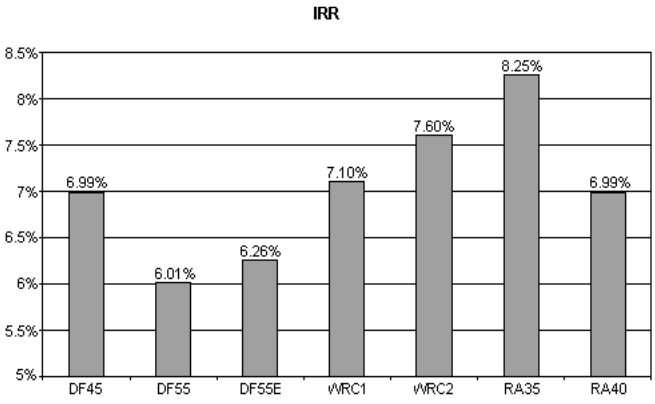
Red alder and western red cedar have long been recognized by tree farmers as good species to plant in areas that are wet, nutrient poor, infected by Swiss needle cast or root rot or in other ways unsuitable for Douglas fir. A strong performance by both alder and cedar log prices when compared to Douglas fir prices may lead some foresters to consider planting alder and cedar on their best sites as well. The above graph displays prices, adjusted for inflation to 2002 dollars, for comparable grades of Douglas fir, alder, and cedar logs from 1970 to present in the Puget Sound region of western Washington.

Alder prices surpassed Douglas fir for the first time in history in 2000 and continue to increase. Cedar logs are currently worth more than twice the value of Douglas fir logs. Interestingly, while Douglas fir production is largely dedicated to commodity lumber products that compete with other alternatives, both alder and cedar are niche species producing products unique to the PNW. Financial performance simulations will help inform species comparisons. For demonstration purposes, assumptions will be that plantations are hardy and on good site, a single rotation is be examined where prices remain constant, 5% is the expected rate of return, results are reported before taxes, and yield estimates are consistent with growth expectations described in the literature. Seven simulations are displayed here.

- DF-45. A 45-year old Douglas Fir rotation; no commercial thin.
- DF-55. A 55-year Douglas Fir rotation with commercial thin.
- DF-55E. A 55-year Douglas Fir rotation with commercial thin and a $150/mbf export premium on 20% on the log volume at final harvest.
- RA-35. A 35-year Red Alder rotation.
- RA-40. A 40-year Red Alder rotation; same volume as the 35-year rotation.
- WRC1-55. A 55-year Red Cedar rotation with a commercial thin and a final harvest volume equal to 75% of Douglas Fir for the same harvest rotation length.
- WRC2-55. A 55-year Red Cedar rotation with a commercial thin and a final harvest volume equal to 100% of Douglas Fir for the same harvest rotation length.



The above display of Net Present Value (NPV) calculations by species shows that western red cedar out performs both Douglas fir and red alder with alder performing better than fir. Many landowners express reluctance to plant western red cedar because of ifficulties associated with browse damage. The above simulations include additional cost at time of planting cedar of $320/acre for browse control (tubing). Cedar's remarkable financial performance at present prices would indicate that tree farmers could make even larger investments in browse control strategies and still enjoy returns greater than those of Douglas fir or alder. An examination of Douglas fir simulation outputs shows that, even with increases in growth and the benefits of export price premiums on 20% of the harvest, the 55-year rotation cannot compete favorably with the shorter 45-year rotation alternative.



Internal Rate of Return (IRR) for the same simulations reflects the benefit to forest landowners from shorter rotations. In this case, alder on a 35-year rotation is clearly the winner. It is interesting to note that if it takes just 5 more years to complete the alder rotation (RA40) both of the cedar simulations offer better returns on investment. Even the 40-year alder rotation, however, is very competitive with Douglas fir.

Some Implications

Douglas fir may be poorly positioned to compete in the small log production of commodity lumber against less costly product alternatives and imports. Subsequently, prices for small diameter Douglas fir logs may remain low. The closure of large log mills over the last decade has meant that larger Douglas fir logs are worth even less than small logs. The unique properties associated with higher quality Douglas fir trees have experienced declining demand. Prices for larger Douglas fir logs are likely to remain low. Red alder and western red cedar logs provide raw material for niche manufacturers that produce products unique to the PNW. Niche markets more readily absorb regional production costs and appear to be less price sensitive to competition. Alder and cedar are commonly planted in areas unsuitable for fir regeneration. Rising prices and potentially short rotations make red alder and western red cedar very attractive species for forest regeneration investments on sites traditionally planted to Douglas fir. However, unfavorable conditions will limit red alder and western red cedar growth success on dry, hot, or frost-prone planting sites. Species diversity brings value to investment portfolios as well as to forest environments. Planting of multiple species can reduce risk from disease or lower markets while improving cash flow from staggered harvest revenues.

Larry Mason, RTI Coordinator

Advanced Quality Control and Standardization Technology for Better Special Forest Products Management

Recent interest in Special Forest Product (SFP) collections has called for a need to improve the quality, efficacy, and safety of medicinal botanicals and herbal nutrient supplements. High quality and consistent SFP have customarily brought a higher market value. Clearly, the harvesters need advanced technologies for quality control and standardization for routine practice. However, due to the traditionally high cost of such technologies and overall low income among the rural SFP community, these technologies are unaffordable. Analyzing tannin content provides a promising approach to measure the quality of Special Forest Products.

The main objectives for the project are: 1) To improve and guarantee both sustainability and profitability of the herbal medicine and dietary supplement industry across Pacific Northwest forest ecosystems by implementing an affordable, easily available, and simple to operate quality control and standardization tannin bioassay technology; and 2) To develop a database on tannin content for several of the most profitable medicinal herbs, such as St. John's Wort, Echinacea, Gingko Biloba, and those with antitumor activity, harvested at specific growing locations, in specific years, under specific environmental, processing, and storage conditions. The Rural Technology Initiative provided funding to Dr. Morris Silber and Bruce Davitt to complete a feasibility study on these objectives.

To approach this problem they employed a newly patented tannin bioassay and pioneered its implementation as a simple, low cost, and accurate technology for continuous quality monitoring and standardization of the herbal crops. This appears to be the first time tannin content in Echinacea and several other botanicals has been detected. Detecting tannins is of scientific and practical importance as it may explain the inconsistent pharmacological effects of St. John's Wort, Echinacea, and other herbal therapies usually reported from in vivo studies in animals and humans when administered orally. The project's latest results show that tannin bioassay may be helpful along with assessing quality of the medicinal botanicals and also in making close predictions about their expected pharmacological activity in the body. Longer term, the laboratory bench-top tannin assay procedures should be convertible into a Tanalyzer Technology - a hand-held digital device providing multiple sample screening for tannin directly in the field.

Why Tannin?

Tannins are ubiquitous in the plant kingdom. They are polyphenolic compounds and constitute one of the most important classes of secondary metabolites in plants. When digested as part of plant food, tannins aggressively precipitate the host's proteins. Tannins also display many other biological activities in human and animals (anti-oxidant, anti-bacterial, anti-viral, and anti-tumor) and, therefore, are very important in agriculture, medicine, and nutrition. Many methods for tannin detection and measurement in plants have been proposed including chemical methods and those based on tannin's inherent ability to precipitate proteins out from solutions. The last group of methods is more favorable in ecological, nutrition, and bio-medical studies. There are, however, many drawbacks and pitfalls in the protein-precipitation methods. A unique reagent, alkaline CBB-BSA was invented (US Patent, 2000) and chemically constructed. The big advantage of this reagent is that it can bind tightly to tannins in a concentration-dependent manner with no dye leakage. This allows for immensely increasing the specificity, sensitivity, and accuracy of the analysis, as well as to dramatically reduce its duration (from overnight to 15 min.) and cost (about 10 times). The method has high feasibility proof to be modified into a hand-held digital "Tanalyzer" for in-the-field use by harvesters and pickers.A tannin content database is being developed on various medicinal herbs from diverse locations and environmental conditions. A categorization of data needs has been designed and a database is being assembled for future analysis and study of PNW forest ecosystem medicinal plants.

The capacity to provide front line technological support for PNW SFP industries is being enabled through scientific recommendations aimed at improving the standardized growing, harvesting, and processing methods so that consistently high quality herbal medicines and dietary supplements are sustainable and readily available.

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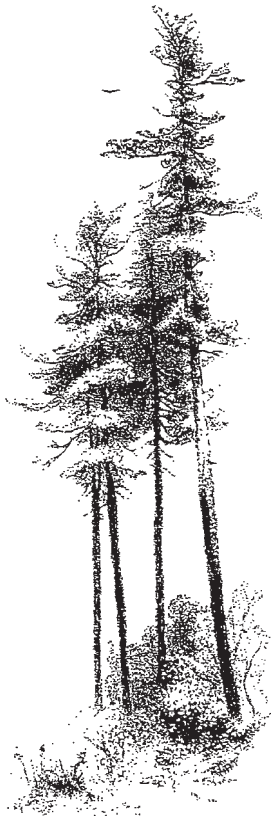
Rural Technology Initiative Wins National Award



TO: RTI Rural Advisors and supporters:
Thanks to your continuing support, The Rural Technology Initiative (RTI) just received national recognition and an award. The National Private Forestry Education Award for 2002 was awarded to UW/WSU for the Rural Technology Initiative. The National Woodlands Association (NWOA) and the National Association of Professional Forestry Schools and Colleges (NAPFSC) presented the award to Bruce Bare, Dean, College of Forest Resources, UW, and Keith Blatner, Chair, Department of Natural Resource Sciences, WSU at the 2002 National Society of American Foresters annual meeting.
While we knew we had strong local support, this award will provide national exposure and help sustain the importance for our activities. The recommendation letter leading up to the award was written and submitted by Larry Mason. A huge thank you, Larry, for getting the nomination forwarded on time during a busy period.

Bruce Lippke, UW
Don Hanley, WSU Extension

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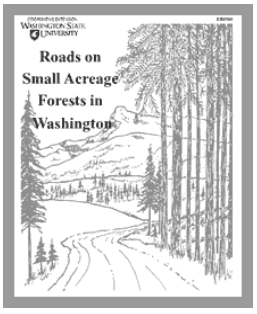
Fall 2002 Forest Stewardship Notes at web address:
http://ext.nrs.wsu.edu/newsletter/index.htm

Washington's Forest Products Industry: Current Conditions and Forecast 2002 at web address:
http://cru.cahe.wsu.edu/CEPublications/misc0484/misc0484.pdf



Roads on Small Acreage Forests in Washington
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