



Rural Technology Initiative

Working Paper 2

An Examination of the Washington Department of Natural Resources Timber Sale Program Against a Backdrop of Changing Regional Infrastructure and a Growing Forest Health Crisis

C. Larry Mason

April 2005

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This report represents a synthesis of information provided from many sources. The work of the research team included review of the literature, interviews with individuals, companies, and other organizations, the development and implementation of the project survey, and the synthesis, analysis, and report of all collected information. The project leader and report author is Larry Mason, Project Coordinator for The Rural Technology Initiative (RTI). Members of the research team included Bruce Lippke, Economics Professor at the University of Washington College of Forest Resources and Director of the RTI; Nick Kirkmire, senior forestry consultant, and Kevin Ceder, Forestry Technology Specialist for the RTI. Additional support was provided by RTI staff, Luke Rogers, Kevin Zobrist, Ara Erickson, and James McCarter, as well as from RTI graduate students, Elaine Oneil and Derek Churchill. Administrative support was provided by Nicole Stevens and Clara Burnett.

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ABSTRACT

Forest health harvesting activities to remove excess fuel loads from overstocked stands conducted within DNR forests in eastern Washington are expected to produce merchantable timber volumes of 25-35 million board feet Scribner (MMBF) per year for the next 5-7 years. As yet undetermined volumes of trees too small for most DNR timber purchasers will also be removed to reduce current fuel loads. Other recent adjustments to the DNR timber sale program such as the recent recalculation of the annual sustainable harvest and amendments to the State Habitat Conservation Plan are expected to result in additional increases of 100 to 150 MMbf in annual timber sales volumes as compared to recent years. Important to the success of forest health harvest activities will be the development of effective strategies for the sale of logs removed.

Keywords: Washington Department of Natural Resources forest health, State timber sales, forest products, logs, lumber, engineered wood products, biomass-to-energy, economic development, sustainability.

EXECUTIVE SUMMARY

For this investigation a review of available literature including scientific reports, journals, conference proceedings, and other topical publications as well as DNR and other governmental agency reports and applicable Washington State and United States policies and laws has been considered against a broader backdrop of state, regional, and global influences. Numerous interviews were conducted by phone, email, and personal conversation with DNR personnel, Forest Service personnel, industry professionals, tribal foresters, timber purchasers, and university scientists. In order to better understand the capabilities and preferences of current and potential DNR timber sale purchasers in WA, OR, CA, and ID, a survey was designed and distributed for response.

Forecasted increases in DNR timber supply of more than 100 million board feet per year, while not insubstantial, represent a relatively small addition to annual harvest volumes for the purchasing region (less than 2% per year). A majority of timber purchasers surveyed report that log supplies are sometimes scarce, increasingly distant purchasers are competing for DNR logs, DNR stumpage prices have risen 30% over the last year, and new sawmill start-ups and expansions are expected to add 1 billion board foot of production capacity in Washington. This investigation finds that DNR additions to available regional timber volume are unlikely to result in negative market reaction. By contrast, new purchaser perception of increasingly reliable timber availability from the DNR in concert with new market-oriented DNR timber sales strategies may result in premium improvements in stumpage values with less expenditure for sales preparation and forest management. Many planned DNR harvest activities are designed to restore forest health and create habitat. Net environmental benefits are expected as well as net revenue improvements. 33% of timber purchasers indicate interest in expanding capacity for utilization of small diameter timber if sufficient supplies are made available.

However, the expectation from purchasers is that the greatest potential use of small diameter timber from DNR forests will be for chips. This situation should be cause for concern given the continuing decline of the pulp and paper industry in the region and that there is no industry expectation for future investment.

Another potential use for small diameter logs and forest biomass is biomass-to-energy generation. While there appears to be growing public interest in biomass-to-energy projects, a majority of surveyed timber purchasers indicated that small diameter trees would most likely be used for chip production not energy generation. A feasibility study commissioned by the Yakima County Public Works Department concluded that forest biomass was too expensive to harvest and not reliably available to warrant investment in a biomass-to-energy conversion facility. However, evolving state and federal policies may provide public investment dollars for biomass-to-energy projects which, combined with the rising cost of fossil fuel energy, could offset high harvest and haul costs to change the currently unfavorable economics of energy generation from biomass as compared to natural gas or coal.

Oriented Strand Board (OSB), laminated veneer lumber (LVL), and other engineered wood products (EWP) continue to gain market share over traditional wood products such as plywood and lumber products. EWP manufacturing processes can utilize small diameter logs. Large EWP markets exist on the west coast yet there is little domestic manufacturing capacity west of the Mississippi River. The currently unfavorable economics of biomass-to-energy projects, the continuing decline of the Pacific Northwest pulp and paper industry, the high cost of harvest and production, the relative lack of regional EWP manufacturing capacity, and the transportation challenges that isolate many forest areas of Washington are all factors that undermine the potential for profitable utilization of small logs in the near term. In the absence of sufficient federal harvest assurances, infrastructure investment incentives, and price supports for alternate energy projects, private sector investment in specialized industrial capacity to absorb small diameter low value logs has not been forthcoming. However, survey results indicate that purchasers have interest in new investment if reliable and adequate log supplies will be made available. In eastern Washington, new forest health contracting flexibilities combined with new management targets created by amendments to the DNR Habitat Conservation Plan (HCP) should mean that greater and consistent volumes of small diameter logs from state lands will be available. DNR will be well advised to look for ways to cooperate with federal, state, tribal, and local economic development interests that seek to create new incentives for small log utilization programs for energy, paper products, or engineered wood products.

As a result of policy changes, annual timber harvest volumes from federal forest lands have declined in Washington to only 5% of 1988 levels but a forest health emergency on these lands has resulted in new political pressure to increase harvest. A substantive increase in available federal timber could improve forest health and provide

opportunities for economic development; however, abrupt increases to timber supply would have negative impacts for log markets in the region. When survey respondents were asked if they thought that volumes of timber would likely increase from federal lands, 63% indicated increases are unlikely or impossible and 21% responded that they were uncertain. Interviews with forestry professionals suggest that similar opinions are widely held in the region. Review of the literature also confirms that any increases in federal timber harvest are unlikely to be of sufficient magnitude to influence regional market dynamics.

The forest products industry has undergone dramatic adjustments during the last decade that continue today. Generally there are much fewer players and the spectrum of product operations has narrowed. However, a large and viable forest products industrial sector remains. This investigation finds that aggressive timber sale marketing adapted to changing purchaser needs and preferences can successfully ensure maximum returns to trust beneficiaries and will bring greater opportunities for utilization of all log species, sizes, and qualities. As the largest public timber supplier in Washington, the DNR is well-positioned to provide reliable and attractive timber sale opportunities for purchasers throughout the region which will result in significant state revenues, environmentally responsible opportunities for economically viable forest management, encouragement for investment in needed regional infrastructure, and many other important values as mentioned in this report.

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INTRODUCTION

In 2004, the Washington State Legislature, recognizing deterioration of forest health as a serious environmental, economic, and social problem, directed the Washington Department of Natural Resources (DNR) to initiate a program of timber sales and other silviculture treatments for the purpose of removing hazardous fuel loads from overstocked and distressed forests on state forestlands to reduce risk of forest health decline and catastrophic wildfire. New contracting flexibilities were granted to facilitate the accomplishment of this goal (Washington State Legislature 2004).

Forest health harvesting activities to remove excess fuel loads from overstocked stands conducted within DNR forests in eastern Washington are expected to produce merchantable timber volumes of 25-35 million board feet Scribner (MMBF) per year for the next 5-7 years (Tweedale pers. comm.). As yet undetermined volumes of trees, too small for most current DNR timber purchasers, will also be removed to reduce fuel loads and restore forest health. The combined timber volume will be in excess of the currently-planned regular DNR timber sale program. Other recent adjustments to the DNR timber sale program, both in eastern and western Washington, are expected to result in additional increases in annual timber sales volumes as compared to recent years. These increases in available timber volumes come at a time when the number of sawmills in Washington is at a record low following rapid adjustments to industry infrastructure in response to reductions in public timber availability, changes in sawmill technologies, global market fluctuations, and other factors (Blatner 2003, Pease 2003, Perez-Garcia 2005).

Increasingly complex interactions of evolving science, policy, markets, economics, and public opinion within the region have combined to create unprecedented constraints and opportunities for forest management. Early in this investigation it became apparent that, perhaps as never before, forest management activities on DNR lands in eastern Washington have become inextricably linked to forestry activities within the rest of the state and beyond. This report has subsequently been prepared to provide a synthesis of pertinent informational resources to assist the DNR in the development, communication, and implementation of adaptive approaches for restoring forest health, maximizing returns to trust beneficiaries, and providing opportunities for economic development in eastern Washington as an integral part of a broader State forestland management program.

1. Background

1.1 The Risk – East Side

1.1.1. A Changed Forest

Changes in forest composition and structure throughout the inland west due to a century of fire suppression, grazing, and past harvest practices have been widely documented (Agee 1993, Pyne 1997, Arno 2000). Where once frequent fire return intervals resulted in savanna-like forest conditions, now dense understories of shade-tolerant species have become established (Pfilf et al. 2002, Harrington 2003). Outbreaks of insects and of root disease have resulted in large areas of tree mortality (Stewart 1988). Dead trees and multiple layered canopies have become ladder fuels and increase risk of destructive wildfires. Concerns about large areas of forest lands in the inland west that are overstocked with small diameter suppressed trees are not new (Cooper 1960, Pyne 1982). However, increases in forest fire severity, extent, and costs in recent years have served to focus national attention on the widespread and urgent nature of this problem (Western Governors Association 2001 and 2002, National Fire Plan 2004).

1.1.2. Values at Risk

Because of the fine particulate matter and other pollutants present in the smoke, forest fires can pose a significant health threat to people living in proximity to fire-prone forests (Government Accounting Office 1999, Norton 2002, US Environmental Protection Agency 2001). Smoke from forest fires increases atmospheric carbon associated with global warming (Buchanan and Keye 1997). Intense forest fires create other undesirable environmental consequences such as destruction of wildlife habitat and hydrological damage to watersheds (Camp 1995, Lavery and Williams 2000, Hill 1998, Ice 2004, Lynch 2004). Mechanical operations on the ground to remove surplus fuel loads have the potential to create site disturbances and impact water quality, however, studies have shown that wildfires produce much higher flows of sediment into surface waters than thinning treatments (Elliot and Miller 2002, Rummer et al. 2003). Without intervention, burned lands recover slowly and may be susceptible to vegetation changes that result in undesirable ecological consequences such as proliferation of exotic invaders (Agee 1993, Babbitt and Glickman 2000). Soil nutrients such as nitrogen, carbon, and sulfur can be volatilized during forest fires resulting in long term loss of forest soil productivity (Bigley and Hull 1998, Baird et al. 1999). A cost/benefit analysis of multiple market and non-market values at risk from forest fires has shown that potential public loss exposures are likely very high in absence of stocking density reduction activities in large areas of eastern Washington (Mason et al. 2003).

1.1.3. Pre-European Conditions

More than one hundred years of land management practices and wildfire exclusion have changed the species composition, densities, and structures of forests in eastern Washington and other forested areas in the inland west (Everett et al. 2000). Before the arrival of European settlers, frequent fire return cycles in lower elevation eastern Washington forests ignited by lightning or Native American cultural practices resulted in low to moderate-severity fire events (Agee 1993). Subsequently, pre-settlement landscapes had open park-like forests dominated by large Ponderosa pine (*Pinus ponderosa*), western larch (*Larix occidentalis*) and Douglas-fir (*Pseudotsuga menziesii*) (Johnson et al. 1994). Riparian areas and other protected locations on the landscape contained denser forests that served as refugia for wildlife and late seral tree species (Camp 1995). After the European settlers arrived, many of the large old trees were harvested, fire was excluded, and forests shifted to closed-canopies with dense understories of mixed shade tolerant species such as grand fir (*Abies grandis*), white fir (*Abies concolor*), and Douglas-fir. Where high severity fires have occurred, dense stands of lodgepole pine (*Pinus contorta*) can now be found. Today, forest fuel loads are much higher, more contiguous, and more susceptible to insects, disease, and drought than would have been the case in the forests that existed 150 years ago. Stand replacement fires burn with such intensity that even riparian refugia are consumed (Camp 1995). Numerous studies have determined that fuels treatments to reduce stocking in overly-dense fire-prone forests can lessen risk of catastrophic wildfire while restoring ecosystems to protect environmental resources and replicate pre-settlement conditions (Everett et al. 2000, Omi and Martinson 2002, Fiedler et al. 2001, Graham et al. 2004).

1.1.4. Moisture Deficits

In recent years, eastern Washington has experienced unprecedented drought conditions (Seattle Press On Line 2003). Research findings at the University of Washington indicate that if extreme fire weather associated with recent low rainfall is indicative of global climate change then fire severity and extent can be expected to increase posing a threat to ecosystems and habitats of sensitive plant and animal species. Reduced snow pack and earlier snowmelt in the mountains will extend periods of moisture deficits in water-limited forest ecosystems leaving stressed trees more vulnerable to pathogens and stand-replacing crown fires (McKenzie et al. 2004).

1.1.5. Insect Outbreaks

In the last 15 years, epidemic outbreaks of forest insects have caused significant damage and mortality in eastern Washington forests. In 2003, the DNR reported that hundreds of thousands of acres in eastern Washington have been infested with western spruce budworm (*Choristoneura occidentalis*), fir engraver beetle (*Scolytus ventralis*), Pine bark beetle (*Dendroctonus brevicomis*), Douglas-fir beetle (*Dendroctonus pseudotsugae*), and Spruce beetle (*Dendroctonus rufipennis*) resulting in high levels of tree mortality (DNR 2003).

1.1.6. Rising Costs

With Washington's population growing at the rate of 67,000 people per year (DNR 2004) development has occurred adjacent to forest lands in areas that have become known as the wildland/urban interface (WUI). Risk from forest fires to private property and human life has increased making fire fighting more complicated, expensive, and dangerous (Government Accounting Office 1999, Babbitt and Gickman 2000). From 2000 to 2004 DNR fire suppression costs per acre have more than doubled from under \$1,000 per acre to over \$2000 per acre. Total state cost for fire suppression in the 2002-3 biennium was almost \$60 million. In addition, more than \$10 million is spent each year from state protection funds for fire preparedness (DNR 2003, DNR 2004).

1.1.7. The Legislature Acts

In 2004, the Washington State Legislature, recognizing deterioration of forest health as a serious environmental, economic, and social problem, directed the Washington Department of Natural Resources (DNR) to initiate a program of timber sales and other silviculture treatments for the purpose of removing hazardous fuel loads from overstocked and distressed forests on state forestlands to reduce risk of forest health decline and catastrophic fire (Washington State Legislature 2004).

1.2 The Risk – West Side

1.2.1. Shifting Paradigms

While the need for density reductions on Washington forestlands may be most urgent for the drier eastside, a growing number of scientists are calling for increases in thinning activities in west side forests as well. For several decades there has been increasing regulatory pressure on public and private forestlands to provide for the ecological benefits associated with old growth forests. Early strategies for protection of threatened species such as the northern spotted owl (*Strix occidentalis caurina*) centered around creation of large forest reserve areas that would be off-limits to any forest harvesting activities (Thomas et al. 1990, Johnson et al. 1991, Thomas et al. 1993, FEMAT 1993). Today a growing number of researchers question the ability of young planted forests to provide old growth functionality without management to reduce stem densities (Muir et al. 2002, Rapp 2002, Hunter 2001). Scientific evidence has shown that thinning of younger forests can accelerate the development of old growth characteristics (Garman 2003, Muir et al. 2002, Acker et al. 1998, Bailey and Tappeiner 1998, Tappeiner et al. 1997, Carey et al. 1996). Scientists, environmentalists, and forest managers are recommending more active management in young stands (Heiken 2003, Franklin et al. 2002, Spies et al. 2002, Carey et al. 1998, Curtis et al. 1998).

1.2.2. Regeneration Differences

Young planted forests, established at high densities in very short time periods with the expectation of pre-commercial and commercial thinnings, are typically uniform and dense with little differentiation (Oliver and Larson 1996). By comparison widely-spaced early stocking densities, associated with a wide range of natural regeneration establishment periods (100-420 years), have been observed as the principal factor in the growth trajectory of older forests with large diameter trees and multi-layered canopies (Poage and Tappeiner 2002). Without density reductions, planted forests eventually evidence suppressed growth, high height-to-diameter ratios, and short crowns; conditions that have been shown to make stands susceptible to windthrow, disease, and fire while inhibiting the development of the large trees associated with old growth forests (Wilson and Oliver 2000).

1.2.3. Thin for Structure

Three major research projects, the Managing for Biodiversity in Young Forests Project in western Oregon (Muir et al. 2002), the Forest Ecosystem Study in western Washington (Carey et al. 1999a), and the Young Stand Thinning Study on the Willamette National Forest (Hunter 2001), have undertaken comprehensive investigations into the effects of thinning. Results of these studies show that understory vegetation, shade tolerant tree regeneration, and the vertical distribution of the canopy in thinned stands tend to be more similar to old growth conditions than in unthinned stands (Acker et al. 1998, Tappeiner et al. 1997, Muir et al. 2002, Bailey and Tappeiner 1998). Wildlife and plant diversity, including birds, macrolichens and bryophytes, fungi, small mammals, and bats, have also been shown to be greater in thinned stands (Carey et al. 1999, Hayes et al. 1997, Muir et al. 2002, Hunter 2001).

1.2.4. The DNR HCP

Lippke et al. (1996) demonstrated that landscape management alternatives based on “biodiversity pathways” (Carey et al. 1996) can serve both commodity production and non-timber goals. It was in the spirit of integrated management for the production of environmental and economic objectives that the DNR in 1997 negotiated with federal agencies to establish a Habitat Conservation Plan (HCP) on 1.6 million acres of western Washington State forestlands. Eight years later this approach to forest landscape management dominated the selection of a Preferred Alternative for the sustainable forestry calculation that will guide DNR management objectives on western forestlands into the future. The DNR will increase its use of innovative silvicultural approaches to alter forest conditions to produce habitats needed for sensitive wildlife species. A variety of thinning approaches will be employed. At time of regeneration harvest a minimum of eight live trees per acre will be left to contribute vertical structure to the next forest. The goal will be to maintain distributions of forest structural classes across broad landscapes on a rotational basis so that adequate habitat acreages, forest health, and trust revenues are sustained into the future (DNR 2004).

1.3 The State Forest

1.3.1. Washington

The state of Washington encompasses a total land area of 43 million acres, of which 49% or 21 million acres is forest. Productive timberland, that is forest lands capable of growing at least 20 cubic feet of timber per year per acre and operationally manageable for commercial timber harvests, amounts to 18.3 million acres or 88% of the total forest area or about 43% of all lands within Washington boundaries. Around 11% of Washington’s forests are managed for Public Trust Beneficiaries by the Washington Department of Natural Resources.

Table 1.1. Area of timberland by owner and land class in Washington. (Bolsinger et al. 1997)

Land Class	Eastern Washington			Western Washington		
Timberland	7,393			10,911		
Other forest land	1,625			963		
Nonforest land	17,889			3,786		
Total land	26,907			15,660		
Timberland	Unreserved	Reserved	Percent Reserved	Unreserved	Reserved	Percent Reserved
USDA Forest Service	2,494	698	21.87%	2,208	509	18.73%
Misc. Federal/State/ County and Municipal	764	127	14.25%	1,662	822	21.87%
Forest industry	878	--	<0.06%	3,732	--	<0.01%
Native American/Farmer/Misc. Private	2,366	65	2.67%	1,978	--	<0.03%
Total	6,502	890	12.04%	9,580	1,331	12.20%

1.3.2. Five Million Acres

The DNR was established in 1957 to serve as a land steward for a variety of state-owned lands. Of the more than 5 million acres currently under DNR management, about 2.1 million acres are in forestlands. Of state land in forest, 1.4 million acres are located west of the Cascades and approximately 650 thousand acres are located east of the Cascades. There are seven Administrative Regions within the DNR. Five of those regions are west of the Cascade Mountains and are considered to be the western Washington holdings. Two regions are east of the Cascades and are considered to be the eastern Washington holdings. These regions are referred to as the Northeast (NE) and the Southeast (SE) regions. While forest health problems are not exclusive to east side forests, the most acute forest health risks on state forestlands currently exist east of the Cascades.

2. Methods

While the primary motivator for this investigation has been public concern about eastern Washington forest health, early review of market information made it apparent that a broader context of the region as the global-to-local interface would need to be considered. Subsequently, this project has been designed to assess multiple influences that affect the market elasticity for increased timber volumes and changing log types that are anticipated to result from adjustments to the DNR timber sale program; east and west; apart and combined. Factors identified that influence marketability will include the existing timber industry infrastructure, infrastructure adaptability to change, regional supply and demand, public and regulatory pressures, and market strategies customized for timber purchaser preference. Information provided in this report has been assembled to help maximize attractiveness of DNR timber sales program, insure favorable revenue benefits to trust beneficiaries, assist in substantive and effective improvements to the health of state forests, and inform potential for economic development. Also important to insure success of a state forestry program will be an integrated understanding of the evolving forest health and timberland management activities on other public and private forests.

2.1 Review of Available Literature

There are many dynamic factors that combine to influence forest management possibilities. An effort has been made to review pertinent elements of the scientific literature and available government reports in order to gain broad informational overview identified by the research team as important to the results of this project. For this investigation reviewed literature included scientific reports, journals, conference proceedings, and other topical publications as well as DNR and other governmental agency reports. Applicable Washington State and United States policies and laws have also been considered.

2.2 Interviews

Throughout this investigation numerous interviews were conducted by phone, email, and personal conversation. Those interviewed included DNR personnel, Forest Service personnel, industry professionals, tribal foresters, timber purchasers, and university scientists. Many individuals generously contributed information founded upon their professional and personal experiences. The body of anecdotal information that resulted was invaluable to the design, execution, and analysis phases of this project. Insights provided from personal interviews served to underscore a recurring theme in this project: solutions will likely be based upon an integration of professional and institutional knowledge that customizes management strategies to best accommodate local conditions and adapt to rapidly changing regional influences.

2.3 Purchaser Survey

In order to better understand the capabilities and preferences of current and potential DNR timber sale purchasers, a survey was designed, based upon recommendations from industry and DNR professionals, and distributed for response to assess the characteristics, capacities, and preferences of potential purchasers of state timber. A list of current and potential purchasers was assembled by combining contact information from DNR mill surveys, DNR lists of successful bidders on state timber sales, University of Washington, Washington State University, and Oregon State University mill surveys, attendee lists from regional timber purchaser meetings, and interviews with mill representatives.

While this investigation has specific interest in timber sales as part of a state forest health program, such sales are considered to be inextricably linked through regional log markets to other DNR timber sales activities. DNR timber sales have historically been sold to both processor and non-processor timber buyers located in and out of state. Processor representatives are typically professional log buyers under the employ of sawmill, paper mill or other wood products manufacturing companies. Processor purchasers buy timber to secure raw material supplies for their manufacturing operations. Non-processor timber purchasers typically fall into two categories: log buyers from large timberland companies and log buyers from family-owned timber merchandizing companies. Non-processor purchasers resell logs to multiple processor customers. Both processor and non-processor purchasers are important to the success of the DNR timber sale. The DNR Timber Sales Summary Report for fiscal year 2002-2003 shows that, of the 25 top timber purchasers for that year, 12 are processors and 13 are non-processor companies.

The survey for this investigation was designed to elicit response from a broad group of active and potential purchasers. Several types of question formats were employed in the survey to insure that maximum information was contributed. Written comments were encouraged as well.

In a related parallel exercise, a DNR timber processor's survey was begun by the DNR sales and market group in 2000. This survey is ongoing and adds data as it becomes available. Data accumulated from 2000 to 2002 was received from the DNR and reviewed for inclusion in this project. Some companies with multiple facilities have returned multiple responses. While this survey was designed to collect information only from the subset of purchasers with manufacturing facilities, many of its questions are applicable to this investigation. Data from this survey, other mill publications, and DNR timber sales records will be used in this report in combination with response data from the survey conducted as part of this investigation to provide broadest overview of timber market potentials and customer preferences.

Table 2.1. Distribution of survey recipients by state and type.

Purchaser Type	Washington	Oregon	Idaho	California	Total
Processors	47	36	6	7	96
Non-Processors	46	6	3	0	55
Total	93	42	9	7	151

Table 2.2. Distribution of DNR processor respondents 2000-2002 by state.

	Washington	Oregon	Idaho	California	Total
Individual Companies	44	27	7	5	83
Total Responses	70	62	8	5	145

3. Results From Review Of Available Literature And Public Documents

3.1 State Forestlands

3.1.1. DNR Responsibilities

A review of federal and state laws and DNR documents reveals that the DNR has unique management responsibilities that must be integrated as it plans for a forest health program. The overwhelming majority of the lands administered by the DNR are held in trusts created by federal and state laws that provide revenues to specific trust beneficiaries. Although the management of trust lands provides broad benefits to all the people of Washington, DNR has a clear legal duty of undivided loyalty to each separate beneficiary to maximize revenue generation from forested trust lands. Trust beneficiaries include public schools, state universities, state prisons, community colleges, Capitol buildings, and 17 Washington counties. In order to meet obligations to all generations of beneficiaries, the DNR must manage state forest lands to balance current and future income production such that perpetual productivity of trust assets is insured. In addition to trust obligations, DNR must comply with a number of federal and state statutes that protect public resources and provide public benefits. To fulfill these mandates, there are governing policies, procedures, and strategies for management of forested trust lands.

3.1.2. The Board of Natural Resources

The Board of Natural Resources provides oversight. The Board of Natural Resources is composed of six members: the Commissioner of Public Lands, the Governor, the Superintendent of Public Instruction, the Dean of the College of Agriculture at Washington State University, the Dean of the College of Forest Resources at the University of Washington, and an elected representative from a county that is a trust beneficiary. The Board of Natural Resources must approve all major policies and management activities for DNR-managed state forest lands.

3.1.3. The Commissioner of Public Lands

It is understood by the people of Washington that the DNR is to be a leader in sustainable forest management and that the pursuit of this goal is publicly recognized and respected. Achievement in this regard is insured by referendum with a popular election every four years to select the Public Lands Commissioner as the titular head of the DNR.

3.1.4. The HCP

Forestry in the Pacific Northwest has evolved in recent decades resulting in shifting mandates with increasing emphasis on adaptive management to insure long term sustainability of a broad suite of public resources (Sutherland and Bare 2002, Washington State Legislature 2001, WAC 222-12-045). DNR interest in adaptive forest management for the sustainable integration of forest restoration activities with revenue generation began in the 1980's (Commission on Old Growth Alternatives for Washington's Forest Trust Lands 1989). To demonstrate its commitment to sustainability, in 1997 the DNR formally entered into a Habitat Conservation Plan (HCP) with federal agencies under Section 10 of the Endangered Species Act (ESA). The HCP was designed to provide protection for threatened and endangered species such as the northern spotted owl, as required by the ESA, while allowing more flexibility and stability in land management activities. The HCP guides DNR management of all state forest lands west of the Cascade Mountains but also includes some lands in the eastern foothills of the Cascades within the SE region where northern spotted owls are found. DNR forest lands in northeastern Washington are outside the HCP management area.

3.1.5. 25% of Gross Receipts

The DNR mission statement declares that the agency will provide professional, forward-looking stewardship of the state lands, natural resources, and environment to create a sustainable future for the Trusts and all-citizens. For the provision of resource management services to trust beneficiaries, the DNR is authorized to retain up to 25% of gross timber receipts to cover operating costs. The adequacy of the 25% of gross timber receipts to cover DNR forest management expenses is currently under review (Independent Review Committee 2004). Additional DNR activities not connected with the generation of trust revenues are funded independently by the State Legislature.

3.1.6. Stewardship

Forward-looking stewardship requires ongoing reassessments of available information to support integration of design, management, and monitoring in order to adapt and learn (Salafsky et al. 2001). There is a growing consensus amongst silviculturalists and forest ecologists that, especially in the case of forests that have been previously managed, opportunities exist to develop revenue generating harvest activities that lead to ecological improvements. Fundamental to this approach is an understanding of the dynamic nature of forests as a shifting

mosaic of age classes and vegetative structures that can be managed at the landscape scale to insure achievement of multiple biodiversity targets distributed through time and space (Carey et al. 1996, Oliver 1999, Lindenmayer and Franklin 2003). Research findings indicate that comprehensive restoration prescriptions that selectively target for removal a combination of small and large diameter trees may be economically and environmentally desirable in overstocked fire-prone ecosystems where failure to reduce fuel loads can have disastrous consequences (Brown et al. 1996, Fiedler et al. 1999, Fiedler et al. 2001). In the spirit of adaptive management, a number of factors have converged that make this investigation timely:

- The forest health crisis
- Changes in DNR management strategies
- Changes in federal and state harvest volumes over the last two decades
- Adjustments to timber industry infrastructure
- Changes in markets for forest products
- Emerging federal forest health policies
- Strong public interest in forest management

3.2 Forest Health

3.2.1. Remove Excess Fuels

There is a large body of evidence within the scientific literature to indicate that many researchers are in agreement: millions of acres within inland west forests are experiencing an unprecedented decline in forest health that has led to fuel accumulations, catastrophic wildfires, increased risk to life and property, destruction of ecosystems and critical habitats, and loss of valuable timber resources. Many researchers and forest managers concur: removal of excessive hazardous fuel loads is warranted across all forest ownerships (Courtney 2004, DNR 2004). Policy makers at federal and state levels are also in agreement (Babbitt and Glickman 2000, Western Governors Association 2001 and 2002, The White House 2003, National Fire Plan 2004, Washington State Legislature 2004).

In 2000, the USDA Forest Service outlined a strategy to address forest health and wildfire in the forests of the inland west entitled *Protecting People and Sustaining Resources in Fire-Adapted Ecosystems; a Cohesive Strategy* (Laverty and Williams 2000). This report emphasizes that the stakes are high, “Without increased restoration treatments in these ecosystems, wildland fire suppression costs, natural resource losses, private property losses, and environmental damage are certain to escalate as fuels continue to accumulate and more acres become high-risk.”

Washington has over 1.9 million acres of forestland that contain elevated levels of tree mortality, tree defoliation, or foliage diseases. Fire suppression costs have risen due to extreme fire behavior caused by high fuel loads and increased tactical complexities (DNR 2004). Opportunities have been identified to improve habitat qualities for sensitive species, restore forest health, and generate positive economic returns through an expansion of the DNR timber sales program (DNR 2004).

3.3 New Management Challenges for the DNR

3.3.1. The Sustainable Harvest Calculation

State law requires the DNR to manage the timber sale program for sustained yield. Periodical adjustments to forest acreages designated for inclusion or exclusion in the sustained yield management program along with new information on growth and yield performance warrant a recalculation of the state sustainable harvest forecast. This exercise was recently conducted for the western Washington forestlands and multiple alternatives were subsequently presented to the Board of Natural Resources for review. After examination of a spectrum of potential harvest strategies, the Board of Natural Resources, in 2004, selected a management alternative based upon innovative silvicultural approaches to increase production of both complex forest habitats and trust incomes. The projected harvest volume under the newly adopted management alternative for western Washington state forest lands is 597 million board feet per year (DNR 2004). The average harvest from western Washington DNR forest lands from 1998 to 2002 was 480 million board feet per year (DNR 2004). The DNR is currently developing long-term sustainable harvest calculation alternatives for eastern Washington for submission to the Board of Natural Resources for review in the next biennium.

3.3.2. HCP Amendment

The DNR recently submitted and was granted an amendment from the federal government to the state HCP for three sub-landscape areas in the Klickitat Planning Unit within the SE administrative region (Yakima and Klickitat Counties). Because of serious forest health problems in this area, it was determined that habitats for the northern

spotted owl were in jeopardy and that new management approaches were needed. Following two years of consultation, a modified, ecologically sound, and operationally feasible strategy was agreed upon whereby the DNR would employ selective harvest activities to protect and restore northern spotted owl habitats. An increase in annual harvest volume of 20 -30 million board feet per year for 5 to 7 years is anticipated as a result. A large portion of this harvest volume may be comprised of smaller diameter trees from suppressed stocks (DNR 2004).

3.3.3. New Harvest Flexibilities

The traditional state timber sale arrangement involves the auction of cutting rights to standing timber within a defined boundary. The winning bidder is responsible for the removal of the timber. In 2004, the Washington State Legislature passed into law SB 6144. SB 6144 states that the DNR may initiate contract-harvesting activities and silvicultural treatments for the purpose of improving forest health. SB 6144 creates a contract-harvesting revolving account; expenditures from which may be made by the DNR for payment of harvesting and silvicultural treatment costs necessary to improve forest health. Upon completion of timber removals, decked logs are then sold to the highest bidder at auction. The revolving account is reimbursed from the proceeds of any log sales that develop from these activities. Net revenues in excess of costs are then distributed to trust beneficiaries. The DNR may retain 25% of net revenues to cover administrative costs. This new law enables the DNR, for the first time, to undertake forest health projects with some opportunity for cost recovery; where otherwise the timber removal costs might have been prohibitive (Washington State Legislature 2004). It is anticipated that forest health activities may generate a harvest volume of 30 million board feet per year in addition to the regular timber sale program. Many trees harvested to promote forest health will be smaller diameter suppressed stock.

3.3.4. Marketing and Sales

For the last several years the DNR marketing and sales department has been developing new ways to improve effectiveness of timber sale offerings. There is increased emphasis on the recognition that timber purchasers are valuable DNR customers. A service-oriented focus has been established to better serve purchaser needs. Aggressive promotional strategies have been employed both in state and out of state such that an increasing number of potential purchasers are being made aware of DNR timber sale opportunities. Improvements are evidenced by increased operational efficiencies, reduced costs, and improved returns to the trust beneficiaries (Tweedale 2004, Independent Review Committee 2004). Marketing changes include the shortened contract lengths for some sales, increased pole sales, management of wood flow timing to the market, and contract harvesting to provide different product mix availabilities. These innovative marketing approaches have received praise by timber purchasers, the Board of Natural Resources, and the Independent Review Committee to the Commissioner of Public Lands. However, continuous quality improvement of a marketing program (Walton 1986) with flexibility to accommodate shifts in product volumes, types, and customer needs requires ongoing informational assessments and strategic re-evaluations. An adaptive operational framework is needed and periodic consideration of multiple dynamic influences at many scales is required. For the DNR to increase harvest activities, additional personnel will be needed to replace retirees and to expand operational capabilities. Timber volumes to become available for the statewide DNR harvest as a result of recalculation of the sustainable harvest target on the west-side, modifications to the HCP in the SE region, and forest health activities in NE and SE are expected to increase available regional timber supplies by 100-150 MMBF per year. Continued sensitivity to purchaser preferences and innovative approaches to timber offerings will help to insure that DNR timber sales attract aggressive bidder interest and produce maximum economic return to trusts.

3.3.5 Shrinking Resources

The complexities and costs of managing forests have increased dramatically for the DNR in the last two decades but revenue returns in real dollars from harvest activities have dropped well below historic averages. Additional trained natural resource management professionals are needed to expand the present workforce to meet increased harvest targets and to replace the current wave of “baby-boomer” retirees. Recent DNR reports suggest that the current management fund deduction of 25 percent of gross timber sale receipts is inadequate to address current work load and human resources challenges. If adequate funding is not available to plan, prepare, and implement forest health and other timber management activities then future harvest volumes and trust revenues will fall short of projections. At stake are millions of dollars of trust revenues, increases in older forest habitats, improvements for spotted owl populations, and protection of riparian resources (Aust 2004, Independent Review Committee 2004).

3.4 Historic Changes in Federal and State Harvest Volumes

Dramatic changes in forest management occurred in the Pacific Northwest throughout the 1980's and 90's. Concerns about species habitats and old growth protection resulted in court injunctions and policy shifts that caused abrupt reductions in timber harvests from federal forest lands. In 1988, the timber harvest from National Forests in

Washington State was 1.5 billion board feet. In 2002, the federal harvest in Washington was 72 million board feet; less than 5% of the 1988 level. Timber harvest levels were reduced on DNR forestlands from 826 million board feet in 1988 to 457 million in 2002; a 45% decline. Lumber and log prices experienced volatile spikes and drops during this period. Unable to respond to such rapid changes, many forest products companies ceased operations. Current public concerns over forest health and habitat restoration, however, now appear to be prompting new management approaches on both federal and state forestlands that may result in increases in harvest activities and saleable log volumes for the first time in more than a decade.

3.5 Adjustments to Infrastructure

3.5.1. Smaller Logs

As a result of dramatic drops in public timber harvests, during the period from 1988 to the present, many sawmills, pulp mills, and veneer mills in the Pacific Northwest, unable to secure sufficient log supplies or to respond to rapidly shifting markets, closed operations. Paul Ehringer, long-time industry consultant, reports that 378 mills closed in the region during the period from 1989 to 2002 (Pease 2003). However, the consequences were more profound than closed businesses and lost jobs; a total restructuring of the forest products industry occurred. Many surviving mills retooled for small diameter logs and higher production outputs. Perez-Garcia (2004), in an investigation of changes to the Washington lumber manufacturing sector, found that many of the mills that closed were operations with smaller production capabilities (less than 30 million board feet annually) while there was little drop in the number of mills with capacity for large annual production volumes. Mill surveys from the DNR, the Forest Service, and Random Lengths provide similar reports (Larsen 2003, 2000, 1998, Spelter et al. 2001, Spelter 2002, Random Lengths 1988 & 2004). Larger mills survived and smaller mills closed. Some large mills actually increased levels of production. The implications of these infrastructure adjustments are likely to be lasting. Most of the remaining sawmill capacity has focused on the high-production manufacture of second growth logs available from private forests with a maximum large end diameter of 20 - 24 inches and a minimum small end diameter of 6 inches. Little production of the valuable high grade clear lumber that comes from larger logs remains (Warren 2004). Subsequently, price premiums for large logs disappeared as did many markets for specialty Northwest lumber products (Wagner 2003). Industrial timber managers responded by shortening harvest rotations to produce uniform second growth logs most in demand.

3.5.2. Four Billion Board Feet

While the volume of public timber harvest fell off sharply, the number of forest products manufacturers declined, and 10,000 forest products workers lost their jobs in Washington, the total volume of lumber production gradually increased with an average of about 4 billion board feet per year (Blatner et al. 2003, Warren 2004). The state of Washington set a post World War II sawmill production record in 2003 with 4.9 billion board feet of lumber produced for that year (Western Wood Products Association 2004). There are several reasons why this happened. Regulatory and market changes resulted in reduced log exports making more logs from state and private forests available to domestic processors. Mills that retooled for efficient utilization of smaller diameter logs experienced higher production and improved log-to-lumber recovery ratios through reduced saw kerf, increased wane allowances, curve sawing innovations, and other manufacturing modernizations. An overall gain in capacity was achieved as remaining mills offset capacity losses through capital investments in production improvements (Spelter 2002). In 2003, sawmills producing more than 100 MMBF per year account for more than 64% of regional sawmill production, whereas in 1988, mills with such large capacity accounted for only 38% of total production (Western Wood Products Association 2004). Some industry analysts predict that recent price increases connected to strong housing demand and anticipated increases in log availability will result in future investment in new sawmill capacity in Washington (Perez-Garcia 2004).

3.5.3. Tributary Areas

By the late 1990's the Japanese economy went into decline and log export volumes dropped off making more logs available from private forests for domestic process. As the number of mills declined but average capacity increased, the haul distance from logging site to mill increased (Perez-Garcia 2004). Logs not only traveled across state lines but logs were imported from other countries. In 2002, more than 400 million board feet of logs was imported from British Columbia for Pacific Northwest Mills (Warren 2004). Historic understanding of log-to-mill tributary areas as defined by a distance radius from the mill site would appear to be no longer applicable.

3.5.4. Panel Products

While region sawmill volume of production has remained stable, this has not been the case for other forest products manufacturing sectors. The plywood industry in the west lost 54% of capacity during the years from 1990 to 2004

and projections indicate that capacity decline will continue into the future at rates higher for the west than for the rest of the United States (Adair 2004). Reduction in public forest harvests limited the volume of old growth timber that was available to plywood producers resulting in declining quality of panel production. As a result, end-use markets have become indifferent to product differences between western plywood and plywood produced from southern pine. Market share shifted to the southeast and the plywood industry is expected to continue to decline in the Pacific Northwest (Adair 2004). Coincident to these dynamic changes, production of oriented strand board (OSB) increased throughout North America further eroding market share of western plywood. OSB can be manufactured from small diameter low quality logs and OSB markets have increased dramatically in recent years, claiming more than 50% of the structural panel market (Haynes 2003), yet there are currently no OSB manufacturing facilities in the western United States (Adair 2004).

Particle board and medium density fiberboard (MDF) are wood-based panel products that have taken market share from plywood for some applications such as underlayment. These products are generally made from sawmill residues and wastes that are unsuitable for pulping such as planer shavings, dried trim, and sander dust. These residual materials provide an inexpensive source of fiber that is less costly than round wood. Three particleboard facilities and one MDF plant currently operate in the west. All of these products utilize waste fiber making the use of round wood generated from forest thinnings an unlikely raw material for the manufacture of particle board or MDF (Spelter et al. 1996).

3.5.5. Engineered Wood Products

Large log scarcities created by federal harvest reductions helped to spur market entry of engineered wood products as replacement alternatives for wide dimension lumber and structural joists and beams. Structural engineered wood products (EWP) include glulams, wooden i-joists, oriented strand lumber and laminated veneer lumber (LVL). A subsequent reduction of market premium for larger dimension solid wood products has been the result. One manifestation of this value shift is likely a permanent reduction in price premium for larger logs. EWP markets are projected for continued upward growth (Adair 2004). There are currently 12 EWP producers of structural products in Oregon, 3 in Washington, and 3 in Idaho.

3.5.6. Pulp and Paper

In recent years, the pulp and paper industry has experienced reductions in the number of operating mills in the Pacific Northwest. Between 1989 and 2001 the number of pulp and paper mills in the Pacific Northwest dropped from 35 to 23 (Gammel 2004, Center for Paper Business and Industry Studies 2004, Lockwood-Post's Directory 1988 & 2003). Dramatic declines in production capacity accompanied reductions in the number of operating facilities. In 1988, there were 26 pulp and paper mills operating in Washington. By 2003, the number of operating pulp and paper mills was reduced to 15 accompanied by a 45% reduction in domestic production and a 71% reduction in exports. Most remaining capacity is located in western Washington. There are presently 3 pulp and paper mills operating in eastern Washington. While problems for the domestic pulp and paper industry may be toughest on companies in the Pacific Northwest; flat product prices, strong international competition, and high production costs have resulted in cuts in capitol spending for the pulp and paper industry throughout the United States that in recent years have fallen below the point required to maintain facility competitiveness (Kinstrey 2004). Kraft pulping is the dominant pulping technology used in the United States and worldwide. However, kraft pulping is extremely capital-intensive. Newly constructed mills cost in excess of \$1 billion and must process between 1,000 - 2,000 tons of dry wood chips per day to be economically viable (Youngquist and Hamilton 1999). No investments in new capacity for the Pacific Northwest are anticipated and future closures of existing facilities may occur (Lockwood-Post's Directory 2003).

3.5.7. Global Demand

An estimate of the range of increase in future global demand for wood fiber over the next 50 years was developed by Perez-Garcia in 2003 using the Center for International Trade in Forest Products (CINTRAFOR) Global Trade Model (CGTM). Projections were based upon a 0.5% annual rate of increase, reflective of the rate of change from 1990-2000, and a 1.4% annual rate of increase, reflective of rate of change prior to 1990. The annual rate of growth in the gross domestic product (GDP) was assumed to average 3.5%. (Perez-Garcia 2004, Perez-Garcia 2005). International consumption was estimated to reach between 353 billion board feet (BBF) and 499 BBF annually by 2050. The US is the largest market for softwood lumber in the world and is expected to remain so during the projection period. Perez-Garcia estimates that the US West would respond to rising demand by increasing the regional harvest level by 1.8 BBF per year by 2050. Such a volume increase would suggest a need for new capacity expansion for the US West Region of 7 to 8 large production mills or approximately 60 smaller production mills. The implications for needed regional infrastructure adjustments for pulp and paper production were not examined.

3.5.8. Labor Availability

At the local level a key issue is the availability of sufficient skilled labor and appropriate harvest equipment. At issue as well is the proximity of workers and machinery to areas where work needs to be done. If forestry companies are required to move personnel and equipment large distances costs will be high and competition reduced. Due to reductions in public timber harvests the availability of skilled forestry workers in the western U.S. has declined to an estimated 6.4 forest workers per 100 square miles. By comparison the U. S. South is estimated to have 15.4 forest workers per 100 square miles (Rummer et al. 2003). Sufficient numbers of resource management personnel to administer agency programs are also in short supply (Renewable Natural Resources Foundation 2003-4). See also Section 3.7.5, *Disappearing Workforce*, in this report.

3.6 Changes in Markets for Forest Products

3.6.1. High Production Costs

The relative increasing costs of regulations, labor, energy, and transportation complicated by the strong value of the U.S. dollar have made the Pacific Northwest a high cost region for the production of wood and wood fiber products as compared to other areas of the world (Wood Markets Monthly 2002, Haynes 2003). After 15 years of dramatic reductions to regional log supplies, proposed harvest volume increases for forest health and habitat restoration may occur at a time when reductions in industrial infrastructure, increased global fiber competition, high production costs, and uncertain markets leave the Pacific Northwest poorly positioned for rapid response. Fortunately, record housing starts in recent years have translated to price increases for saw logs while future decline of the dollar against other currencies is projected to result in increased access to export markets and less competition from Canadian producers (Aust 2004). An emerging demand for North American wood to provide building materials for a fast growing China economy may add to increases in the value of Washington timber (Aust 2004). Strategies for maximizing timber sale effectiveness will need to consider the interactions of such multiple and dynamic market influences.

3.6.2. Attractive State Timber

With the decline of the federal timber sale program, the DNR has become the dominant source of publicly available timber supply within the state. The DNR typically manages its forests for longer rotations with less intensive efforts to maximize growth than industrial forest landowners and subsequently produces finer grained saw logs that are attractive to purchasers. Another positive development for timber sales, which has served to broaden the purchaser pool, has been the increased use of rail and water freight to transport logs further from the woods to the mill. The DNR marketing and sales department has new programs to capitalize on such opportunities by focusing timber sales offerings to best suit a range of customer needs. The result has been heightened competition amongst bidders for timber sales and the DNR timber sale program has benefited (Independent Review Committee 2004).

3.6.3. Large Logs

Over the past ten years, timber producers in the Pacific Northwest have witnessed significant downturns in prices for some log types. This has been particularly true for logs 30 inches and larger in diameter (Wagner et al. 2003). Today few Washington mills want large high grade conifer logs. Log Lines, a regional log price reporting service in Mount Vernon, WA, stopped publishing market prices for Douglas-fir peeler grades in Washington in 1994 (Log Lines 2004). Log prices for Douglas-fir peeler logs, however, are reported for the coast and Willamette areas of Oregon where mills still secure and manufacture large diameter logs. Prices for large diameter logs are lower than they have been for ten years. When an inflation-adjusted price comparison is made between what Oregon mills would pay for Douglas-fir peelers in 1994 verses 2003, reductions in available market prices for peeler grades are more than 50% (see Table 3.1). Similar market adjustments have occurred for large diameter logs of other species. The price for Ponderosa pine number one saw logs also dropped by 50% between 1994 and 2002 (Wagner et al. 2003).

Table 3.1. Price changes for Douglas-fir peeler logs in the coast and Willamette regions of Oregon in \$/MBF (Log Lines 2004, US Department of Labor 2004).

Grade	1994 price	Inflation adjusted; 2003 \$	2003 price	Change (reduction)
1 - P	\$1978	\$ 2451	\$1123	(55%)
2 - P	\$1718	\$ 2133	\$916	(57%)
3 - P	\$1314	\$ 1631	\$672	(59%)

Other factors combine to further erode the market value of high-grade large diameter logs from Washington. Recognition by private (especially non-industrial) forest landowners that large log prices could continue decline may mean that private landowners liquidate remaining inventories of older larger trees to avoid risk of future low prices. As private forest landowners cease the offering of larger diameter logs, further reductions of processor infrastructure and market prices can be anticipated. In 2002, logs from private forestlands accounted for 76% of the total annual harvest in Washington and 85% of the total harvest in Oregon. By comparison, in the same year, annual harvest volumes from state-owned forestlands in Washington (DNR) accounted for only 13% of the total in-state harvest and in Oregon (ODF) only 7% of the total in-state harvest (Warren 2004). Many of the large logs harvested from DNR and other forests in Washington are sold into Oregon markets. When Washington logs are sold to Oregon buyers, the negotiated price must reflect a discount needed to absorb high transportation costs. There are other factors that serve to further compromise prices for large logs. Domestic and export market shares for some high-end lumber products historically produced from large Pacific Northwest logs have been lost to Canadian imports, Southern pine, and product alternatives. The Asian recession has negatively impacted Washington clear lumber export volumes and prices. This is especially true for white wood markets that have historically been dominated by Asian customers.

Price information for large higher quality logs in the Pacific Northwest, where markets are available, indicates that for Douglas-fir, western hemlock, and ponderosa pine, real log prices have dropped to the lowest level in 25 years. The trend towards increased utilization of small-diameter logs is expected to result in continuing price declines for large diameter tight-grain logs (Aust 2004). Wagner et al. (2003) interviewed 18 timber processors in Oregon and Washington that can still handle large diameter logs and found, while most of them have specialized in distinct niche markets (export clears, crossarms, specialty panels, etc.) for the lumber yields from large logs, that only 6-7 of current Oregon processors of large logs will likely continue in this market into the future. About half of large log purchasers in Oregon reported that log supplies were readily available while the others reported log scarcities. Large log processors are hauling logs much farther distances than historically has been the case. Log buyers reported that sawlogs (smaller coarse grain) are hauled by truck up to 150 miles, while peeler logs (larger fine grain) are being hauled up to 400 miles by truck. Distances can be much greater if logs are transported by rail or water.

3.6.4. Clear Lumber

While Pacific Northwest market share in Japanese post and beam construction has diminished due to housing start declines, an increased emphasis on quality, and competition from Canadian and European lumber and laminated products, some opportunities remain for sales of high quality lumber products into this market especially for western hemlock, Douglas-fir, and true fir species. European countries such as Italy and Spain also purchase Douglas-fir clears. As the dollar weakens, these export markets are expected to strengthen. Domestic markets for clear fine grain lumber products from large Ponderosa pine, western hemlock, and Douglas-fir logs include doors, windows, and molding. While some market share for these products has been lost to product alternatives such as composites and plastics, high quality architectural applications still provide stable albeit reduced demand. Strong competition from Canadian suppliers, however, has had a dampening effect on market prices for clear lumber products from the Pacific Northwest.

3.6.5. Beams and Timbers

A select market still exists for large architectural solid wood beams and pillars where customers demand products more aesthetically attractive than laminated beams. Solid wood timbers are typically more cost competitive than laminated beams when dimensions are 6x10 or smaller. Domestic lumber products from large logs also include crossarms and crossties. The market for crossarms (used by public utilities and sometimes called transmission arms) is large and steady while providing a premium price due to the small knot and strength requirements for this product.

Crossties are lower grade large timbers used on railroad lines. There are about 750 million ties in service nationwide. Of those, 16 million ties were replaced in 2001. While the market is large, the price is low for crossties and laminated wood products have made market inroads for some railroad applications.

3.6.6. Poles

Utility poles are premium-priced whole log products made from moderately large trees that are straight with little taper and can produce long logs (often 100 feet or more). Across the nation, there are 165 million wood utility poles in service and 2-5 million poles are replaced annually. In the Pacific Northwest, the highest value log return is from sales of utility poles. Some forest land owners market standing timber suitable for utility poles independent of general timber sale offerings.

3.6.7. Saw Logs and Dimension Lumber

Currently sawmills in the Pacific Northwest consume logs that are predominantly softwood species and average 11 inches in diameter with a minimum of 6-8 inches and maximum of 24 inches in diameter depending upon mill equipment and location. Logs are generally milled to produce a mixture of dimension lumber, studs, chips, and other residuals. Prices for logs of this type are sensitive to conventional market influences such as interest rate changes, housing starts, and short term supply and demand fluctuations. Although average saw log prices have not fallen as dramatically over the last ten years as have the large log prices, inflation adjusted price reductions have been over 30% for most species and grades (see Tables 3.2 – 3.4). However, Haynes et al. (2003) projected these markets to remain stable with some upward trend far into the future based upon assumptions of increasing consumer demand for building products. The Economic and Revenue Forecast (Aust 2004) produced by the DNR shows slight upward price trend through the end of the decade. The majority of the harvested timber volume from DNR lands is and will be softwood logs suitable for dimension lumber production. While total lumber production volume in contrast with most other aspects of the forest products industry has remained relatively stable in Washington state for the last decade, there has been a shift in where the lumber is produced. Warren (2004) cites data from the Western Wood Products Association that indicates that the inland production has declined by 13% during the period from 1994-2002 while the coast production increased by 39% during the same period. Recent sales of Boise Cascade Corp. mills and land suggest that declines in the inland west milling capacity may not be over (Dietz 2004). In contrast, new milling facilities in western Washington are being planned or have been recently constructed (Aust 2004).

Table 3.2. Price changes for Douglas-fir (DF) and whitewood (WW) sawlogs in western Washington in \$/MBF (Log Lines 2004, US Department of Labor 2004).

Species & Grade	1994 price	Inflation adjusted; 2003 \$	2003 price	Change
DF #2 Saw logs	\$586	\$728	\$457	(37%)
WW #2 Saw logs	\$447	\$555	\$316	(43%)

Table 3.3. Price changes for Douglas-fir (DF) and whitewood (WW) Chip & Saw 5”+ in western Washington in \$/MBF (Log Lines 2004, US Department of Labor 2004).

Species & Grade	1994 price	Inflation adjusted; 2003 \$	2003 price	Change
DF Chip & Saw	\$500	\$621	\$404	(35%)
WW Chip & Saw	\$350	\$435	\$209	(52%)

Table 3.4. Price changes for Douglas-fir (DF), lodgepole pine (LP), Ponderosa pine (PP), and whitewood (WW) camprun sawlogs in eastern Washington in \$/MBF (NW Management Inc. 2005, US Department of Labor 2004).

Species & Grade	1994 price	Inflation adjusted; 2004 \$	2004 price	Change
DF camprun	\$480	\$612	\$460	(25%)
LP camprun	\$476	\$607	\$375	(38%)
PP camprun	\$522	\$665	\$450	(32%)
WW camprun	\$448	\$571	\$360	(37%)

3.6.8. Log Sort Yards

Maximum returns from log sales are logically linked to the sale of distinct log types to highest and best users. One method for adding value to logs is to resort, remanufacture, and merchandize through a log sort yard. In response to community and government interest in the economic development potential of forest restoration, fuels reductions, and thinning projects, several studies have examined the feasibility of sort yard operations to increase effectiveness of timber merchandizing programs. Log sorting yards can provide timber sellers with a number of opportunities to segregate logs by species and grade for highest value return when landing sorting is too limited for quality-control merchandizing. Camp run logs can be rebucked and graded in sort yards for improvements in quality and scale. Some log customers will pay higher prices for log decks of known quality that are available on demand. Log customers may pay a premium for log yard services such as debarking or reloading for water or rail freight. Log yard residuals such as bark, chips, and rock can be recovered to help defray operations costs. Log customers may pay a premium for sorted logs in order to avoid risks associated with uncertain qualities and costs that result from timber sale purchases. Several studies have examined the operational and economic feasibilities of log sort yard operations (Dramm et 2002, Dramm et al. 2004). Log sort yards have been used successfully throughout North America but both of the studies cited in this report stress cautionary conclusions. Government-operated log yards have had limited success and only in Canada where 75% or more of handled log volume was higher quality saw log through peeler grade material. Log yards were found to be not practical for handling small diameter or low value material. If the logs are used primarily for high value log types then the minimum annual volume necessary to profitably operate a log yard is suggested to be 10 million board feet but can vary considerably depending on the operational costs and net return margins (Dramm 2004). With the decline of log exports and old growth harvests, the number of log sorts needed for most harvest activities has decreased along with the value differential between log grades and the subsequent operational attractiveness of sorting yards.

3.6.9. Small Diameter Wood

Of growing contemporary concern in the Pacific Northwest are the volumes of very small diameter low value logs not generally considered large enough for sawmill production that must be removed to reduce hazardous fuel loads. Many mills have shifted raw material needs towards smaller logs than may have been used a decade ago, however, most still do not want logs smaller than 8 inches in diameter. Barbour (1999) in a sawmill recovery study of 8 foot long small diameter logs found that logs five inches in diameter and logs ten inches in diameter require the same process time per piece in the sawmill but the production difference for the two log sizes was huge. To produce one thousand board feet of lumber it took 160 five-inch diameter logs but only 31 ten-inch diameter logs. The production for an eight hour shift was 65 MBF for five-inch logs and 336 MBF when ten-inch logs were run. In northeast Washington, however, there are several mills that have installed special equipment expressly for the purpose of manufacturing dimension lumber and chips from smaller logs that may range from 3-8 inches in diameter with an average of 5 inches. Ironically, these mills struggle to secure sufficient raw material (Petersen 2004). The DNR should have no difficulty selling small logs in NE Washington where infrastructure is well established.

In other areas round wood pulp markets exist that can absorb small diameter volumes albeit with marginal economic benefit to the seller depending on haul distance and current market price. Transportation is a critical factor in small diameter harvest costs calculations (Han et al. 2002). Where rail lines are close to harvest activities there can be critical savings on freight charges. In many areas of eastern Washington, however, haul must be by truck and the subsequent cost of freight to pulp and paper mills and sawmills is prohibitively expensive for low value logs.

Pulp log markets have experienced dramatic price reductions during the last decade. Current pulp log prices are lower than estimated harvest costs. The removal of smaller diameter timber has been shown to be net cost when logs are less than 8-9 inches DBH (Kluender et al. 1998, Wagner et al. 1998). The negative value-to-cost relationship of small diameter pulp log removals demonstrates the need in some eastside forests for innovative approaches to reduce forest fire risk while retrieving maximum value from harvested trees.

There have been a number of publicly and privately supported research and demonstration projects designed to explore alternative utilization strategies for small diameter logs resulting from fuels reduction projects. Innovative small log products have been developed that include habitat structures, fencing, erosion controls, veneer, log furniture, post and pole construction materials, and animal bedding. While there have been some successful local projects with resultant economic development benefits for rural communities, as yet none of these projects have resulted in establishment of new log markets that have successfully increased the market value of small diameter logs (Lincoln Industrial 2004, Livingston 2004, Al-Khattat 2002, Dooley 2002, Eckelman and Haviarova 2002, Kamarata 2002, Paun and Wright 2001, Paun and Jackson 2000). If a mixture of log types and sizes are removed during a harvest or forest restoration treatment, the overall return from the harvest activity can be positive. Integrated harvest strategies that combine removal of some larger sawmill material with the less valuable small diameter fuel loads have been shown to produce both positive ecological and economic results (Barbour et al. 2004, Fielder et al. 2001).

Table 3.5. Price changes for Douglas-fir (DF), and whitewood (WW) pulp logs in western Washington in \$/MBF (Log Lines 2004, US Department of Labor 2004).

	1994 price	Inflation adjusted; 2003 \$	2003 price	Change
Douglas-fir	\$199	\$247	\$99	(60%)
whitewood	\$189	\$235	\$83	(65%)

Table 3.6. Estimated average harvest and haul cost in \$/MBF for eastern Washington small diameter forests by equipment type (Chandler. 2004, Han et al. 2002).

Ground Based	Cable	Helicopter
\$160-200	\$195-235	\$325-375

3.6.10. OSB and LVL

Spelter et al. (1996) examined key performance parameters of various processing alternatives for small diameter timber (4 to 8 inch small end diameter) from forest health thinning treatments. Oriented strand board (OSB) and laminated veneer lumber (LVL) were two engineered wood products that offered respectable returns on investment. However, returns from LVL diminished appreciably as diameter size decreased below 8 inches. Depending upon average diameter of raw material supply, annual volumes of timber needed as raw material supply for either product manufacture ranged from 60 to 100 million board feet. Capital investment in plant construction was estimated to be \$100 million for OSB and \$65 million for LVL.

3.6.11. MSR Lumber

Returns from stud and random length lumber production from small diameter timber were found to be marginal but could be increased with addition of machine-stress-rating (MSR) capability to sort lumber for value-added applications such as trusses and laminations. Because of dense stocking and slow growth many trees to be removed in eastern Washington may produce lumber with the desirable strength properties needed for high value strength applications. In a study of small diameter timber in Northern Idaho, Erikson et al. (2000) found that machine-stress-rating of lodgepole pine lumber production produced a \$27/MBF increase in overall lumber value and MRS grading of grand fir produced a \$15/MBF increase in overall lumber value above visual grading. Minimum annual raw material supply required for efficient lumber production from small diameter logs was found to be 70 million board feet. Capital investment for small log sawmill construction was estimated to be \$30 million. MSR capability can be added to existing sawmill production at an estimated cost of approximately \$750,000.

3.6.12. Acoustic Resonant Testing

Fibre-gen, a division of the New Zealand firm, Carter, Holt, Harvey, has been working with American scientists at the USDA Forest Products Laboratory to develop field tools that utilize acoustic resonant frequencies to measure timber stiffness in the log or at the tree. There is growing recognition amongst producers of MSR and LVL that wood stiffness is a key element in log valuation. For example, depending upon grade, MSR lumber can bring a price premium of \$65 to \$98 per MBF beyond wholesale value of 2x4 random length standard and better lumber. An opportunity may soon exist for log sellers to receive premium prices for logs that test well for stiffness. Stiffness testing tools are hand held and can easily be used in the log yard as part of scaling or in the woods as part of the timber cruise.

3.6.13. BCTMP

Spelter et al. (1996) suggested that conversion of pulpwood for bleached chemithermomechanical pulp (BCTMP) might hold promise as well. While BCTMP plants can operate successfully with raw material supplies as low as 25 MMBF per year, the investment to net income ratio was much higher than other manufacturing alternatives indicating greater risk and longer time to recover capital investment. Estimated capital cost for BCTMP plant construction was \$80 million.

3.6.14. Panels

Production of particle board and medium density fiberboard was examined and found to be reliant upon an inexpensive raw material supply from residues and wastes from sawmills and plywood plants. Production of particle board and medium density fiberboard was determined not feasible from small diameter timber. Plywood manufacture requires larger log sizes and was also found to be an unsuitable utilization strategy for small diameter materials.

3.6.15. Composites

Another emerging product group is wood-plastic composites (WPC). Development of WPC technology is not new. The Washington State University Wood Materials and Engineering Laboratory has been successfully developing wood composite applications for more than fifty years. Wood composite applications for siding, decking, molding, and roofing products are expected to capture 20% of their respective markets by 2005. WPC is composed of 50-70% wood flour and 30-50% plastic. The wood flour in WPC is produced from sawdust, shavings, and other wood products manufacture residuals (Clemons 2002). Another composite wood product that has experienced steady market growth for the last decade is the manufactured firelog (Shook 1999). Firelogs are generally made from compressed planer shavings and wax. Wood pellets are also compressed wood fuel products made from sawmill residuals.

3.6.16. Small Log Availability

Regardless of manufacturing strategy, critical for consideration for private investment in new capacity is the amount of fiber availability and the haul distance from the woods to the mill. A study, undertaken by forest managers and scientists from Oregon State University, Oregon Department of Forestry, U.S. Forest Service Pacific Northwest Research Station and the Wallowa-Whitman, Malheur, and Umatilla National Forests, to assess timber availability from forest restoration projects on more than 1.6 million acres in the Blue Mountains of Oregon estimated that, while small diameter timber (in this case less than 7 inches in diameter at breast height) may comprise many of the stems in at-risk forests, the actual volume to be removed is less than 3% of the total log yield resulting from hazardous fuel removal harvests (OSU and others 2002). An assessment of forest inventory from Continuous Vegetation Survey (CVS) plot data for the Okanogan National Forest showed that while trees less than or equal to 6 inches diameter at breast height (DBH) accounted for 90% of the stem count such small diameter trees comprised only 2% of the total volume (Mason et al. 2003). If similar distributions of trees by size class are consistent for DNR forests in eastern Washington, the subsequent available harvest volumes of small logs from state lands would be too small to warrant private investment in any of the manufacturing options investigated by Spelter et al. The only forest land owner in eastern Washington with sufficient volumes of standing small diameter timber to warrant private investment in new manufacturing capacity is the USDA Forest Service.

3.6.17. Biomass-to-Energy

Hazardous fuel loads from overstocked forests to be removed to reduce risk of forest fires include many small diameter logs, tops and limbs. When markets have been strong, there have been opportunities to economically utilize some of this material as pulp. However, pulp markets are currently weak, forest biomass from tops and limbs is unsuitable to produce clean chips for pulp, and, for many areas of eastern Washington, pulp and paper mills are

prohibitively distant from the woods. New consideration is being given to the potential utilization of surplus forest biomass as a clean and renewable alternative to fossil fuels for the generation of energy. A number of recent studies have examined the potential for the utilization of otherwise non-merchantable round wood and forest harvest residuals as feed stock for energy conversion plants (Graph and Koehler 2000, Sampson et al. 2001, Han et al. 2002, Antares Group Inc. 2003, McNeil Technologies Inc. 2003, Rummer et al. 2003, USDI Bureau of Land Management and USDOE National Renewable Energy Laboratory 2003). In addition to non-merchantable materials resulting from harvest activities, other sources of woody biomass could include stems taken from pre-commercial thinning in young forests and by-product residuals from forest product manufacturing operations such as shavings and saw dust.

3.6.18. Biomass Supply

Total logging residues have been observed to be 7.9% of harvested saw log volumes (McClain 1996). Interviews indicate that if the delivered price paid for biomass is less than harvest and haul expenses limited quantities of this fuel will be available from privately managed forestlands (TSS Consultants 2002). Saw mill biomass from trim and side-cut has been estimated to average 14.6% of total harvested saw log volumes, however, 12% of this volume can be utilized as clean chips which bring a more valuable return than biomass for feedstock. The remaining 2.6% would be available for use as fuel (Keegan et al. 1997). However, many mills burn this biomass on-site to generate energy and heat for internal use. Future volumes of biomass will develop from thinnings in regenerated public forestlands but volumes and temporal availability are problematic to estimate. While important for consideration in long-term forest plans, these future forest biomass supplies grown from currently regenerating forests are likely to become available (20 plus years) only after potential investment in cogeneration capacity would have been fully amortized. Addition of nonforest biomass feed stocks from other sources such as agricultural and municipal waste could increase estimated generating capacity by several times and may reduce overall fuel costs. A rule of thumb for investor confidence in the financing and development of biomass power plants is that fuel availability must be 2 to 3 times the volume of fuel necessary to sustain a new biomass plant (TSS Consultants 2002). While public interest in biomass-to-energy appears to be building, a secure, sufficient, and affordable biomass supply for energy generation has yet to be identified.

3.6.19. Biomass Cost

Another serious obstacle to investment in biomass-to-energy development has been the cost of delivered fuels as compared to the wholesale value of generated electricity. For every \$5.00/bone dry ton (BDT) increase in the delivered price of fuel, the cost of cogeneration production is increased by about \$0.006 per kilowatt-hour (kWhr). A feasibility study to consider the siting of a cogeneration plant in Prineville, Oregon estimated that the current average delivered price for a BDT of wood biomass is between \$30 and \$44 depending upon haul distance within a maximum 50 mile radius (TSS Consultants 2002). At this delivered price/BDT, biomass-to-energy fuel costs alone approach \$0.04/kWhr. When the cost of fuel is added to the fixed and variable costs of facilities operations with an expected rate of return, a base load power sales contract at \$0.096 – 0.103/kWhr would be needed to cover project costs of a biomass-to-energy project. Projects with production of less than 50 megawatts (MW) would have higher production costs (Emergent Solutions and Christopher Allen & Associates 2003). Current power sales contracts for base load plants range from \$0.025 to \$0.04/kWhr. A wholesale electricity market analysis indicates that with addition of “green tag” and federal tax credit programs for renewable energy projects, the highest currently available price is approximately \$0.077/kWhr (Emergent Solutions and Christopher Allen & Associates 2003). A US Department of Energy report estimated that the cost of delivered logging residue to conversion facilities in Washington would be \$60-80/BDT, approximately twice the Oregon estimate (Kerstetter and Lyons 2001). Recent feasibility studies in Oregon (McNeil Technologies Inc. 2003) calculated the implied energy price based upon competitive pricing for wood chips at \$0.16/kWhr. These figures reveal that energy generated from forest biomass and delivered to the power grid could currently sell for less than the cost of delivered biomass fuel not including other conversion costs such as labor, maintenance, depreciation, and amortization.

3.6.20. Yakima Biomass-to-Energy Feasibility Study

A feasibility study was commissioned by the Yakima County Public Works Department to review biomass opportunities and barriers in Yakima County, Washington (R.W. Beck Inc. 2003). Located in Yakima County and nearby Klickitat County are significant DNR forestlands that have been plagued by forest health problems as a result of overstocking, species composition, insect outbreaks, and disease. The successful establishment of a biomass-to-energy project in Yakima could provide benefit to the DNR forest management program. Also in Yakima County are large areas of tribal, private, and federal forestlands that have similar forest health problems. Several large tribal and private sawmills are operating in the area that produce residual wood waste. A private sawmill in the city of Yakima currently burns 135,000 BDT of mill residues per year to generate steam for the plant’s plywood kilns and dryers. In addition to accessible forest biomass and sawmill residuals, there are substantial volumes of agricultural

residues, urban yard waste, and dairy industry manure that are locally available as supplemental sources of feedstock. Utilization of these waste products would benefit the county by reducing landfill use and mitigating the odor and environmental issues associated with dairy and livestock wastes. Yakima County is also interested in the economic benefits and job creation that a biomass project could offer. On the surface, Yakima would seem to be a well-suited location for a successful biomass-to-energy project, however, estimated cost of delivered forest biomass in Yakima County was found to be \$60 to \$80 per BDT. Agricultural residuals were only seasonally available and the handling logistics of dairy and municipal waste were considered to be too costly. This investigation found that a biomass-to-energy project could bring many benefits to Yakima County, but it also determined that biomass fuels have low energy densities, collection and transportation costs are high and that, while the technology for using biomass to generate electricity is well established, the price paid for electricity does not offset the cost of fuel and operations. Biomass can also be used for gasification and production of biofuels. These processes may present better opportunities to convert biomass to products of higher value than electricity and steam. However, the Yakima study found that the technological and economic barriers for all potential biomass conversion projects are currently too significant to be profitably overcome.

3.6.21. WA Biomass Utilization Infrastructure

Sawmill residues have been used to generate electricity and steam in Washington for a long time. There are 38 facilities currently operating that combust about 3 million BDT of mill residues per year. All but two of these mill residue-to-energy operations are owned and operated by the wood products companies that supply the fuel. Mill residues are created on site as a by-product of profitable manufacturing operations and subsequently are much less expensive than harvested, hauled, and chipped forest biomass. However, evolving state and federal policies are providing public investment dollars for biomass-to-energy projects which could change the currently unfavorable economics of forest biomass utilization. A study conducted for the Oregon Office of Energy (Sampson et al. 2001) suggests that wholesale price supports of \$.035 per kWh (low estimate) to \$.09 per kWh (high estimate) are needed to make bioenergy projects competitive with current low cost sources of energy. Other studies have found similar cost relationships (Antares Group Inc. 2003, McNeil Technologies, Inc. 2003).

Looked at differently, opportunities for forest biomass utilization are likely to produce other benefits. If small diameter forest fuels are considered as a waste disposal problem and hazardous fuels removals are considered as an investment in forest productivity, such as pre-commercial thinning, then public expenditures in forest health restoration are justified. Under such circumstances the cost of delivered biomass could be underwritten. Additionally, when removals of very small trees are undertaken as part of a revenue-generating commercial timber harvest activity, equipment and handling costs can be dramatically reduced and absorbed by associated revenue-generating saw log removal activities.

3.6.22. DNR Market Challenges

The market and infrastructure challenges for the DNR harvest program that would appear to be of greatest concern are the sale and utilization of the larger and the very small diameter log yields. Fortunately for trust beneficiaries, the yields of large and very small diameter logs appear to be a minority volume of the planned total timber to be offered for sale. National lumber use is near peak levels (Haynes et al. 2003), increases in consumption are anticipated (Aust 2004), and the Pacific Northwest sawmill industry has stabilized following a decade of upheaval (Perez-Garcia 2004). Projected increases in DNR harvest levels represent a relatively small addition (less than 2%) to total available Washington and Oregon timber supply. This volume is unlikely to cause substantive market reaction. New sawmill capacity, predicted for the region, may in part be because of increases in available state log supplies (Aust 2004). Imbalances in the age-class distribution of private forest ownerships (Haynes et al. 2003) may mean unique market opportunities for the DNR timber sales program if specific log types can be offered to the right customers at opportune times. Aggressive marketing approaches could provide small but potentially lucrative markets for minority volumes of large older logs and other specialty log types. However, the current poor economics of biomass-to-energy projects, the uncertainty of regional small log volume (federal) availability, the high cost of production, and the continuing decline of the Pacific Northwest pulp and paper industry indicate that profitable utilization of small logs and sawmill residuals will likely remain a problem. In the absence of federal harvest volume assurances and infrastructure investment incentives, new industrial capacity to absorb small diameter low value logs is likely not forthcoming.

3.7 Emerging Federal Forest Health Policies

3.7.1. Healthy Forests Restoration Act

Following nearly twenty years of reductions to harvests from public lands, today there appears to be growing consensus that increases in harvest activities are needed for forest restoration and fire risk reduction. The DNR is implementing such activities and increases to the state harvest program of 100 to 150 MMBF per year are anticipated. In response to similar public concerns about declines in forest health and increases in the incidence and magnitude of forest fires, the U.S. Departments of Agriculture and Interior are attempting to increase harvest activities on federal lands as well. In 2003, following several record-breaking years of catastrophic fires in the inland West, Congress passed the Healthy Forests Restoration Act. This historic law is intended to reduce the complexity of federal environmental analysis and to give the Forest Service more flexible contracting authorities to work with communities on fuels reduction projects. A year later reliable estimates of future activities on federal lands remain elusive. However, a recent Forest Service report entitled "A Strategic Assessment of Forest Biomass and Fuel Reduction Treatments in Western States" (Rummer et al. 2003) estimates that, if implemented, the needed fuel removals on accessible ground from only high risk federal forests would constitute an increase in available timber in the western United States of 25% of the current conventional processing volume. Without increases in existing manufacturing capacity, market impacts from increases in log availability of this magnitude could be large and would be negative. This report goes further to suggest that about 75 average-sized conventional sawmills would be needed for 30 years as new capacity in the region to provide adequate processing facilities to utilize fuel reduction harvest volumes. Another study (Haynes et al 2003) estimates that future thinning volumes resulting from forest health harvests on public lands in the Western United States could be roughly equivalent to raw material supplies needed for 28 new wood pulp mills. Salvage harvesting of the 4-6 million acres of federal forest that are consumed each year by forest fires could also add large timber volumes to regional supplies. Haynes warns, however, that potential supply increases in the absence of investment in infrastructure expansion will have profound market implications. To date, in spite of growing public and Congressional pressures, there has been little change in federal timber availability. Forest Service harvests are infrequent and currently represent only 2% of the total annual Washington timber harvest.

3.7.2. Analysis Paralysis

A combination of factors serves to undermine implementation of large scale federal forest health activities within the region. The federal project planning, assessment, and review process is lengthy, time consuming and expensive following which the likelihood of litigation from environmental groups is high (USDA Forest Service 2002). A classic example of the paralysis that grips the federal timber sale process might be the "Biscuit Fire" of 2002 that burned 400,000 acres of federal forest in Oregon. Fire fighting cost was \$154 million. The Biscuit Fire destroyed approximately 4.2 billion board feet of timber (Sessions et al. 2004). Conservatively calculated at a low market value of \$100/MBF, stumpage returns from a timely salvage harvest would have equaled \$420 million. As of this writing, after two years of controversy and conflict, no timber has been salvaged and much of the recoverable value has been lost to decay. By contrast, in 2002, the DNR auctioned off the largest state timber sale in history; a salvage sale of dead and dying timber. The sale preparation was completed in four months. Losses to decay were minimized and the stumpage value recovered by the DNR as trust revenue was \$270/MBF (DNR 2002). Delay of harvest in fire killed timber has been shown to result in substantial loss to timber value due to decay (Parry et al. 1996, Lowell et al. 1992).

3.7.3. The Empty Pipeline

Another important aspect of the lengthy federal planning process is that few prepared timber sales are in the Forest Service "pipeline" for the Pacific Northwest. For a sustainable timber sale program, a back log of prepared timber sales ready for auction must be accumulated. Sales that are sold today can only be offered as a result of planning that was initiated in the past. Planning initiated today will be for sales to be sold at a future date. The cumulative supply line represented by timber sales planned but as yet unsold combined with timber sales sold and under contract but not yet harvested is sometimes referred to in the industry as the "pipeline." Pipeline volumes represent the available timber supply by land owner type. The Forest Service pipeline was emptied as a result of policy adjustments and court actions through the 90's that curtailed most harvest activity. Given the lengthy and expensive planning process needed to prepare for Forest Service harvest activity, restoration of a reliable federal timber pipeline would take years perhaps decades to complete.

3.7.4. No Bidders

A report prepared by Mater Engineering Ltd in 2002, found that on four Oregon National Forests even when forest health timber sales were offered for auction there was little bidder interest. In 2001, 42% of all small log sales that

were offered went unsold. Mater suggests factors that discouraged bidders might be that logs were too small for existing infrastructure, the quality was poor, the sales program sporadic, and the minimum acceptable bid price set too high for existing market conditions. Elements of the Healthy Forest Restoration Act are intended to correct this buyer/seller disconnect by giving the Forest Service greater flexibility to negotiate contract arrangements. Timber sales that attract no bidders are expensive evidence of how important seller/buyer communication is to the success of a timber sale program.

3.7.5. Disappearing Workforce

Another significant obstacle to preparation and implementation of federal fuels reduction and harvest activities is the increasing shortage in federal agencies of qualified professionals, such as entomologists and silviculturalists, because of “baby boomer” retirements (Powell et al. 2001). Federal natural resource management agencies employ more than 90,000 people and about one-half of them are expected to retire by 2007. Reports from state agencies confirm a similar pending labor need. Compounding the problem, national undergraduate enrollment in natural resource science programs has declined since 1995 by 40% (Renewable Natural Resources Foundation 2003-4). A shortage of available natural resource professionals is a problem for the DNR as it attempts to expand the timber sale program. Washington logging companies report a similar shortage of young people starting careers in timber harvesting and log truck driving (Pickell pers. comm.)

3.7.6. Increases in Federal Timber Unlikely

While significant increases in the federal harvest program appear to be unlikely for the near term (Lamm 2005), as political pressures increase, it is logical that some increases will occur. If increases are gradual and accompanied by supply assurances that inspire confidence in infrastructure investments then market disruptions may be minimized. If dramatic changes occur quickly, researchers agree that unstable downward pressures on log prices would likely result. The DNR sales program would appear to benefit in the absence of federal timber offerings but could lose if more federal timber is released to the market.

3.7.7. Green Energy

There are other policy changes at the national level that may influence the DNR forest health and timber sales programs. When intense crown fires consume overstocked forests, costs are high. Costs include the obvious such as fire-fighting expense and destruction of property and resources. Costs also include the loss of many values not readily measured in the marketplace such as damage to watersheds, destruction of habitats, carbon releases to the atmosphere, and others (Mason et al. 2003). There is a growing international concern over the risk posed by global warming caused by fossil fuel combustion that releases carbon to the atmosphere. Some policy makers argue that there is a connection between reduction in atmospheric carbon and investments in small log removals to reduce fuel loads and promote forest health. The federal government has responded with the development of policies, price supports, technical assistance and research programs, tax incentives, low interest loans, and other forms of public economic support that are intended to reward investment in biomass-to-energy projects. While many of these programs are national in scope and federally funded, there are also others that may be offered by states, municipalities, public utility districts, carbon credit traders, and non-governmental organizations seeking to promote “green” energy programs. The success of price supports from the Department of Agriculture for the conversion of agricultural corn-to-ethanol provides ample example of how powerfully effective public investment in green energy programs can be (Renewable Fuels Association 2004). However, in spite of price supports, provision of stable woody biomass supplies from federal lands remains a troublesome issue for potential investors. Biomass-to-energy investments require a 10-20 year pay-back period. No new biomass-to-energy facilities are under construction in Washington and feasibility studies, such as the Yakima investigation mentioned earlier in this report, would seem to indicate that the cumulative result of currently available price support mechanisms is still insufficient to offset the high cost of biomass-to-energy projects. Given the growing public interest in clean energy, adequacy of price support could change, however, reliable biomass supply is likely more problematic. Federal programs such as the National Fire Plan provide grant support for fuels removals on all ownerships, especially in the wildland urban interface (WUI) where risk to life and property is greatest, but so far have not resulted in substantive increases in available biomass supplies. In most areas, only the federal forests have volumes of biomass that if harvested could be sufficient to warrant local investment in biomass-to-energy projects. However, continued policy shifts toward increased public support for investment in forest health and green energy programs have been and will continue to be beneficial to the DNR harvest program.

3.8 Strong Public Interest in Forest Management

3.8.1. Rural Economies

Rural communities, in Washington, are often economically depressed with higher rates of unemployment than urban areas (Warren 2004). In many areas east of the Cascade Mountains, it is the rural communities that are surrounded by overstocked and unhealthy forests that are the most at risk from wildfire. While fighting fires will induce some economic activity, much of that benefit goes to imported labor with little positive local impact (Mosely and Shankle 2001). Fires also hinder some rural economic activities such as tourism and recreation. Fire risk reductions through fuels removal treatments, when scheduled over time, produce positive and sustainable contributions to the economies of local communities and provide increases to regional timber harvest. Since many of Washington's rural communities have lost jobs through the reduced sale of public timber, the economic development aspect of thinning can be important. Warren (2004) reports that, from 1991 to 2002, 22,000 forest products workers in Washington and Oregon lost their jobs. Indirect job losses have been estimated to be 3 – 4 times that number (Conway 1994).

3.8.2. Urban-to-Rural Disparity

Reductions in the harvests of public forests over the last two decades have resulted in dramatic changes to the economies of Washington's rural timber-dependent communities. A national study entitled *Development Report Card for the United States* (Clones and Rist, 1997) listed Washington as 48th in its assessment of state urban to rural income disparity suggesting that the State's rural economy is declining compared to the urban economy. This report prompted a University of Washington examination of State urban and rural per capita income from 1979-1997 (CINTRAFOR, 1998). This study found an increasing urban to rural income disparity in Washington State that by 1997 had reached 66%. By comparison, from 1979-1997, the State's urban center, King County, had experienced a healthy increase in per capita income of 17% while the State's rural timber-dependent counties had experienced a decline in per capita income of 29% (CINTRAFOR, 1998). In 2002, the Washington Employment Security Department reported the widest urban to rural income disparity in 30 years (Mapes et al. 2002).

3.8.3. Job Multipliers

Increases in the timber harvest activities on state forests can reasonably be expected to result in economic benefits for rural communities. Warren (2004) estimated direct forest industry employment in Washington and Oregon at 13.2 workers/MMBF of annual timber harvest for the year 2002. Han et al. (2002) suggests that, depending upon the availability of paper industry jobs, the number of direct jobs in Idaho may fluctuate from 9 to 11 forest products workers/MMBF of harvest/year. Keegan et al. (2004) found that the harvest and processing of saw timber generates 9 direct full-time jobs per MMBF per year in Montana. In addition to direct forest industry employment, there are many more indirect jobs that also result from timber harvest economic activities that provide benefits throughout the state. Conway (1994) developed a regional interindustry econometric model called the Washington Projection and Simulation Model (WPSM) and estimated the total direct and indirect jobs per year created from one million board foot of timber harvest in Washington State in 1992. Conway found that for every direct industry job/MMBF/year another 4.2 indirect jobs were created. He estimated that for 1992 there were 7.7 direct jobs and 32.3 indirect jobs linked to each MMBF of timber harvest. The Conway multipliers are dated and newer information is needed, the magnitude of direct/indirect job impacts is important. While there have certainly been changes in efficiencies within various job sectors that alter job multiplier relationships, some may decrease while others may increase. For example, modern sawmill workers/unit product may be less, but increases in secondary manufacture or government services/unit product may be more. A greater share of the harvest made up by thinnings or difficult to harvest areas and longer hauls also increase the labor content. The practice of outsourcing more activities to local firms increases the jobs multiplier offsetting some productivity gains. Changes in the DNR timber sales and forest health program that result in a 150 MMBF increase in the available annual log supply could mean an addition of 6000 direct and indirect jobs for the region.

3.8.4. Trust Revenue Benefits

Since DNR logs are purchased by both instate and out-of-state companies, not all of the jobs linked to timber harvest will reliably stay within Washington. This is not the case, however, for the trust revenue generated by the sale of DNR timber. Revenue generated from DNR timber sales has a uniquely powerful impact on state wealth; one hundred percent of stumpage revenues are reinvested for the public good in government projects and services in Washington. Lippke and Conway (1994) developed an estimate of the economic costs associated with incremental decreases in trust revenue from reductions in the DNR timber sales program. There are two ways to think about assessing such impacts. First, if trust revenue that funds school construction and government operations is reduced then, as activities slow, jobs in these sectors as well as those impacted indirectly are lost. Second, if taxes for

Washington residents are raised to replace trust revenue shortfalls then job losses result from subsequent reductions in disposable wealth. Lippke and Conway choose the second approach to simulate the jobs impacts associated with an increase in state and local taxes and estimated that 29.7 Washington jobs would be lost for every \$1 million in tax increases to replace lost trust revenue. The DNR currently estimates the average stumpage value of timber sold at \$290/MBF (Aust 2004). If the DNR timber sale program increases as anticipated by 150 MMBF/year; at \$290/MBF the annual gross income would be \$43.5 million, which, using the Lippke/Conway conversion, would sustain close to 1300 jobs/year that can reliably be expected to remain in state.

3.8.5. Local, State, and Federal Tax Revenues

Further public benefits are derived from DNR timber sales through the generation of local, state, and federal tax revenues. Local and state tax benefits are calculated at 11% and federal taxes are calculated at 19% of the Gross State Product (GSP) (Lippke et al. 1996). Using \$50,000 as a low approximation of the additional state economic activity added to the GSP from each new job, an estimate of the GSP and associated local, state, and federal tax revenues can be developed from the jobs to harvest ratios described above. Table 3.7 displays an estimate of the additional jobs, GSP, state and local tax revenues, and federal tax revenues associated with alternative volume increases in DNR timber sales of 100 MMBF or 150 MMBF per year. While it is unfortunate that more current models are not available to better estimate the total employment and economic benefits expected from state timber harvest increases, it is important to note that some fundamental relationships are not likely to change dramatically. For example, the state economic benefit as represented by the GSP from the sale of state timber is more than eight times the gross stumpage value from logs harvested from state forests and the combined local, state, and federal tax revenue is more than twice the stumpage value because of all the down stream processing and indirect economic activity supported.

While there are legitimate concerns about the public costs of harvesting sub-merchantable logs to reduce fire risk in overstocked eastern Washington forests, calculation of avoided forest fire costs added to employment and tax benefits mentioned above have been found to indicate that, even when government investments are required for fuel reduction programs, there can be a net public environmental benefit while creating economic development opportunities for rural communities (Mason et al. 2003). In 2004 (DNR) the Washington Forest Health Strategy Work Group issued a report to the State Legislature that arrived at similar conclusion and recognized that public investments in a state forest health program are prudent to avoid the many costs associated with fires, disease, and other forest health breakdowns.

Table 3.7. Estimated Washington State Timber Jobs and Revenue Impacts.

	Trust Receipts (\$Million)	Direct Jobs (Increase Harvests)	Indirect Jobs (Increase Harvests)	Indirect Jobs (Trust Receipts)	Total Jobs	GSP (\$Million)	State and Local Tax (\$Million)	Federal Tax (\$Million)	Total Taxes (\$Million)
100 MMBF	\$29	770	3230	861	4861	\$243.1	\$26.7	\$46.2	\$72.9
150 MMBF	\$43.5	1155	4845	1292	7292	\$364.6	\$40.1	\$69.3	\$109.4

3.8.6. Public Support

Every year approximately 9 million people visit DNR-managed forests to enjoy many recreation opportunities. Visitors include hikers, hunters, trail riders, school children, and others. On trust lands, there are 143 recreational sites, over 1100 miles of trails, and 13,000 miles of forest roads that are accessible to the public. Other valuable public benefits provided by DNR managed forest lands include scenic values, aesthetics, wildlife habitat, and ecological services such as watershed protection, flood abatement, clean air enhancement, noise abatement, and other non-market values. Forest health and timber harvest programs are carefully designed to minimize conflicts with public multiple use expectations (DNR 2004).

Today there are 45,000 jobs in Washington and 52,000 jobs in Oregon held by forest products workers with many times that number of jobs indirectly reliant upon forest management and products manufacture (Warren 2004). The DNR timber harvest program provides close to \$200 million per year to trust beneficiaries such as public schools, universities, county governments, and others. Thousands of additional non-timber and government jobs result. The goal of the sustainable harvest calculation process for the DNR is to integrate the achievement of environmental values with a sustainable economic return to trust beneficiaries. Forest products workers, rural communities,

recreationalists, and trust beneficiaries generally can be considered as public interests that benefit from and are supportive of the DNR forest management program.

3.8.7. Public Opposition

There are also members of the public that do not support the current DNR harvest program. Advocacy groups have organized well-financed public relations, legislative, and litigation programs to disrupt the harvest of timber on DNR and other forestland ownerships (Washington Environmental Council 2004). In 2004, the Washington Environmental Council, the National Audubon Society, the Northwest Ecosystem Alliance, and the Olympic Forest Coalition joined forces to file a law suit in state court asking that the Board of Natural Resources decision to accept the new DNR sustained yield harvest target be overturned. If this lawsuit is successful a new calculation of sustainable harvest volume subject to imposed constraints could be required by the court. If the courts were to rule in favor of the plaintiffs and against the DNR, revenue and job projections would drop, forest health activities would be delayed, and public costs would increase. Similar litigation strategies have been very successfully employed to disrupt federal harvest programs. Litigation is expensive and time consuming. Even when law suits are not successful, litigation defense results in increased costs, program delays, and lowered returns from harvest programs.

3.8.8. Forest Certification

Another manifestation of strong public interest in forest management has been the development of forest certification labels as a means to help consumers identify and reward forestland managers and product manufacturers that follow responsible and sustainable harvest practices. A number of different certification programs have emerged. Generally, for all certification processes, forestland managers wishing certified recognition of their stewardship practices must undergo an initial review of current forest practices, modify current practices as necessary to meet prescribed standards of acceptability, and submit to periodic audits thereafter to ensure ongoing compliance to certification standards and requirements. While each certification program may have its unique benefits and draw backs, it is beyond the scope of this investigation to undertake critical comparison of alternative certification programs. For reader convenience references for more information about various available certification programs are provided in the Appendix.

3.8.9. DNR to Certify Forest Lands

For more than a decade the DNR has been encouraged to participate in third-party certification of the forestry activities on state lands. In the fall of 2002, the State of Washington developed a Sustainable Washington Advisory Panel, convened by Governor Locke, with a purpose of achieving sustainability in the state. In a subsequent report, dated February 2003, the Governor's Sustainable Washington Advisory Panel (GSWAP) recommended that the State should seek forest certification as a way for the Department of Natural Resources (DNR) to manage the state forests for today and tomorrow's beneficiaries, as well to achieve better economic, social and environmental performance. The Pinchot Institute for Conservation, of Washington, D.C, provided \$250,000 in funding for a certification assessment of DNR west side forests. Funding was contributed by private foundations, as well as Lanoga Corporation, the umbrella corporation for Lumbermen's Building Centers, a large home center store retailer in the Pacific Northwest (DNR 2003, Stiffler 2003, Reiber 2003). In 2004, the State Public Lands Commissioner announced that the DNR was moving forward to obtain forest certification from at least one certification organization for 1.4 million acres of DNR forestlands west of the Cascade Mountains.

3.8.10 Certification Costs

As part of this investigation, estimates of the range of potential costs and benefits to the DNR timber harvest program from certification have been examined independent of label type. Forest certification requires third-party audit of current forest practices as compared to prescribed environmental and other standards. Once certification has been established a periodic review to ensure ongoing compliance with certification standards is required. A number of studies have examined the costs of these activities to forest land owners (Comnick et al. 2004, Cubbage et al. 2003, Vogt et al. 2000, Mater et al. 1999, Hansen 1997). Actual costs of forest certification include an initial review process, ongoing expenses of modifications to record keeping and planning procedures, differed harvest revenues, and annual audits to assess future compliance. While it is acknowledged in the literature that costs of ongoing increases in administrative burden and revenue losses associated with differed harvests may be substantial, comparable numbers for different forests are difficult to estimate. Subsequently, costs of certification are generally reported based upon the expense per acre of the initial review and the expense per acre of the annual audits. As would be expected, the larger the forest; the smaller the cost per acre. From a review of the literature, initial costs range from a low of \$0.09/acre for the Minnesota State Forest to a high of \$27.20/acre for a non-industrial tree farm in New England. Annual audit costs range from \$0.01/acre for the Pennsylvania State Forest to \$7.85/acre for the small tree farm. The Pennsylvania State Forest contains 2.1 million acres of forest land which is most similar in

size, of the lands reported in the literature, to the 1.4 million acres of state forests in western Washington that may become certified. Pennsylvania forest lands were certified in 1996 with funds provided by the Howard Heintz Foundation at a cost of approximately \$200,000. Annual licensing and auditing costs as of 1998 were \$11,446/year (Mater et al. 1999).

3.8.11. Certification Benefits

Primary benefits of certification to forest landowners are thought to include public recognition of environmentally responsible practices, access to premium markets, and increased market share. In recent years some of the world's largest retailers such as Home Depot, Lowe's, Lanoga Corporation, and IKEA have made public commitments to pursue increased sales of certified forest products. However, hard evidence of price premiums linked to certification has yet to materialize. A number of studies have surveyed public attitudes about certified forest products and have found that consumers are generally favorable to certification and that some portions of respondents express willingness to pay a premium for certified products (Irland 1993, Winterhalter and Cassens 1994, Forsyth et al. 1999). However, while consumers may express a preference for certified products it has yet to be shown whether very many will pay a price premium for certified wood products (Anderson and Hansen 2004, Rebhan 2004, Ozanne and Vlosky 2003, Fletcher et al. 2002, Vlosky and Ozanne 1998, Hansen 1997). A review of the literature found little evidence to suggest that premium prices are available for logs from certified forests. Very few log buyers contacted in the course of this investigation felt that premiums for certified logs from DNR forests would materialize (See response analysis to survey questions 19-21 in section four of this report).

Table 3.8. Certification Cost Comparisons. Two costs = two certification labels

Forest	Size in acres	Initial cost/acre	Annual cost/acre	Source
Tree Farm, ME.	100	\$27.20	\$7.85	Vogt et al. 2000
Tree Farm, ME.	1,000	\$11.66	\$1.82	Vogt et al. 2000
UW Pack Forest Washington	4,300	\$8.68	\$1.28	Comnick et al. 2004
North Carolina State University	4,500	\$5.47 / \$9.32	Not reported	Cubbage et al. 2003
Duke University	8,000	\$2.92 / \$4.18	Not reported	Cubbage et al. 2003
North Carolina State Forest	32,000	\$0.54 / \$0.72	Not reported	Cubbage et al. 2003
Southern Industrial Forest	100,000	\$0.16	\$0.06	Vogt et al. 2000
Collins Pine	100,000	\$0.45	\$0.05	Hansen 1997
Aitkin County, Minnesota	223,000	\$0.12	\$0.03	Mater et al. 1999
Menominee Tribe, Wisconsin	234,000	\$0.21	\$0.09	Rebhahn 2004
Minnesota State Forest	291,500	\$0.09	\$0.02	Mater et al. 1999
Pennsylvania State Forest	2,100,000	\$0.10	\$0.01	Mater et al. 1999

There may be other advantages to the DNR from certification, however. The public relations benefits may be significant. It is reasonable to assume that public confidence in DNR harvest policy, if strengthened by certification, could discourage lawsuits with resulting public savings. If expected savings on legal and administrative costs compare favorably with the full cost of certification then certification of state forests could be considered as prudent cost avoidance. Under such circumstances the apparent lack of any consumer premium might no longer be an issue.

The certification question at this time for State forests appears to be limited to the management of lands in western Washington. There has been no apparent discussion of certifying eastern Washington forests. As yet it is unknown what the implications of certification on west side DNR forestlands may be for implementation of forest health programs and the sale of logs from DNR managed forests on the east side.

4. Survey Results and Analysis

In order to better understand the capabilities and preferences of current and potential DNR timber sale purchasers, a survey was designed and distributed for response based upon recommendations from industry and DNR professionals. The purchaser survey was created to assess the characteristics, capacities, and preferences of potential purchasers of state timber. A total of 151 surveys were mailed to companies in four states. Of the total surveys sent, 2 were returned to sender for incorrect address (one company is out of business and the other has had personnel changes), 1 was returned from a California company not interested in Washington timber, and 67 (45% response rate) were returned that were used to complete the following purchaser analysis. Of the 67 responses, 50 were from regional milling companies with a combined operational capability of more than 100 forest products manufacturing facilities utilizing around 3 billion board feet of timber per year. 90% of respondent companies have been in business more than 10 years with 70% in business more than 20 years. Respondent companies appear to represent a combined workforce of 10-15,000 individuals with more than half of respondent companies reporting more than 100 employees. Two respondents were representatives of tribal forest enterprises. This section of the report will present the response data from this survey along with pertinent information from a previous DNR processor survey as well as industry reports from the literature towards providing an insightful accounting of the characteristics, capacities, and preferences of potential purchasers of state timber. Additional survey data and respondent comments are provided in the Appendix.

Table 4.1. Distribution of survey recipients and respondents by state and type.

	Purchaser Type	Washington	Oregon	Idaho	California	Location Unknown	Total	
Sent	Processors	47	36	6	7		96	
	Non-Processors	46	6	3	0		55	
	Total	93	42	9	7		151	
Returned	Processors	27	9	4	2	8	50	
	Non-Processors	14	2	0	0	0	16	
	Unknown	0	0	0	0	1	1	
	Returned/No Response	2 Return to sender	0	0	0	1 Return no interest	0	0
	Total Valid Responses	41	11	4	2	9	67	

Table 4.2. Distribution of DNR processor respondents 2000-2002 by state (DNR 2003).

	Washington	Oregon	Idaho	California	Total
Individual Companies	44	27	7	5	83
Total Responses	70	62	8	5	145

A number of the companies contacted in the DNR processor survey had multiple manufacturing facilities with individual log purchasing agents. The total number of responses therefore represents the sum of all individual responses some of which may originate from the same parent company.

4.1 Purchaser Profiles

Question 1. How many years has your company been in business?

Respondent companies report 90% with more than 10 years in business and 70 % with more than 20 years in business. Only one company reported being in business less than 5 years. This distribution could indicate that respondents represent a mature industry with little new entry.

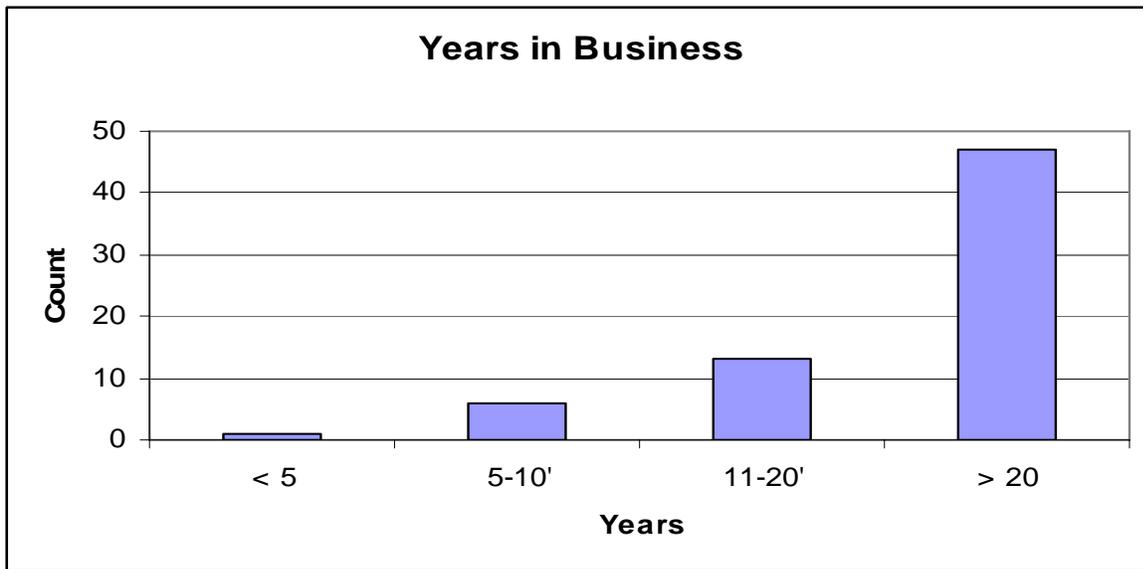


Figure 4.1. How many years has your company been in business?

Question 2. How many people does your company employ?

Respondent companies appear to represent a combined workforce of 10-15,000 direct employees with more than half of respondent companies reporting more than 100 employees and 15% reporting more than 500 employees.

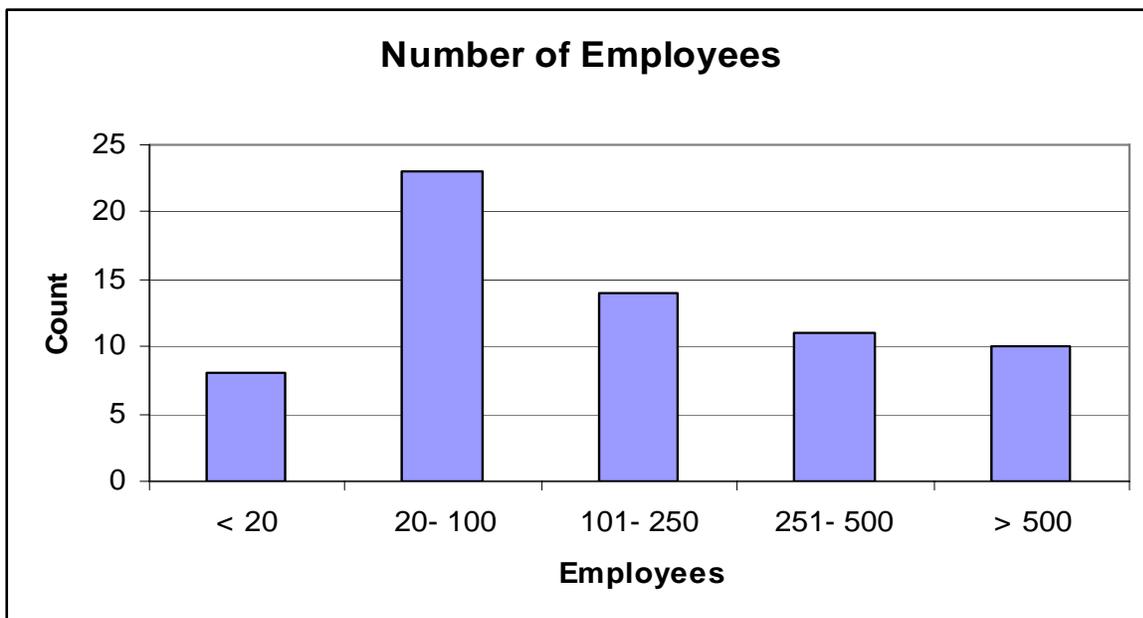


Figure 4.2. How many people does your company employ?

Question 3. What was your company's average annual log purchase volume (volume in million board feet Scribner) during the last 5-year period?

When asked about average annual log purchase volumes, 52% of respondents indicated purchases more than 25 MMBF of timber per year. 87% purchase more than 10 MMBF/year. The combined purchasing power of all respondents is estimated to be around 3 billion board feet per year.

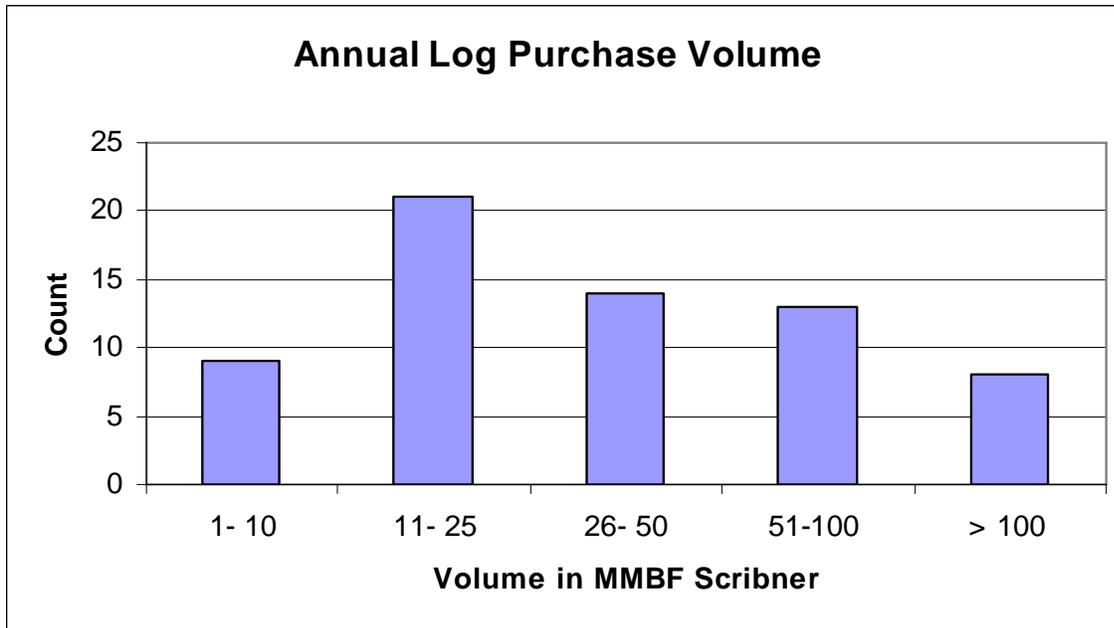


Figure 4.3. What was your company's average annual log purchase volume (volume in million board feet Scribner) during the last 5-year period?

The processors survey distributed by the DNR asked a similar question. How much Scribner log volume per year is consumed by your facility(ies)? 65% responded that their company purchased more than 25 MMBF/year and 84% replied that they purchase more than 10 MMBF/year.

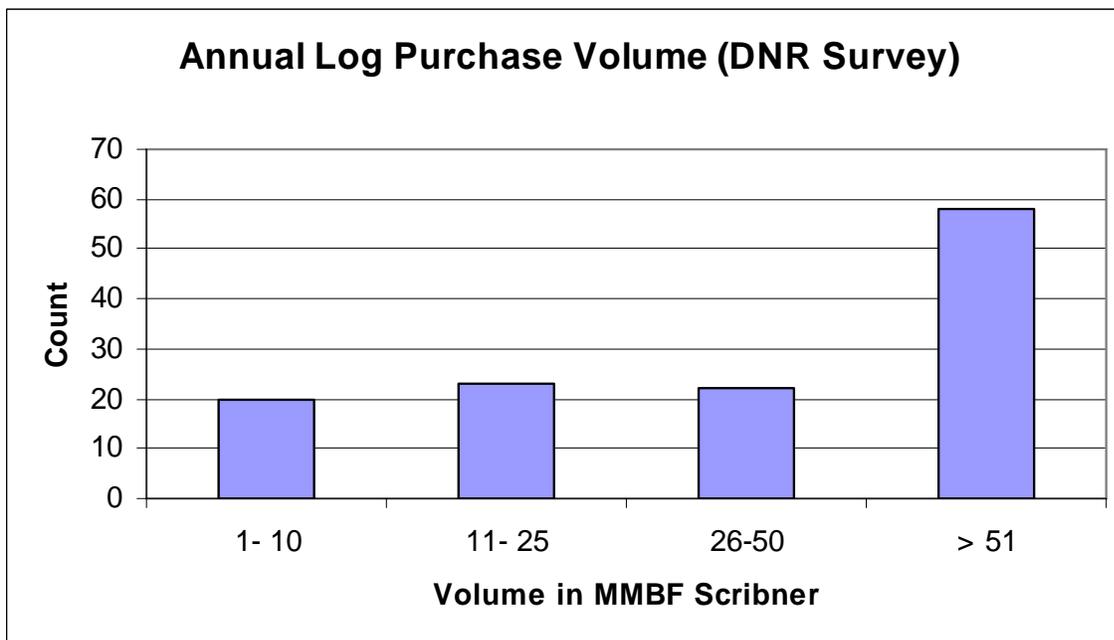


Figure 4.4. How much Scribner log volume per year is consumed by your facility(ies)? (DNR 2003).

Question 4. Where do you procure timber and/or logs? Please enter % total in each box.

Displayed on the graph (Figure 4.5.) below in columns on the left is the percentage of respondents that procure timber from each ownership source. Displayed on the same figure in columns on the right is the average percentage of total supply for each purchaser that is secured from each source. It is worthy of note that the DNR appears to be the largest public timber supplier for purchaser respondents.

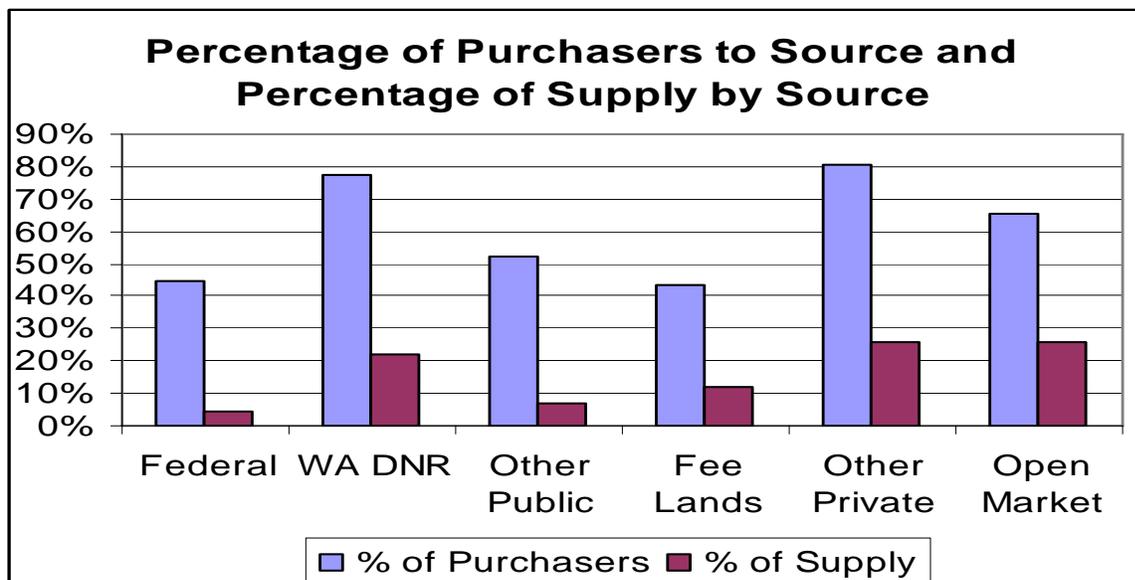


Figure 4.5. Where do you procure timber and/or logs?

The processors survey distributed by the DNR asked a similar question. Where have you purchased your logs in the last 10 years? The open market refers to logs delivered for sale to the purchaser's yard. While open market logs, sometimes referred to as gate wood, appear to be the most commonly accessed source of logs for the mills responding to the DNR survey, 72% of respondents indicate that they purchase stumpage (standing timber) sales. Of those that purchase stumpage sales, 75% purchase from state agencies. It is important to note that this DNR data does not provide percentage of purchaser annual supply information.

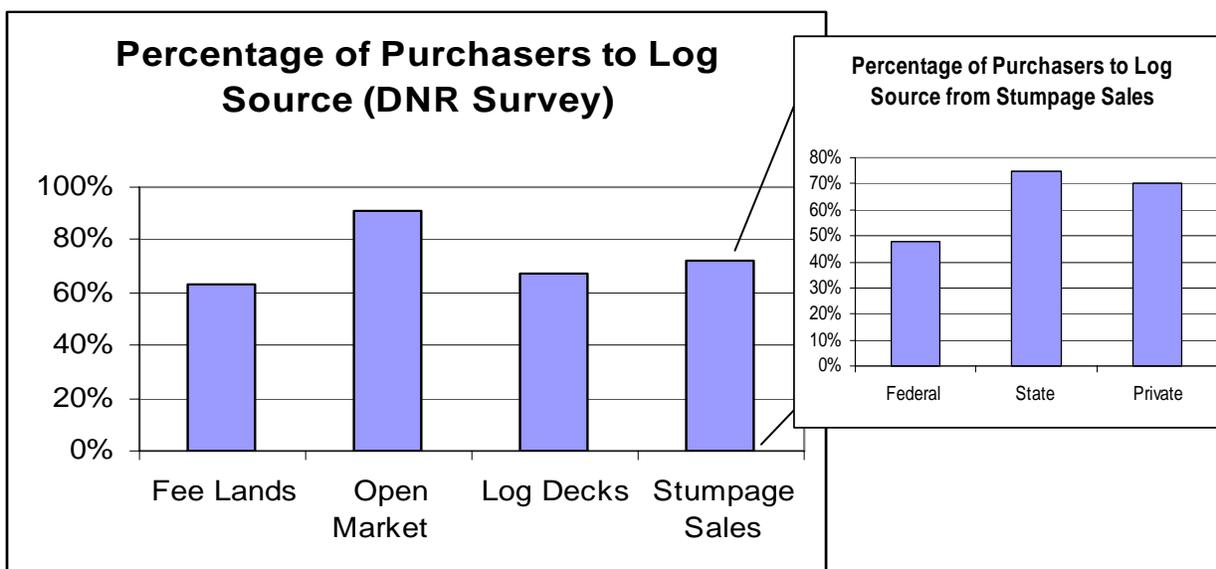


Figure 4.6. Where have you purchased your logs in the last 10 years? (DNR 2003).

The Western Wood Products Association (WWPA) compiles an annual Statistical Yearbook of the Western Lumber Industry. Data for log sourcing by mills by state from 2003 was reported in the 2004 edition of the yearbook. For comparison to the previous graphs, WWPA information will be reported here in Figure 4.7 by timber source for Washington, Oregon, and Idaho. The population of mills represented by WWPA membership includes some very

large companies that don't purchase state timber sales and subsequently were not selected to be represented in either the survey created for this report or the previously conducted processor survey supplied by the DNR.

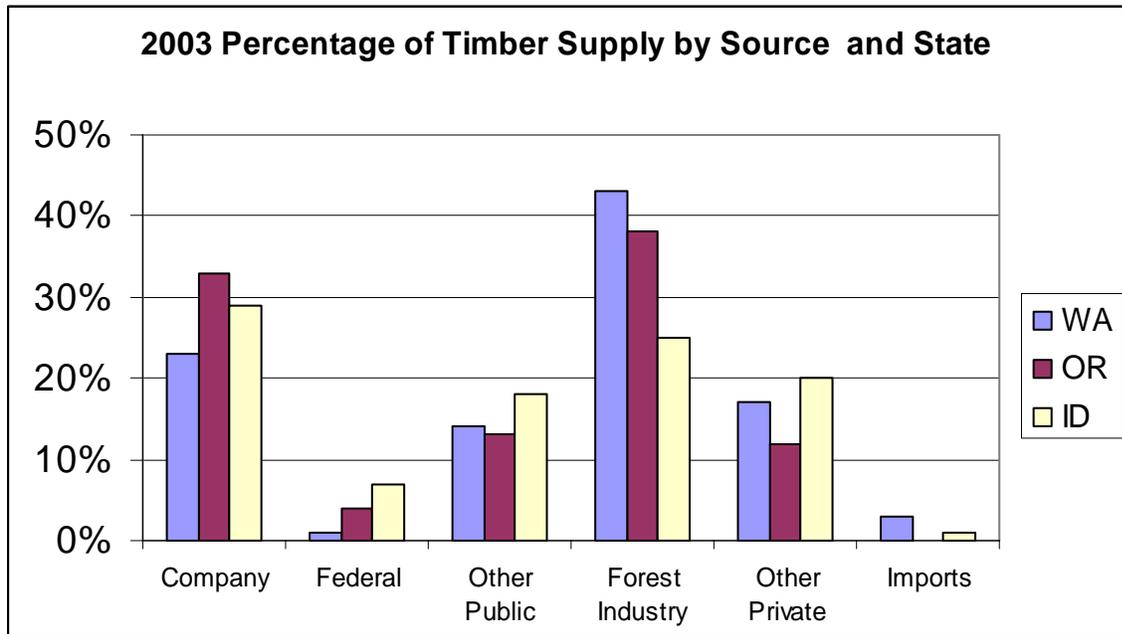


Figure 4.7. 2003 Percentage of Timber Supply by Source and State (WWPA 2004).

Question 5. What timber species does your company prefer to purchase?

In Figure 4.8 the left hand columns indicate the percentage of respondents that have preference for the species shown below. The columns to the right indicate the percentage of annual timber purchase by species for respondents that purchase that species.

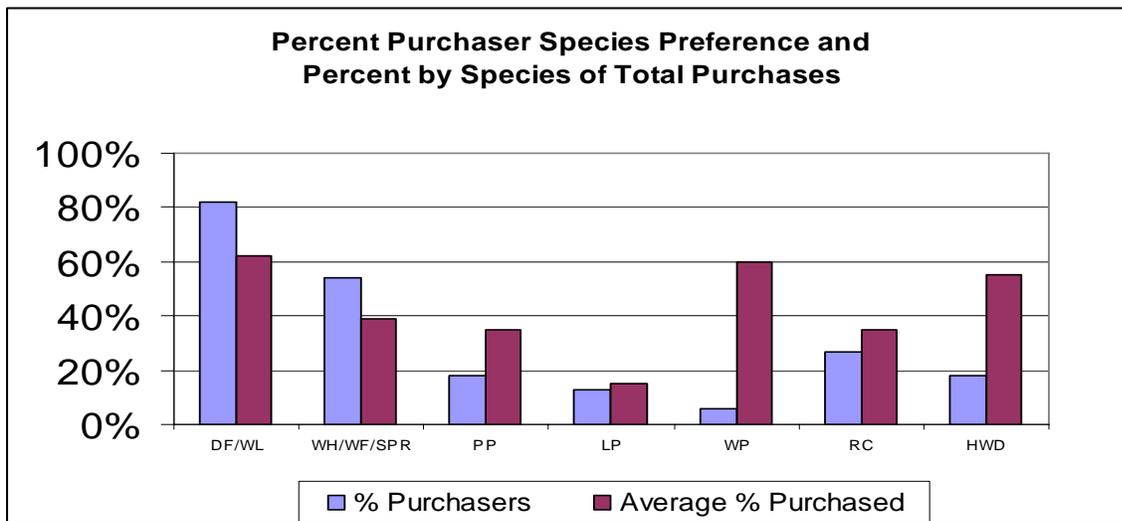


Figure 4.8. What timber species does your company prefer to purchase?

The species preference responses (left hand columns) reveal that Douglas-fir and western larch (DF/WL) are the most popular timber choice with more than 80% of respondents indicating purchases of these species. White woods (WH/WF/SPR) are second with more than half of respondents indicating purchases of these species. In this case white woods refer to western hemlock, white fir, and Sitka spruce which are often interchangeable in the market place. Douglas-fir, larch, and white woods are species that are broadly used and purchased from forests both east and west of the Cascade Mountains. Of particular concern potentially for the DNR forest health program could be the apparent lack of interest amongst respondents for the eastern Washington pine species: Ponderosa pine,

lodgepole pine, and western white pine (PP, LP, WP). Western red cedar (RC) and hardwoods (HWD) are purchased respectively by 27% and 18% of respondents.

Only 17 respondents or 25 % (9 – DF/WL, 2 – WH/WF/SPR, 1 – WP, 3 – RC, 2 – HWD) indicated that their timber purchases were restricted 100% to a single species or species group. The columns to the right in Figure 4.8 indicate more about how species preferences may influence purchasing behavior. Amongst DF/WL purchasers, the average percentage purchased annually was 62%. No other species group comprised more than half of average annual purchases indicating that many purchasers appear to be opportunistic about what mix of species that they might choose to purchase. In the context of previously presented information, an infrastructure pattern emerges of an industry dominated by older large production companies that must purchase multiple species to satisfy raw material needs. If this is the case, then companies may be persuaded to increase purchases of east side species as new timber volumes become available through forest health programs.

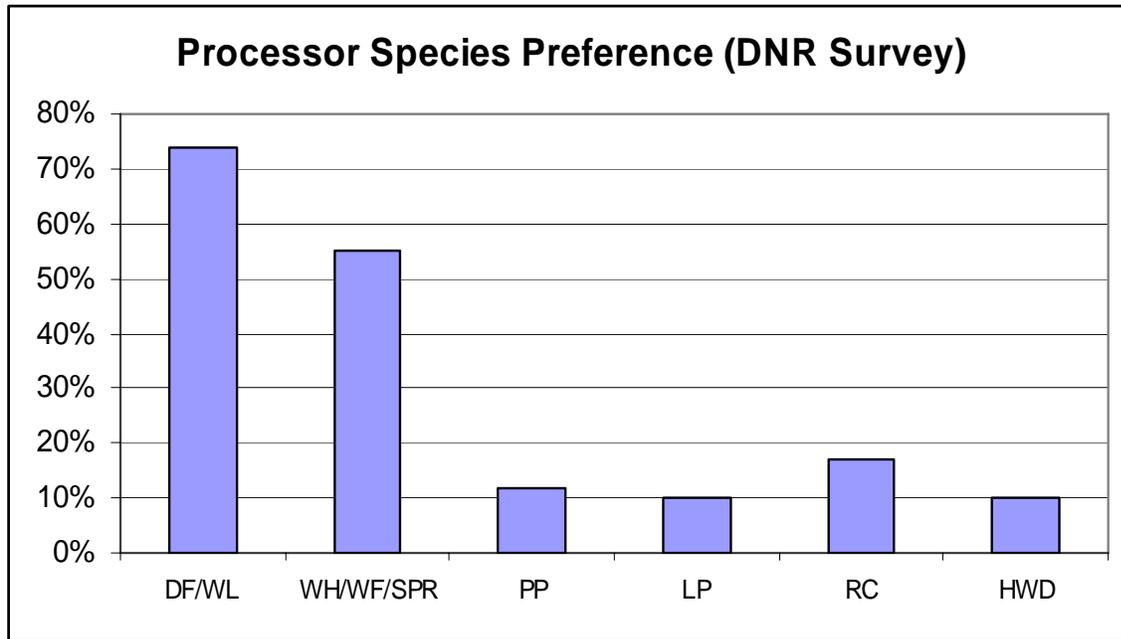


Figure 4.9. Processor Species Preferences (DNR 2003).

The DNR processor survey produced additional response information on purchaser species preference that shows a similar distribution (see Figure 4.9).

The Western Wood Products Association reports annual species use based upon sawmill lumber shipments. Figure 4.10 displays 2003 WWPA species data for Washington, Oregon, and Idaho. Note that in contrast to stated purchaser preferences shown above, Washington lumber production of hem-fir was greater in 2003 than its production of Douglas-fir. The same story as seen above is apparent for all three states, however, in regards to production capacity for pine species. If large increases in pine harvest activities are to result from forest health activities then additions to milling infrastructure may be needed.

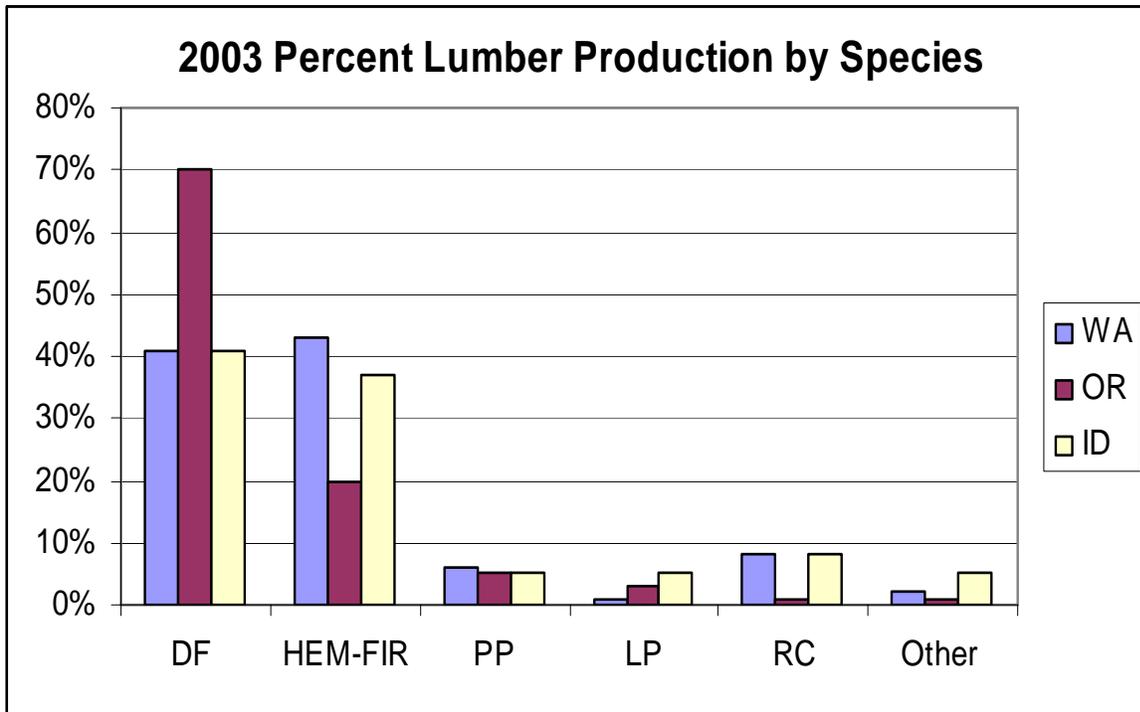


Figure 4. 10. 2003 Percent of lumber production by species for Washington, Oregon, and Idaho (WWPA 2004).

Question 6. What log diameter ranges does your company normally prefer to purchase (check one or more)?

In apparent contradiction to information mentioned earlier in this report that was taken from recent studies and industry journals, more than 40% of respondents report purchasing logs greater than 24 inches diameter. 12% of respondents indicated that they take logs less than 5 inches in diameter. Logs 8 – 24 inches in diameter are widely acceptable.

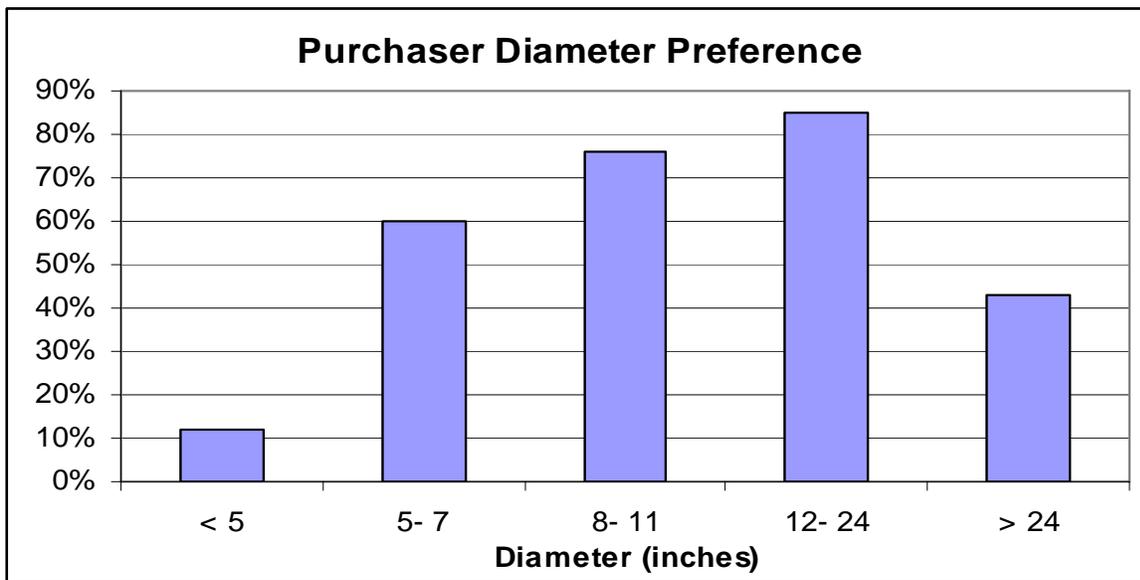


Figure 4.11. What log diameter does your company normally prefer to purchase?

The DNR processor survey asked for diameter preference information also but did not ask specifically about very small and large logs. Processor responses appear in agreement with the Figure 4.11 above. Both sets of responses show more than 60% of respondents purchasing logs 5 – 7 inches in diameter. Response data tells a somewhat different story about small and large log capacities than might be indicated by the literature. One factor that could be considered that might explain this contrast is price difference. Survey responses don't contain information about purchaser price expectations for timber size classes.

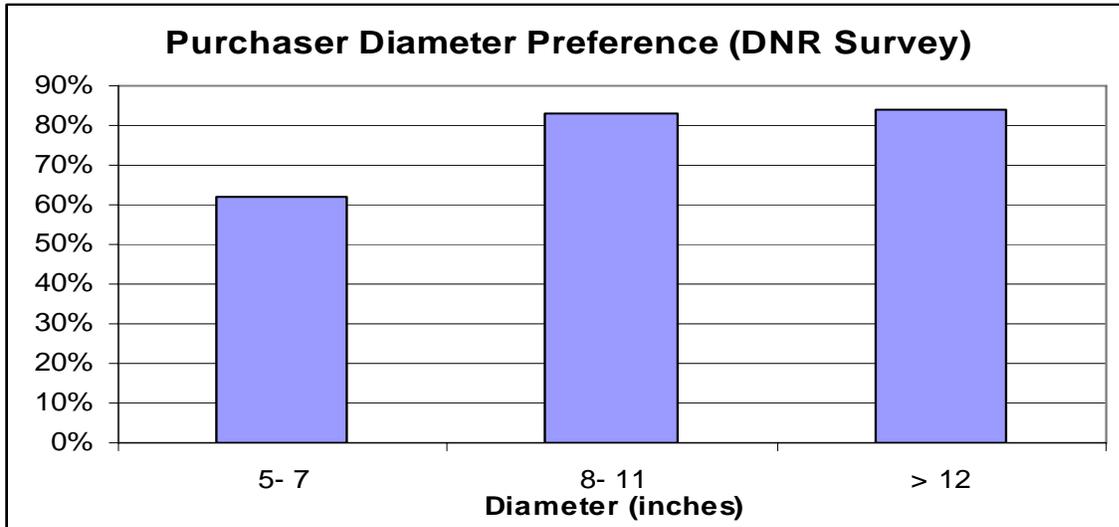


Figure 4.12. What diameter range of logs do you purchase? (DNR 2003).

Question 7. What log qualities does your company purchase (check one or more)?

Purchaser responses show that most companies prefer to purchase saw logs rather than pulp logs with the greatest preference shown for high grade saw logs.

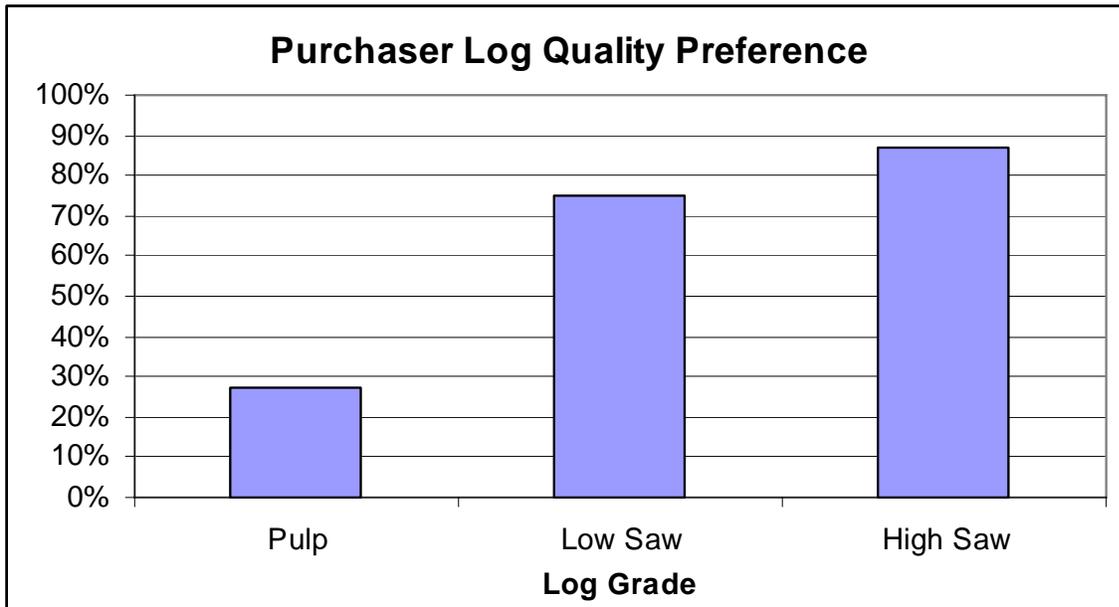


Figure 4.13. What log qualities does your company purchase?

67% of DNR surveyed processors prefer to purchase mixed qualities of log grades with 13% purchasing all grades (pulp thru high grade saw logs), 18% purchase one saw log grade plus pulp, and 15% purchase low and high grade saw logs only. Only 1 respondent purchases pulp exclusively while 10% took low grade and 19% took high grade saw logs exclusively.

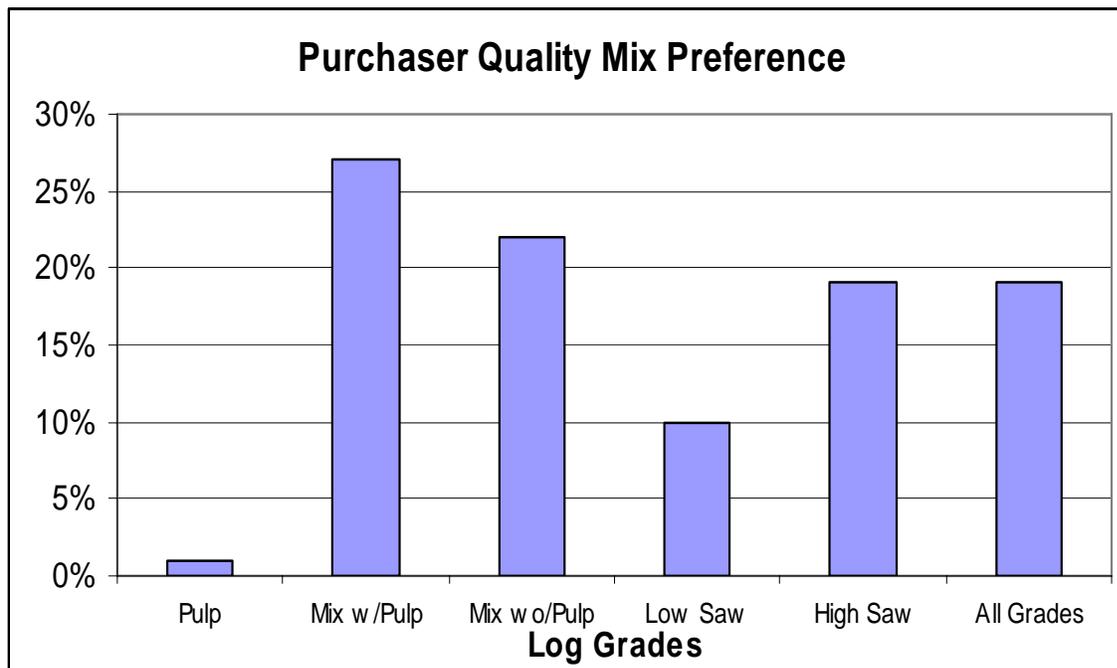


Figure 4.14. What log quality mixes do purchasers prefer?

The DNR processor survey asked if respondents used low grade saw logs and/or high grade saw logs in their milling facilities. Responses showed that 69% used some low grade and 70% used some high grade. When asked about ring count, responses indicated 63% used low ring count and 61% used high ring count.

Summary of respondent background information.

- Respondents are primarily well-established older companies that have survived the decade of the 1990's which saw the closure of many other forest products companies.
- Respondents are well distributed by size as indicated by the range of variability in the number of employees and the annual timber volumes purchased.
- Respondents appear to be versatile when sourcing timber. While almost 80% of purchasers procure timber from the DNR, DNR timber accounts for a little more than 20% of average annual supply. Even though federal timber accounts for only 4% of average annual respondent supply, 45% of respondents report purchasing some volume of federal timber. Private timber from a variety of sources would appear to dominate regional supply.
- While respondents display versatility in species use, there is relatively little interest in pine species. This may indicate an infrastructure problem that could be of concern in planning a large scale forest health program for eastern Washington. Douglas-fir and white fir, both understory shade tolerant species removed in forest health treatments, would appear, however, to be species with strong demand.
- The distribution represented by respondent diameter preferences appears to be broader than a review of the current literature might suggest with buyers available for very small and large diameter logs. However, a closer look at respondent data shows that amongst those indicating that they purchase logs less than 5 inches in diameter only two respondents are from the east side and only one appears to be a small diameter specialist. The remainder of respondents that report purchasing smaller wood also purchase most other diameter classes as well. This might be a relic of what is referred to as the camp run approach to timber purchases where all sizes and species are purchased with some or all volume resold to specialist purchasers. For large logs, 40% of respondents report purchasing logs 24 inches in diameter and larger. A closer look shows that among those that indicate purchases of large logs only four can be identified as large log specialists. One is in Oregon and three are in Washington.

- While purchasers display a willingness to use timber of multiple grades, only one respondent appears to be a pulp specialist. The distribution of grade preferences would indicate, as suggested previously, that many purchasers appear to employ a camp run approach to timber purchases. The relatively small percentage of timber buyers with interest in pulp logs may be indicative of currently insufficient infrastructure to utilize large volumes of sub-merchantable materials from forest health treatments.

4.2 Timber Sale Preferences

Question 8. What size (volume in million board feet Scribner) timber sale would your company prefer to purchase (check one or more and circle preferred size)?

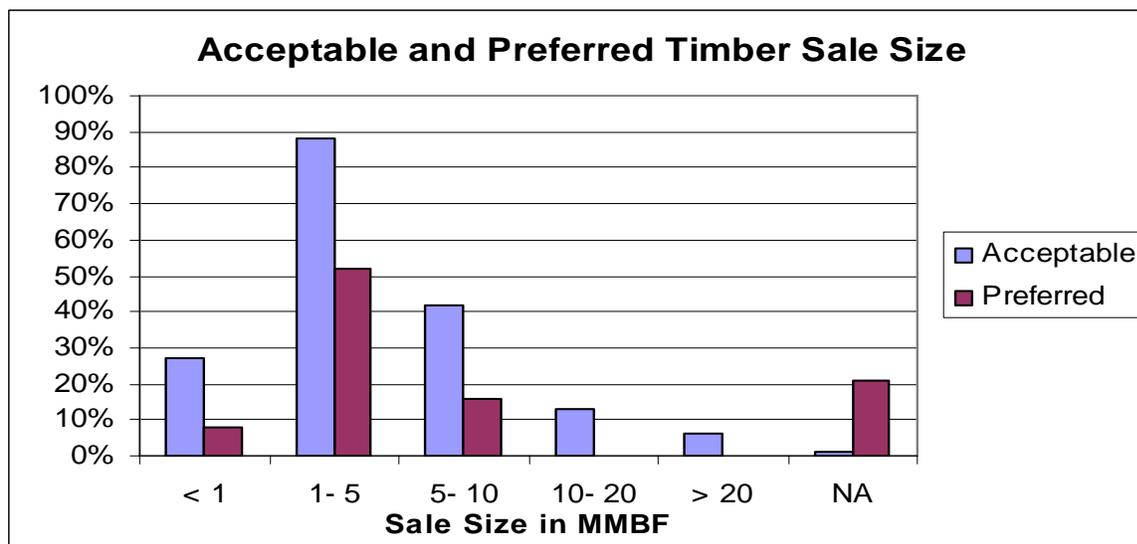


Figure 4.15. What size timber sale would your company prefer to purchase?

Some respondents appear willing to purchase timber sales of all sizes (columns on the left) from very small (less than 1 MMBF) to very large (greater than 20 MMB). Almost 90% express willingness to purchase sales that are 1-5 MMBF in size. Respondents circled the most preferred timber sale size. This data is displayed in columns on the right. None of the respondents indicated that timber sales of 10-20 MMBF or greater than 20 MMBF were preferable. 52% favored sales 1-5 MMBF and 21% (NA) didn't select a preference indicating that they would buy sales both large and small. Only 8% indicated preference for sales of less than 1 MMBF.

Question 9. What would be your company's preferred contract life for a timber sale?

A majority (51%) of timber purchasers responded that their preferred timber sale contract life is 3 years. 22% said 2 years and 9% said 5 years. Very few wanted 1 year contracts (which may be considered as the survey surrogate for spot market or cash sales). It is interesting that respondents were so certain of their preferences that only 6% indicated that the determination of timber sale contract life should be dependent upon market conditions.



Figure 4.16. What is the preferred contract length?

Question 10. What type of timber sale do you prefer?

Displayed below in Figure 4.17 is the response information from the project survey (columns on the left) and the previous DNR processor survey (columns on the right) for the question, what type of timber sale do you prefer. The popular response to this question is pretty clear. Scale sales are the overwhelming favorite from both surveys (72%, 69%) with lump sum sales receiving less votes at 36% and 42%. There is very little interest in other timber sale types from the project survey respondents but greater interest is shown from DNR survey respondents. It may be that since the DNR surveyed only manufacturers that the increased interest shown in contract/direct and log deck sales is indicative of a preference difference between processor and non-processor purchasers.

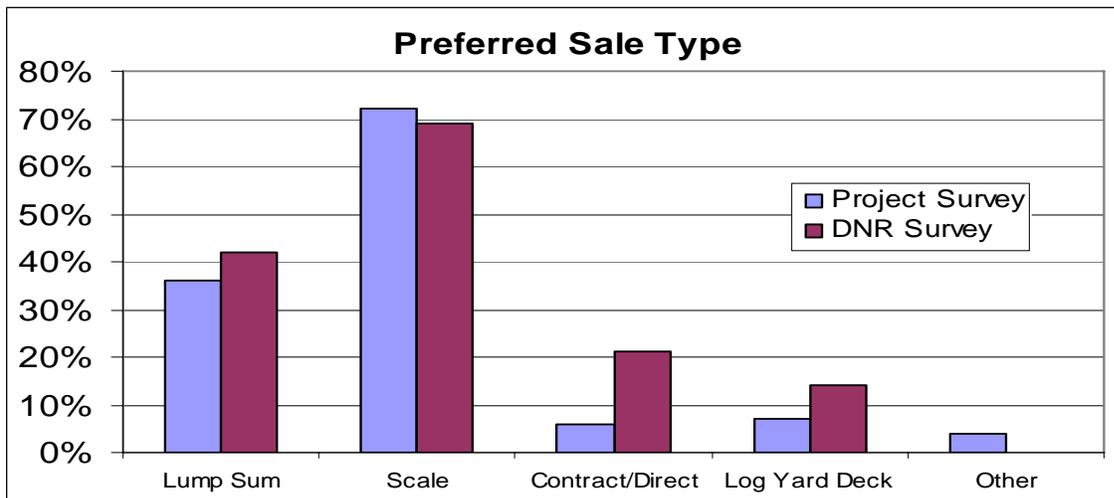


Figure 4.17. What type of timber sale do you prefer?

Question 11. What measure of log volume is best used to describe timber sales?

Fifty years ago, there were foresters that called for the conversion from log scale to cubic scale (Rapraeger 1950, Orchard 1953). Momentum gathered in the 1970's led by the Forest Service to convert to cubic measure. Studies show that as logs get smaller and the difference between actual and nominal size in lumber widens the inaccuracies of measuring logs in board foot Scribner increase (Larsen 2002, Spelter 2002). However, when asked which measure of log volume should be used for timber sales, survey respondents were clear. 96% reported that board feet Scribner should be how timber is measured for sale. 18% agreed that tons could also be used to measure log volumes especially where logs were small diameter. No respondents indicated that either cubic feet or cubic meters should be used.

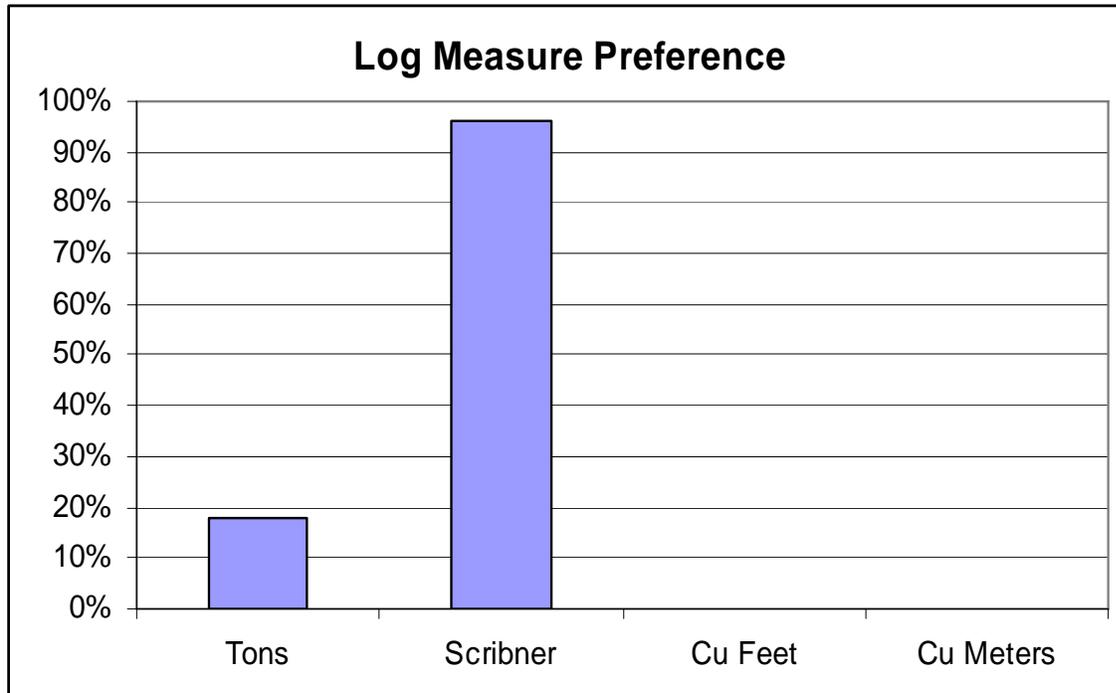


Figure 4.18. What measure of log volume is best used to describe timber sales?

The DNR processor survey asked respondents what aspects of the DNR timber sales program could be changed for improvement. 23% responded that contract length of timber sales could be improved, 12% responded that sale design could be improved, and 11% responded that adjustments to sale size were needed. Project survey respondents were clear about preferences in regards to these concerns.

- **Sale Size.** Most timber sales should be 1-5 MMBF with an occasional sale that is smaller and an occasional sale that is bigger. No sales should be bigger than 10 MMBF except under extreme circumstances such as salvage and forest health emergencies. The responses show that if some big sales are offered there are some companies that will buy. However, since the bigger sale size is not a respondent preference it is likely that timber values may be discounted as sales get larger than 10 MMBF.
- **Contract Life.** Two thirds of sales should have contract lengths of 3 years. One third of sales should have contract lengths of 2 years. Occasional sales with short contract length should be saved for salvage and forest health emergencies.
- **Sale Type.** Approximately two thirds of sales should be scale sales with one third of sales as lump sum. Limit as possible contract/direct and log yard deck sales to not more than 10% of total annual sales, however, the minority of purchasers that prefer these sale types may pay niche market premiums.
- **Timber Measure.** All sales with significant saw log volumes should be measured in board feet Scribner. Forest health, salvage, and thinning sales may be sold by the ton.

Question 12. How many sawmills or other manufacturing facilities does your company own?

Displayed below in Figure 4.19 is the response information from the project survey (columns on the left) and the previous DNR processor survey (columns on the right) to the query about how many mills the respondent company owns. Since the DNR survey was sent exclusively to processors, only respondent information taken from the project survey provides data for companies with no mills. 24% of respondents to the project survey indicated not owning milling facilities. Total mills represented by respondents to the project survey were at least 107. Total milling facilities represented by the DNR processor survey respondents appear to be 178.

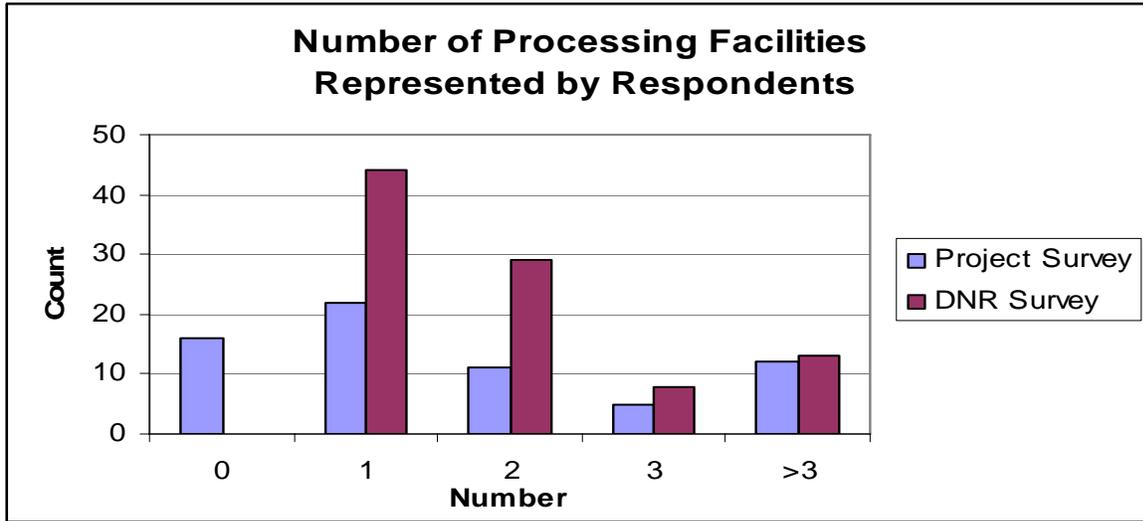


Figure 4.19. How many manufacturing facilities does your company own?

The project survey also asked respondents if their company milling facilities were running at capacity. Nearly 50% replied that their mills were running at full capacity. The DNR processor survey queried respondents as to which products that their mills produced (Figure 4.21). The results indicate that, in contrast to reports from the literature that the suite of industry products has narrowed, a diverse product mix including specialties and clears is still being produced by the subset of the existing milling infrastructure that is represented by survey respondents.

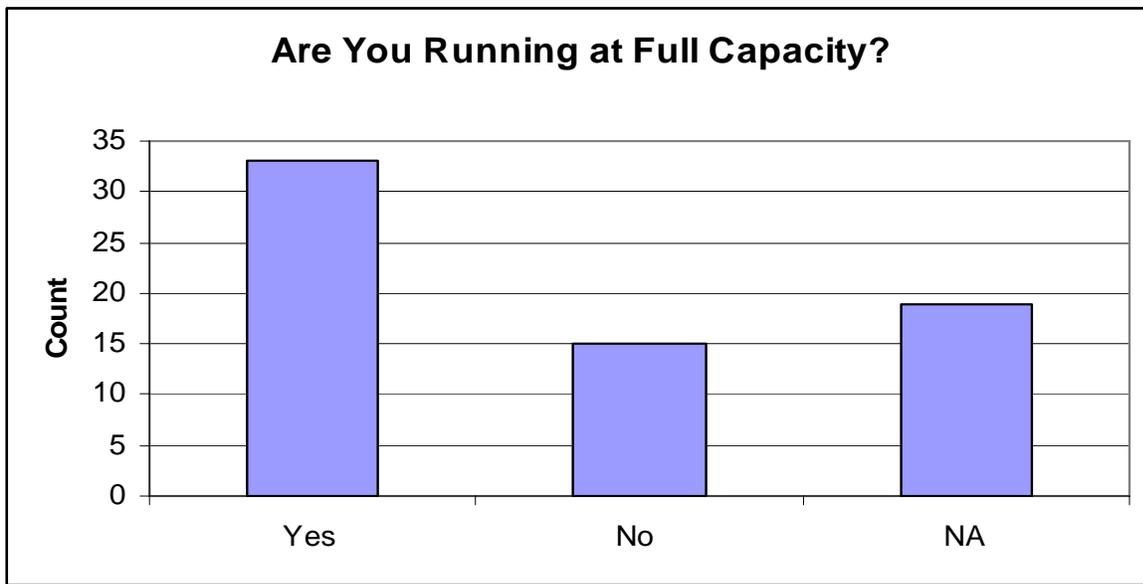


Figure 4.20. If your company operates milling facilities, are you running at capacity?

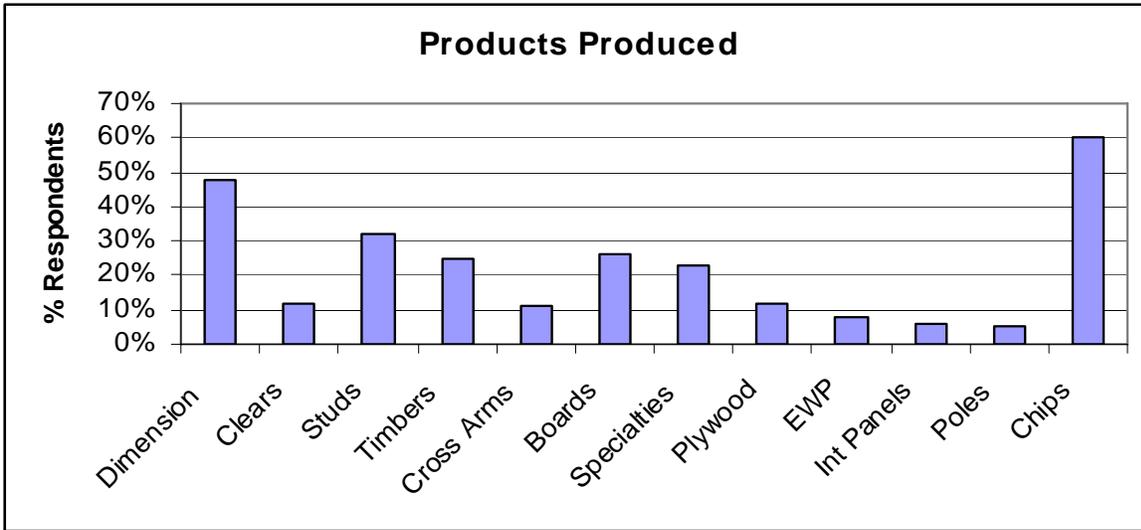


Figure 4.21. What products are produced at your company processing facilities? (DNR 2003)

Question 13 & 14. How are harvest operations conducted by your company? How are trucking operations conducted by your company?

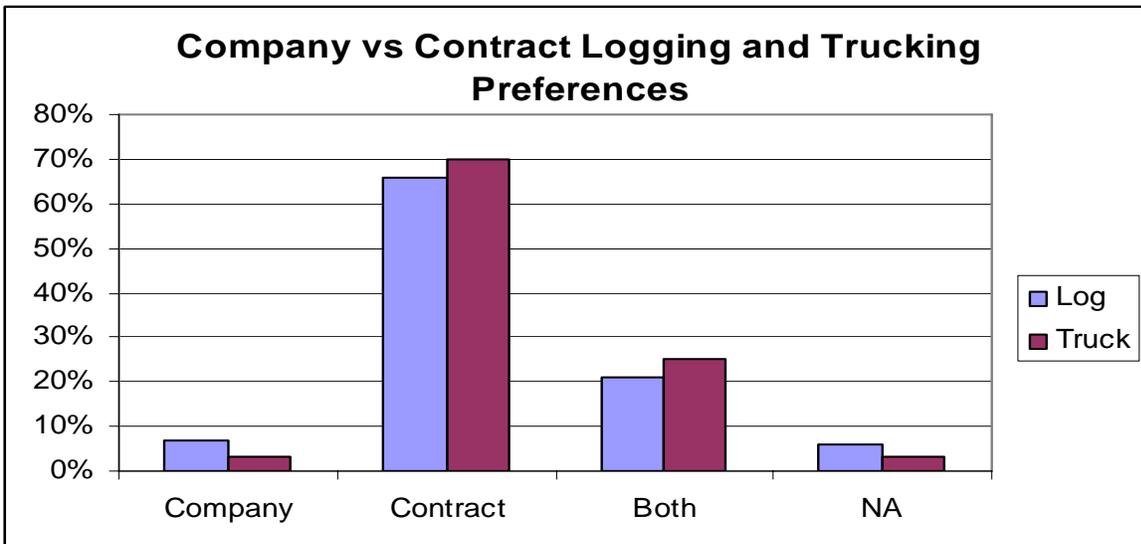


Figure 4.22. How are logging and trucking operations conducted by your company?

In response to these questions DNR purchasers clearly indicate reliance upon contract relationships to handle most of the operational arrangements for harvest and haul of DNR purchased timber sales.

Question 15. Has your company ever used rail or barge services to transport logs long distances?

In response to this question, 59% of respondents indicated that they had used rail or barge services to ship logs long distances.

Question 16. How many miles will your company ship logs from the timber sale to the mill?

This question was asked of respondents in both the project survey and the DNR survey. Results would appear to indicate that many purchasers are willing to ship logs great distances to their mills or customers.



Figure 4.22. How many miles will your company ship logs from the timber sale to the mill?

A closer look at the project survey data reveals that willingness to ship great distances is not necessarily dependent upon whether the purchaser has manufacturing facilities. 40% of non-processor (No Mills) respondents indicated willingness to ship logs more than 200 miles to market. 46% of companies with milling facilities (Mills) will ship logs further than 200 miles.



Figure 4.23. How many miles will your company ship logs from the timber sale to mill/customer; a comparison of companies with and without milling facilities?

A review of log size and grade preferences relative to purchaser willingness to ship greater distances showed no correlation between size, grade, and shipping distance preference. This finding is in contrast to the conclusion in the Big Log Project (Wagner et al. 2003) that larger higher quality logs are transported further distances than smaller low quality logs.

Question 17. How would you describe current log availability?

Half of the project survey respondents indicated that they are running at capacity suggesting sufficient log supplies have been secured for their operations (see Question 12). When asked to describe current log availability most respondents felt that logs are sometimes scarce. However few respondents report extreme market conditions, only 2 respondents reported that logs are always scarce while none reported regular oversupplies.

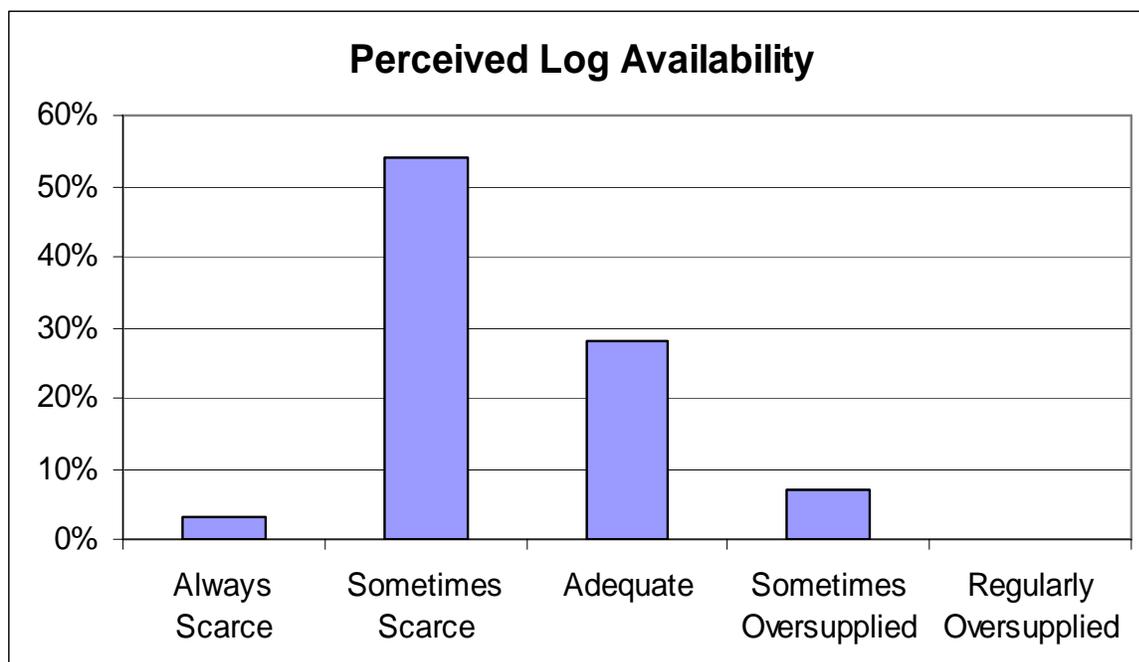


Figure 4.24. How would you describe log availability?

Question 18. Do you feel that volumes of U. S. Forest Service and BLM timber available for harvest are likely to increase appreciably in the future?

The previous question (Figure 4.24) would appear to imply that a healthy market is currently available for log sales; that is a market where sufficient scarcity exists to support healthy competition amongst log purchasers but supply short-falls are not so extreme as to result in decline of the infrastructure. A decade ago this would not have been the case as reflected by supply-shortage-driven price spikes and mill closures. A notable change for log markets between 1994 and 2004 is that the current purchasing infrastructure has transitioned to where it is no longer dependent upon log supplies from federal lands. Figure 4.5 shows that project survey respondents report that federal logs account for only 4% of current supply needs. Figure 4.7, which displays WWP log supply data from 2003, shows that federal harvest volumes accounted for 1%, 4%, and 7% of log supplies to region mills for Washington, Oregon, and Idaho respectively. However, if a growing public interest in forest health and restoration, as reported earlier in this report, would translate into project implementations on federal lands, increases to the federal harvest should logically be one result. While federal logs currently constitute an insignificant portion of regional supply, 45% of project survey respondents report that they purchase some logs from federal forests (see Figure 4.5). It seems likely, therefore, that if more federal logs would become available many DNR log purchasers are positioned to respond quickly to this supply. However, when asked if purchasers anticipate increases in federal log supplies, not very many respondents were optimistic. When survey respondents were asked if they thought that volumes of timber would likely increase from federal lands, 63% indicated this was unlikely or impossible and 21% responded that they were uncertain.

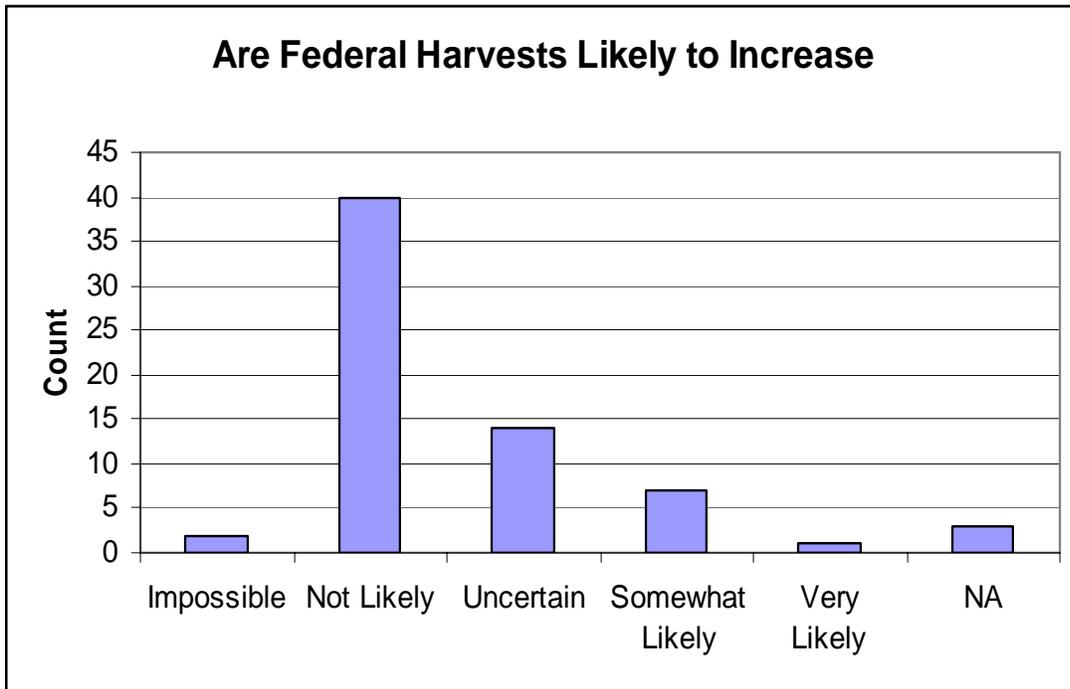


Figure 4.25. Do you feel that volumes of U.S. Forest Service and BLM timber available for harvest are likely to increase appreciably in the future?

Substantial international resources have been expended to develop forest certification programs designed to promote sustainable and environmentally benign forest management practices. Generally it is assumed that benefits return to forest owners that invest in certification for their companies. Speculation about benefits derived from extra management costs borne by certified forest owners, as discussed earlier in this report (see section 3. 8. 11.), has included price premiums and increased market share (customer preference for certified products). The next few project survey questions were designed to provide information on log purchaser perceptions in regards the benefits of forest certification and purchaser willingness-to-pay for certified logs.

Question 19. Are you familiar with forest certification programs such as those offered by the Forest Stewardship Council and the Sustainable Forestry Initiative?

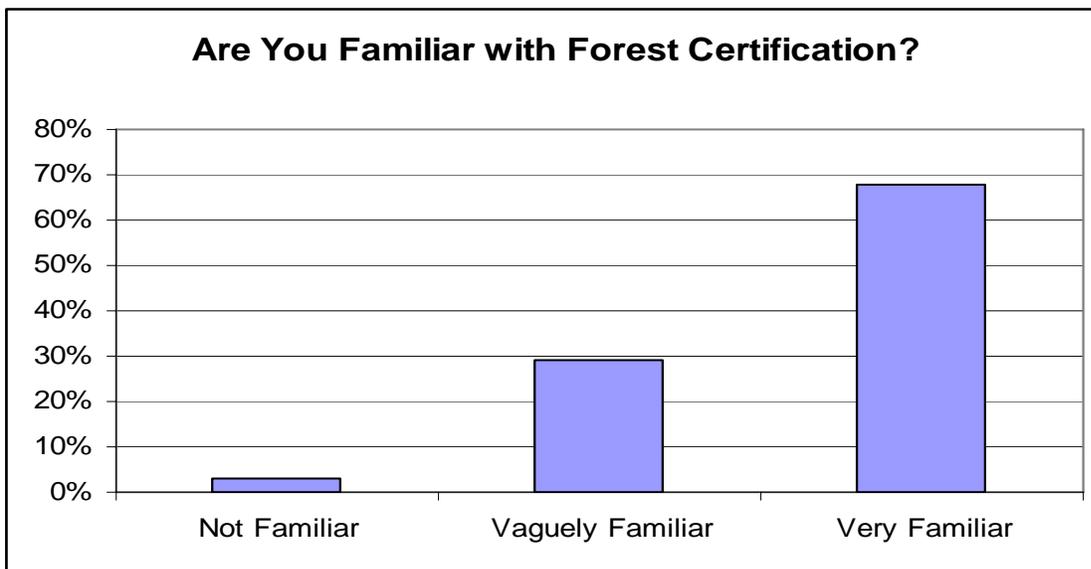


Figure 4.26. Are you familiar with forest certification programs such as those offered by the Forest Stewardship Council and the Sustainable Forestry Initiative?

Question 20. The state of Washington is considering the certification of state forestlands. How does your company regard forest certification?

While a majority of respondents reported that they felt that certification was either not very important or a waste of money, 32% reported that they felt that certification is somewhat or very important.

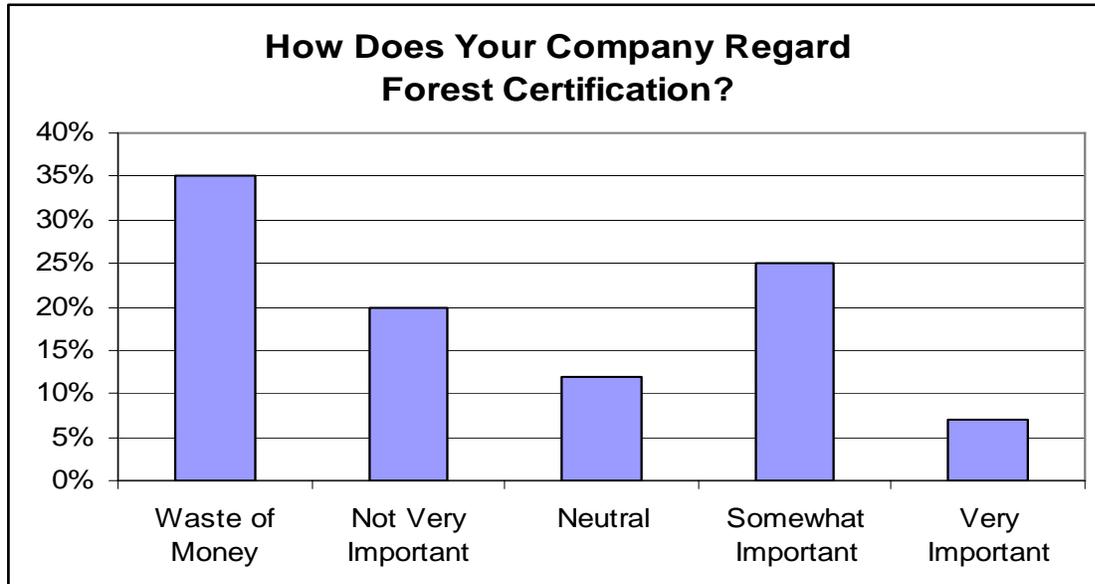


Figure 4. 27. The state of Washington is considering the certification of state forestlands. How does your company regard forest certification?

Question 21. If the state forestlands were to become certified would state logs become more valuable to your company than logs from uncertified forests?

Most of the survey respondents showed no interest in paying premiums for certified state logs (85% No and 6% NA) indicating that currently there is little market for certified logs within the market region. However, 9% of respondents did express willingness to pay a premium for certified state logs indicating that a niche market for such products may exist.

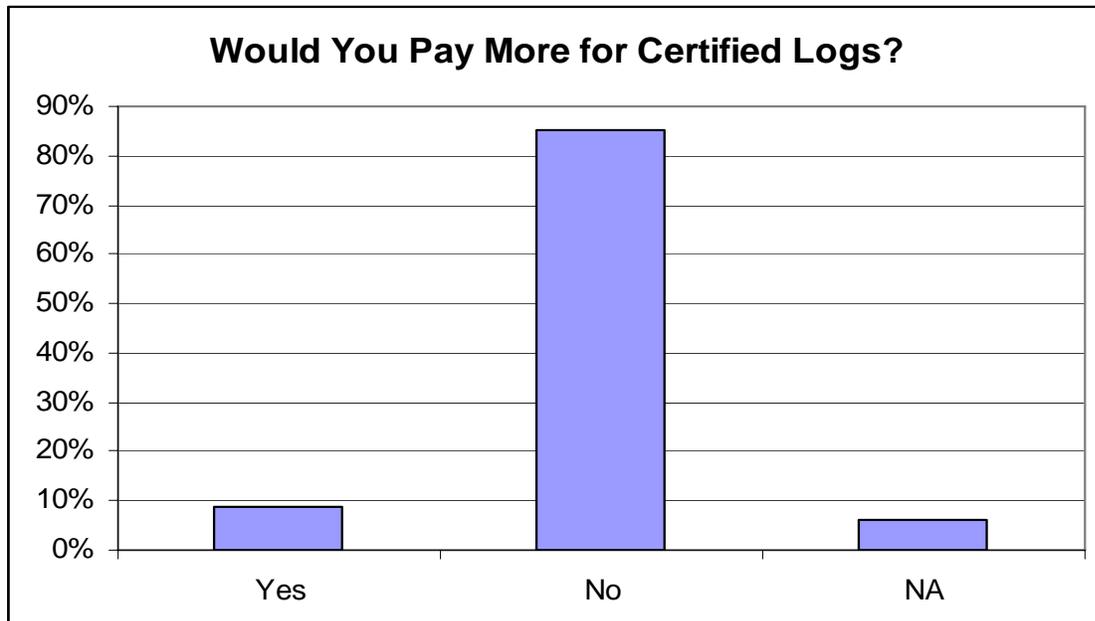


Figure 4. 28. Would you pay more for certified state logs?

Question 22. Many areas of the inland west are plagued by high risk of forest fire as a result of overly dense forests, drought, and insect infestations. Public and Private forestland managers have been expanding the use of forest thinning to remove fuel loads in these fire-prone forests. How does your company regard the use of thinning to reduce fire risk on these east-side dry forests?

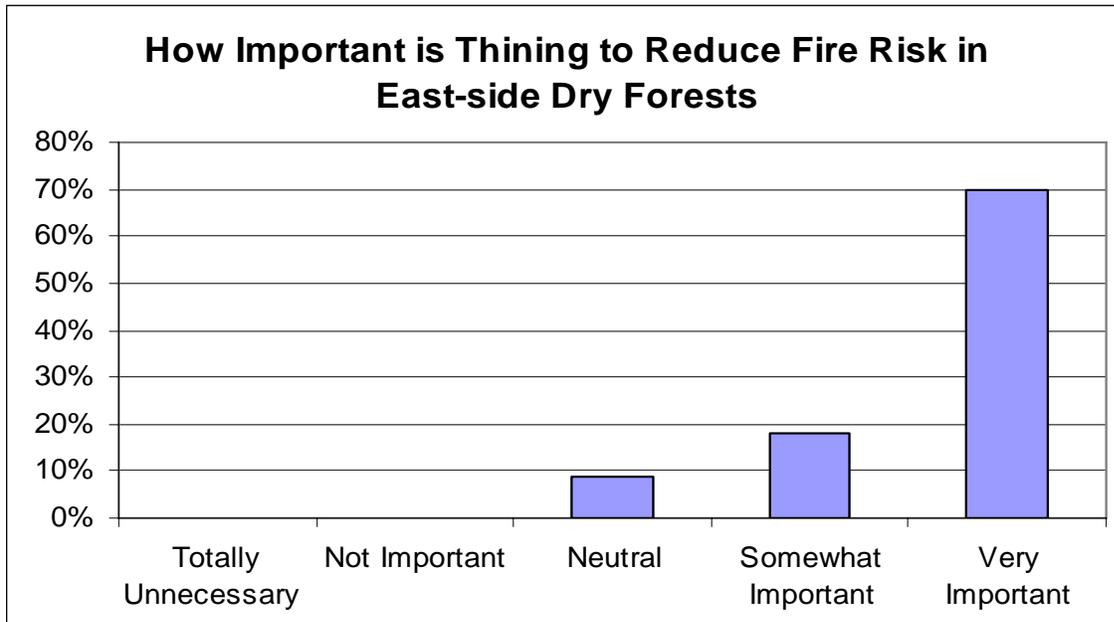


Figure 4. 29. How important is thinning to reduce fire risk in east-side forests?

88% of survey respondents indicated that removal of excess fuel loads through the use of forest thinnings was somewhat to very important with 70% agreeing that this is a very important activity. There were no respondents that indicated that thinning to reduce fire risk was either not important or totally unnecessary.

Question 23. For the next few years the WADNR has made reduction of fire risk through thinning a management priority on state-owned east-side forests. This could mean an increase in availability of small diameter timber. Would your company be interested in expanding its use of logs from 3 to 6 inches in diameter if long-term supplies could be made available?

22 survey respondents (33%) indicated that their companies would be interested in expanding use of small diameter timber (SDT) if supplies could be made available. The response distribution to this question is in contrast to the response information from Question 6, “What log diameter ranges does your company normally prefer to purchase?” Only 12% (8 respondents) of purchasers indicated preference for logs less than 5 inches in diameter.

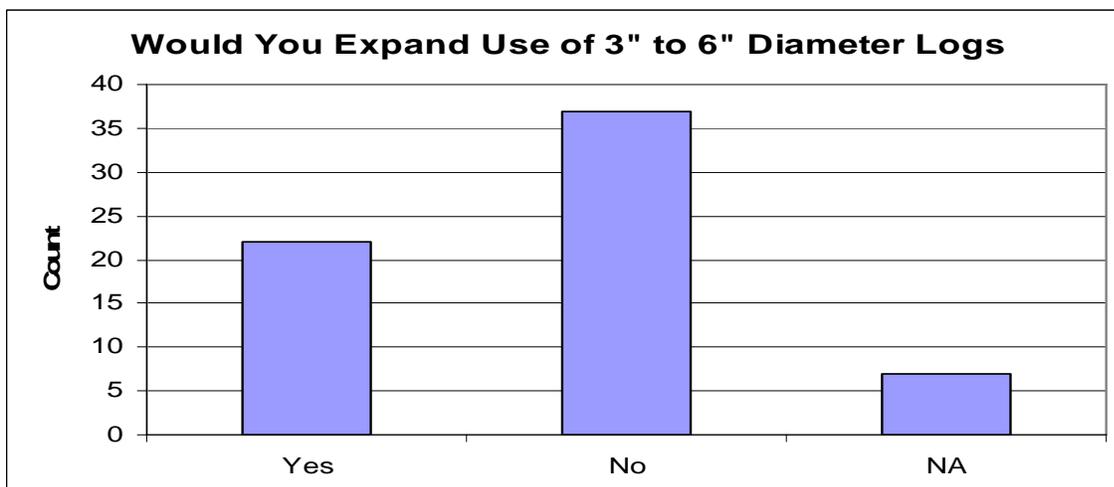


Figure 4.30. Would you expand use of 3” to 6” east-side DNR logs?

Of particular interest may be the distribution of purchasers that indicated interest in expanding their operations to utilize 3” to 6” diameter logs. Figure 4. 31. (Companies with interest in small diameter timber) shows that potential purchasers of small diameter timber are located both east and west of the Cascades in WA, OR, and ID and include mill and non-mill owning companies. Three purchasing companies that expressed interest in SDT did not report the location of their operations, however, two of the companies reported owning sawmills with one company claiming more than 3 and the other claiming 1. The third unknown respondent did not indicate if the company owned a mill. Summing the approximate total purchasing power of companies responding favorably to potential SDT utilization opportunities indicates an annual total purchasing capability of more than 735 million board feet and at least 32 milling facilities.

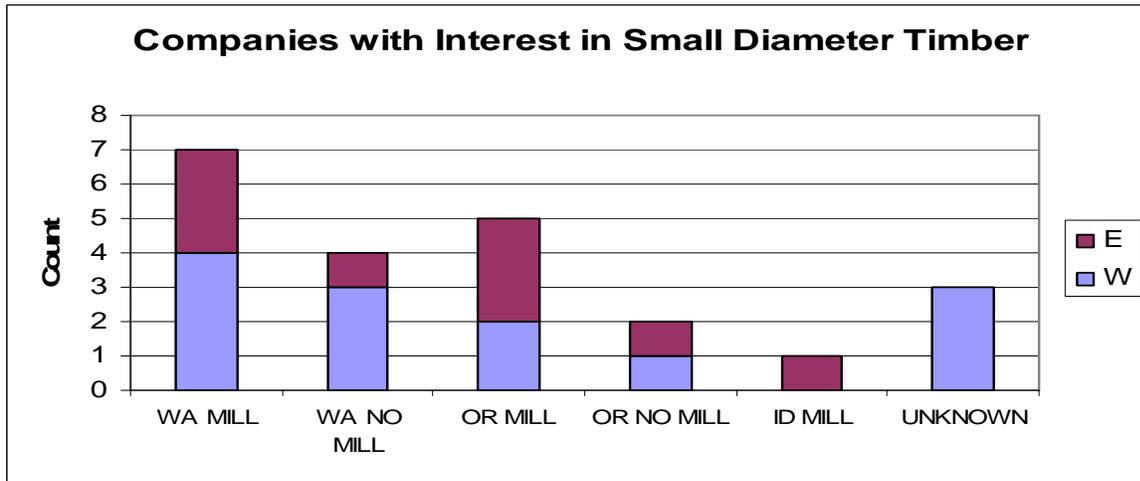


Figure 4.31. Companies with interest in small diameter timber.

Question 24. What would you think could be the most likely use for these small diameter logs?

The majority of respondents (72%) indicated that they expected small diameter logs to be used primarily for chip production as historically has been the case. After chips, the next likely use for SDT expected by respondents was biomass for cogeneration (31%). Respondents were encouraged to select multiple uses as logs are rarely dedicated to a single product line. Engineered wood products, fiberboard, and “other” all received 16% of responses with most respondents that selected “other” indicating that they expected SDT to be manufactured into lumber and chips. 8% thought that SDT could be made into fencing and 12% of survey respondents chose not to answer this question.

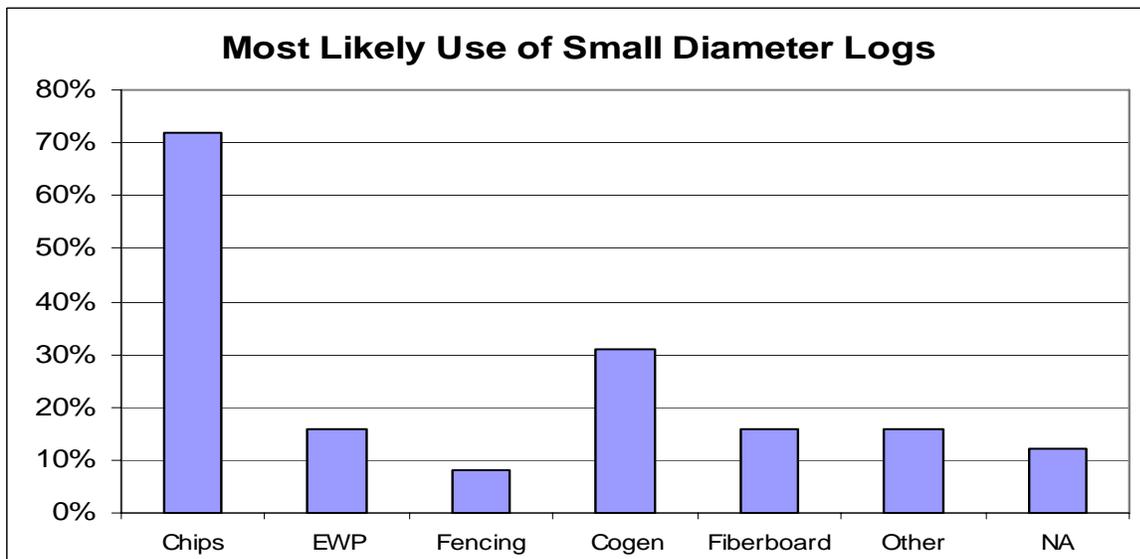


Figure 4. 32. What is the most likely use of small diameter logs?

Question 25. Has your company considered expanding capacity within the next five years?

43% of companies responded that they had considered expanding the capacity of their operations within the next five years. Of the 57% that responded that they hadn't considered expanding the capacity of their operations, many cited concerns about reliable timber supply as the reason.

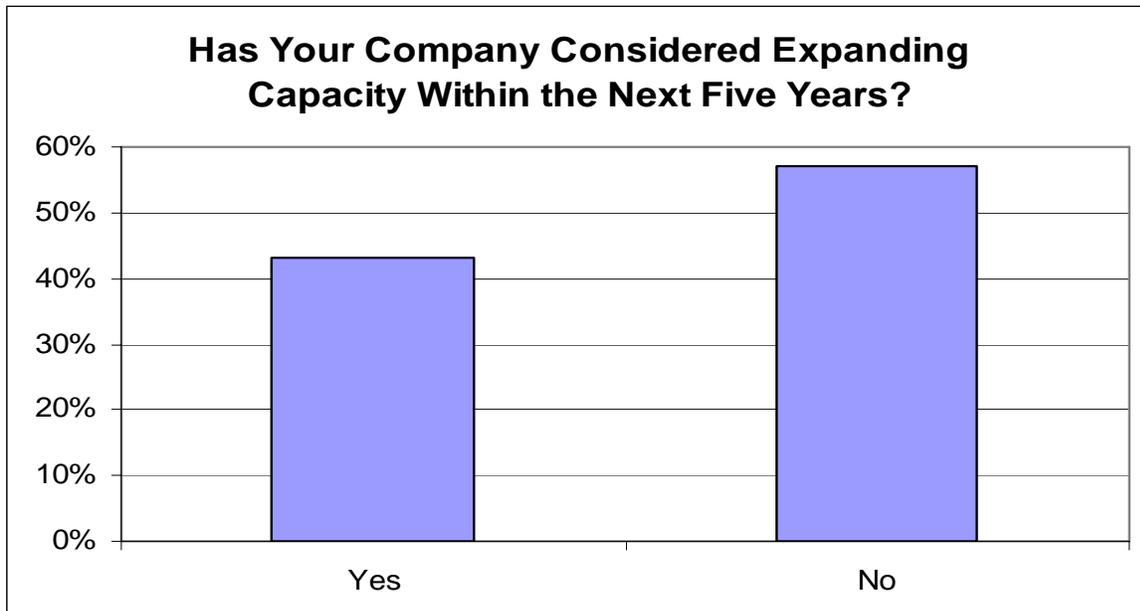


Figure 4.33. Has your company considered expanding capacity within the next five years?

Of the companies that did consider expansion, most are milling companies. Geographically these companies are broadly distributed with the majority in eastern and western WA and OR and a few additional companies located in ID and CA. Figure 4. 34. is provided to show this distribution.

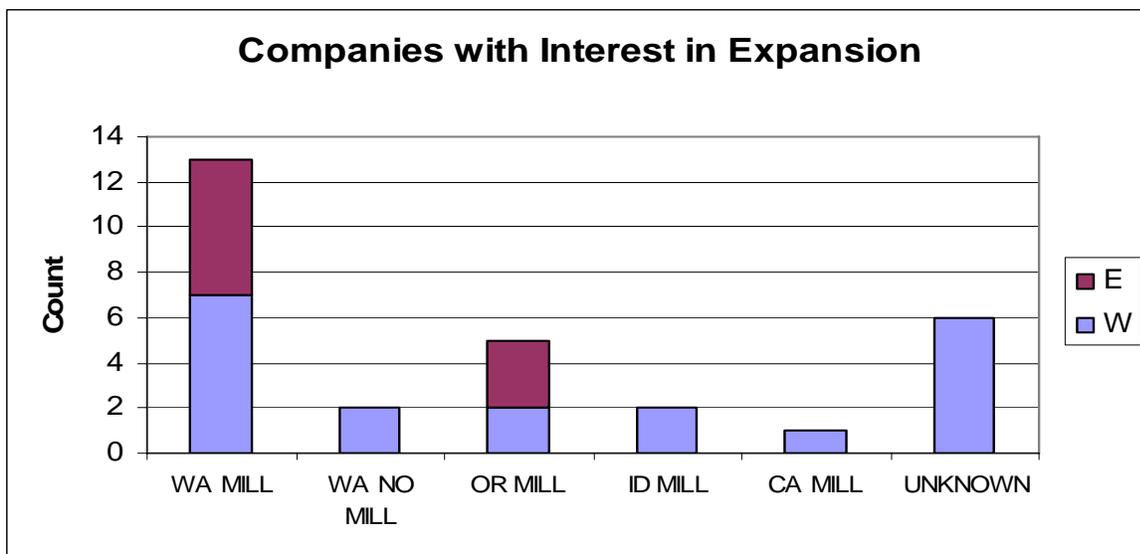


Figure 4.34. Companies with interest in expansion.

When company interest in capacity expansion is compared to company interest in expanding utilization of 3 to 6 inch diameter SDT (question 23), it is apparent that a majority of companies willing to expand use of SDT have also considered expanding operational capacity. This information may indicate that there is a willingness amongst a subset of timber purchasers to make investments in new infrastructure for small diameter utilization. Amongst purchasers east of the Cascades, three purchasers in WA, 4 purchasers in OR, and 1 purchaser in ID indicated both a willingness to expand operations and to increase utilization of SDT. In the comments that accompanied question responses (see Appendix), the single dominant concern in regards company expansion consideration was reliable log supply.

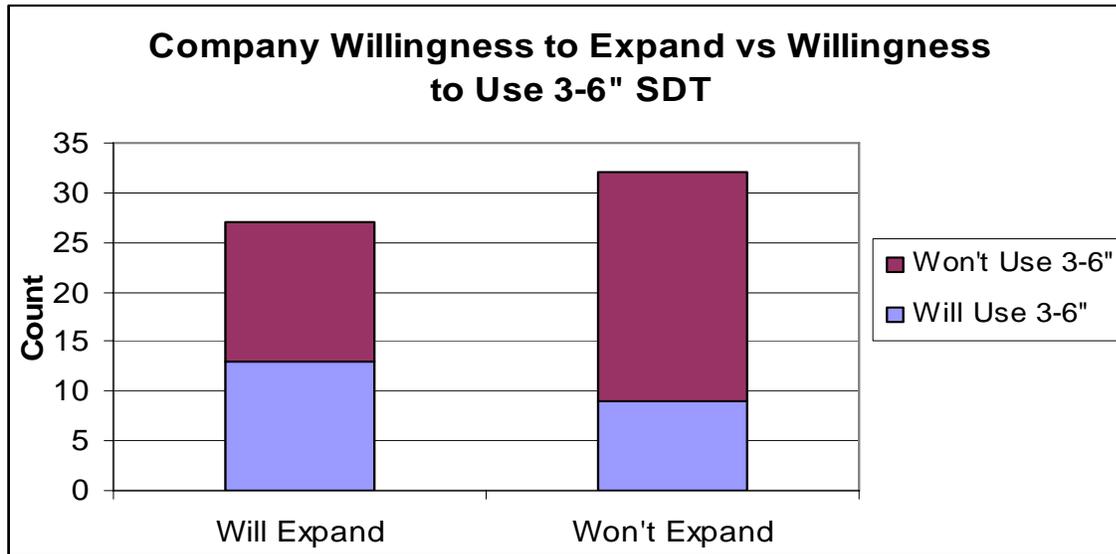


Figure 4.35. Company willingness to expand vs willingness to use SDT.

Question 26. Timber sales that are designed to achieve improved forest health conditions may require management activities in addition to harvest such as the piling and burning of underbrush or the removal of surplus road surfaces. How should such activities be considered within the timber sale program?

Half of the respondents indicated that forest health activities that might be in addition to timber harvests could be designated as the responsibility of either the DNR or the timber purchaser given the understanding that the bid price would adjust accordingly. 41% wanted no part of such additional responsibilities and indicated that the DNR should handle these activities apart from the timber sale program. Very few respondents wanted these activities to be solely the purchaser responsibility.

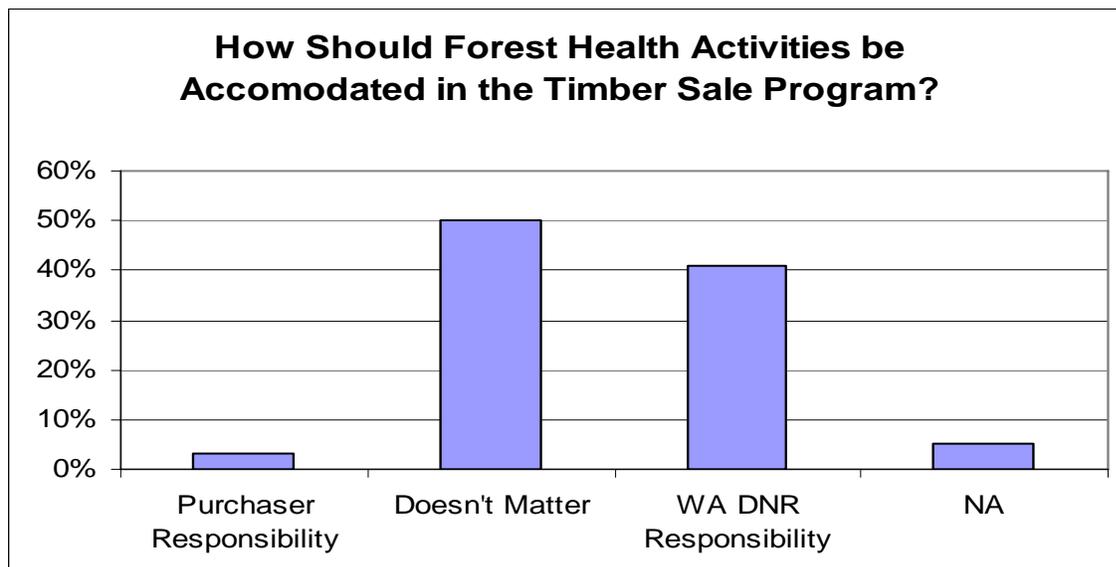


Figure 4.36. How should forest health activities be accommodated in the timber sale program?

Question 27. In which regions has your company purchased state timber sales?

10 survey respondents (15%) indicated that they hadn't purchased DNR timber while 57 indicated that they had purchased timber from the DNR. Many purchasers are active in multiple regions with competition in all areas.

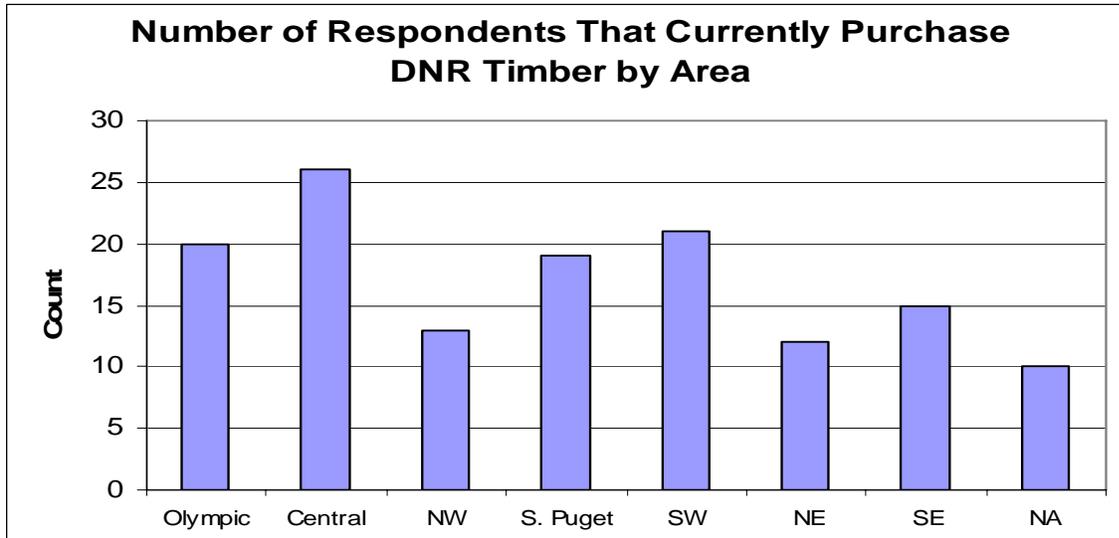


Figure 4.37. Number of respondents that currently purchase DNR timber by purchasing region.

Question 28. Do you have interest in purchasing WADNR timber from east of the Cascade Mountains?

64% of respondents (43) indicated interest in purchasing east-side timber from the DNR. Of the 43 respondents with interest in purchasing east-side DNR timber, 22 indicated that they have considered expansion, 18 said that they would use SDT, and 13 said that they would expand and use SDT.

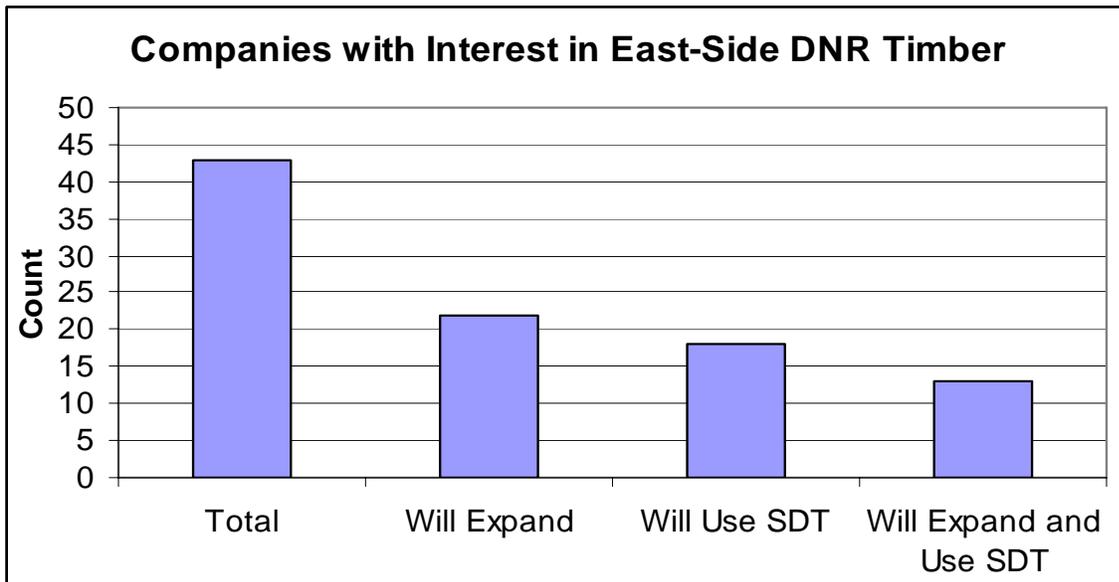


Figure 4.38. Companies with interest in east-side timber.

39% of respondents (26) indicated that they would like a WADNR representative to contact them about changes in the timber sale program and increases in available timber volumes from eastern Washington.

Some respondents offered comments in addition to survey responses. These comments are provided in the Appendix along with a copy of the original survey form and the response data.

5. Discussion

Forest health harvesting activities to remove excess fuel loads from overstocked stands within DNR forests in eastern Washington are expected to produce merchantable timber volumes of 25-35 million board feet Scribner (MMBF) per year for the next 5-7 years. As yet undetermined volumes of trees too small for most DNR timber purchasers will also be removed to reduce current fuel loads. Other recent adjustments to the DNR timber sale program such as the recalculation of the annual sustainable harvest level and amendments to the State Habitat Conservation Plan are expected to result in additional increases of 100 to 150 MMBF in annual timber sales volumes as compared to recent years. These increases to available regional timber supplies come at a time when the number of sawmills in Washington is at a record low following rapid adjustments to industry infrastructure in response to reductions in public timber availability, changes in sawmill technologies, global market fluctuations, and other factors.

There is a large body of information from the literature to indicate that increases in some harvest activities are warranted in both west side and east side forests. Ecological benefits from targeted forest management activities appear to include reduced risk of forest mortality from fires, drought, disease, insects, and other disturbances as well as protection of public resources such as air and water, improvements in habitat qualities for sensitive species, and acceleration of the development of old forest conditions. Economic benefits can include increased stumpage returns for trust beneficiaries, improvements in tax revenues for local, state, and federal taxing authorities, avoidance of wildfire liabilities, and economic development opportunities for resource dependent communities.

This project has been designed to assess multiple influences that affect the market receptiveness to increased timber volumes and changing log types that are anticipated from adjustments to the DNR timber sale program. Since logs and forest products travel great distances across state and national boundaries, an investigation of local markets must include examination of broad influences. Factors considered that influence marketability include the existing timber industry infrastructure, infrastructure adaptability to change, regional supply and demand, and market strategies that best serve timber purchaser preference. Information provided in this report has been assembled to help maximize attractiveness of DNR timber sales program, insure favorable revenue benefits to trust beneficiaries, assist in substantive and effective improvements to the health of state forests, and inform potential for economic development.

Projected increases in DNR timber harvest levels, while significant, represent a relatively small addition to total available Washington and Oregon timber supply (less than 2%). Given that a majority of timber purchasers report log scarcities, that increasingly distant purchasers are competing for DNR logs, that DNR stumpage prices have risen 30% over the last year (Aust 2004), and that new sawmill start-ups and expansions are expected to add 1 billion board foot of production capacity in Washington within the next few years (Stevens 2005), this relatively small addition to available regional timber volume is unlikely to cause negative market reaction. By contrast, many of the factors presented for consideration in this report would appear to indicate that state harvest volume increases come at a time when the DNR may be uniquely positioned for market advantage.

The DNR typically manages its forests for longer rotations with less intensive efforts to maximize growth than industrial forest landowners and subsequently produces finer grained saw logs that are especially attractive to purchasers. The increased use of rail and water freight to transport logs further from the woods to the mill has served to broaden the DNR timber purchaser pool. 40% of survey respondents report shipping logs greater than 200 miles. Interestingly, a review of log size and grade preferences relative to purchaser willingness to ship long distances showed no correlation between size, grade, and shipping distance. These factors combined with imbalances in the age-class distribution of private forest ownerships may mean unique market opportunities for the DNR timber sales program if specific log types can be offered to receptive customers at times of greatest supply need.

The DNR marketing and sales department has new programs to capitalize on such opportunities by focusing timber sales offerings to best suit a range of customer needs. A data base has been created to track purchaser interests and inform timber sale design and advertisement. The result has been heightened competition amongst bidders for timber sales and the DNR timber sale program has benefited. The DNR is well-advised to maintain regular dialogue with state timber purchaser groups and industry associations in order to inform optimum responsiveness to market changes and customer needs. While niche market timber purchasers will continue to play an important role in the timber sale program, it is also apparent from analysis of survey responses that most purchasers regularly buy timber sales of mixed species, sizes, and qualities in order to combine raw material procurement for milling

operations with exploitation of log resale opportunities to other buyers. Many respondents actually indicated a preference for such diversity in timber sale offerings; citing flexibilities in harvest timing and product type versatility as sources of enhanced uncut timber value.

Lacking currently, however, among purchasers is broad interest in east side pine species. While only a few respondents reported past purchases of pine, more positive respondent interest in future purchase opportunities for east side logs may signal a shift to more pine purchases if reliable and sufficient supplies are made available. Special effort to provide such supplies to existing and potential purchasers will be warranted.

As a result of policy changes, annual timber harvest volumes from federal forest lands have declined in Washington to only 5% of 1988 levels but a forest health emergency on these lands has resulted in new political pressure to increase harvest. A substantive increase in available federal timber could improve forest health and provide opportunities for economic development; however, abrupt increases to timber supply would have negative impacts for log markets in the region. When survey respondents were asked if they thought that volumes of timber would likely increase from federal lands, 63% indicated this was unlikely or impossible and 21% responded that they were uncertain. Interviews with forestry professionals suggest that similar opinions are widely held in the region. Review of the literature also confirms that any near term increases in federal timber harvest are unlikely to be of sufficient magnitude to influence regional market dynamics.

Important to purchasers are timber sale contract arrangements. Most purchasers agree that timber sales should be 1-5 MMBF in volume with a contract life of 3 years. More than 70% prefer scale sales. 35% indicate that lump sum sales are also acceptable under some circumstances. While there is little general interest in other timber sale types, it is apparent that a subset of purchasers may pay a premium for contract/direct and log yard sales that offer specific products on an occasional basis.

Purchasers have good reason to want timber sales that have flexible operational contract arrangements. Survey responses and mill interviews revealed that there is broad agreement that the ability to secure multiple year timber sales is critical to the inventory needs of successful forest products manufacturing businesses. When a mill is able to buy many sales with different operational windows, different species, and different prices, it has maximized its ability to respond to market fluctuations while ensuring that needed raw material supplies will be consistently available. The cumulative supply line represented by timber sales planned but as yet unsold combined with timber sales sold and under contract but not yet harvested is sometimes referred to in the industry as the "pipeline." Without continuity of timber flow through the "pipeline", milling infrastructure and timber sales programs become unstable as occurred in the 1990's. Adequate pipeline volumes and multiple year timber sale contracts also benefit the DNR by encouraging speculative bidding and promoting manufacturing investment.

The market and infrastructure challenges for increases to the DNR harvest program that may be of greatest concern are the sale and utilization of the minority log types resulting from the harvest of larger and very small diameter trees. Fortunately for trust beneficiaries, the yields of large and very small diameter logs appear to be a relatively small percentage of the total timber volume to be offered for sale (less than 10%). Aggressive and innovative marketing strategies are warranted for these log types. For large logs the strategy should be to identify and supply existing purchaser markets. For small logs the strategy should be to work with private and public interests to encourage development of new utilization infrastructure.

While some select markets still exist for large logs, sale of very small logs, 3 to 5 inches in diameter, will likely remain a challenge. The currently unfavorable economics of biomass-to-energy projects, the continuing decline of the Pacific Northwest pulp and paper industry, the high cost of harvest and production, the relative lack of regional engineered wood production capacity, and the transportation challenges that isolate many forest areas of Washington are all factors that undermine the potential for profitable utilization of small logs in the near term. In the absence of sufficient federal harvest assurances, infrastructure investment incentives, and price supports for alternate energy projects, private sector investment in specialized industrial capacity to absorb small diameter low value logs has not been forthcoming. However, survey results indicate that purchasers have interest in new investment if reliable and adequate log supplies will be made available. In eastern Washington, new forest health contracting flexibilities combined with new management targets created by amendments to the HCP should mean that greater and consistent volumes of small diameter logs from state lands will be available. DNR will be well advised to look for ways to cooperate with federal, state, tribal, and local forest health and economic development interests that seek to create new incentives for small log utilization programs for energy, paper products, or engineered wood products.

While it would appear that regional wood products manufacturing infrastructure has stabilized and may even be expanding with scheduled construction of several new mills in the area (Stevens 2005), a closer look will reveal that there is more to the story. Sawmill expansions and start ups occur for many reasons. 2003 and 2004 were profitable years for many sawmills. Some sawmills may be choosing to reinvest profits in upgrades so that they might reduce corporate tax liabilities. Many logs from Washington are traveling to mills in other states, but some out-of-state mills are establishing new facilities in Washington to stay competitive by reducing transportation costs. New saw mill facilities planned or under construction in Washington, have been exclusively located on the west side of the Cascade Mountains. It is uncertain if these new facilities will bring market benefit to east side forests where loss of milling infrastructure appears to not yet be over (Associated Press 2005, Random Lengths 2005, Dietz 2004). Moreover, on the west side, while saw mill expansions and new construction would appear to represent new capacity, it may be that these new facilities are an extension of the regional progression described by Perez-Garcia (2005): the number of mills decreases while surviving companies increase in size and production outputs. One billion board feet of milling capacity is being added in the near term to the western Washington sawmill industry, yet no proportionate increase in available log supplies has been predicted. At least for the short term this may bring market benefit to the DNR timber sale program as new mills compete aggressively to establish pipeline inventories. Without increases in available log supplies, however, one mill must close such that another might open. The continuing decline of the pulp and paper industry represents a critical challenge to the region as well. New milling capacity means that more chips and hog fuel are produced in the face of slowing consumption effectively lowering the market price of these important sawmill byproducts as well as the market for pulp logs. New infrastructure is sorely needed in Washington for low value wood biomass utilization (pulp, chips, hog fuel, SDT) if a strong forest products industry is to be available in the future.

Declines in the dollar result in less competitive advantage for Canadian products and greater American-made lumber access to export markets which should support higher stumpage for DNR logs. Since 2002, the U.S. dollar has lost 36% against the euro, 25% against the Canadian dollar, and 23% against the yen. With low interest rates and record housing starts, improvements in domestic lumber prices as compared to recent years should continue to support modest gains in DNR log prices. As lumber prices increase, mills increase production and temporary shortages of log inventories result. The DNR timber sales group should move quickly to exploit sales of particular product types in response to such spot market opportunities. For example, in 1995, pulp log prices spiked dramatically. Companies that responded quickly with increased harvests were able to generate profits from forest stand improvement activities that might otherwise have been cost-prohibitive. Seasonal shortages represent another temporal sales opportunity. Some timber purchasers report that logs are more likely to be temporarily scarce at certain times of the year. DNR coordination of its marketing program with such periodic market shortfalls will positively influence stumpage return potentials and could help insure the success of forest health and fuels reduction harvest activities.

Some purchasers suggest that greater DNR investment to assure accuracy of estimated log qualities and volumes as described in DNR timber sale advertisements would increase purchaser confidence. Higher purchaser confidence results in less perceived risk. Less risk means greater value to the purchaser and improved returns to the trust beneficiaries. Greater investments in cruise time by field staff as well as in emerging technologies that estimate wood quality can help to provide more explicit and accurate timber sale descriptions (Fibre-Gen. 2005).

100% of purchasers indicate that cubic volume metrics are not desirable for timber sale measurements. In total disregard of findings in the literature of scaling inaccuracies associated with Scribner volume estimates, timber purchasers are clear: timber sales should be offered based upon Scribner volume estimates except for sales where majority volume is pulp. Pulp sales may be offered in tons.

Purchasers responding to the survey associated with this investigation are clear about contracting preferences in regards to sale volume, sale duration, and other purchase arrangements. While some sales, such as forest health sales, will logically benefit from new contract logging flexibilities that result in sales of log decks, sales of this type are not what most purchasers prefer and subsequently should be reserved for special circumstances. Available literature on log yards was reviewed to assess merchandizing potential for adding value to DNR stumpage returns. Log yards were found to be costly to operate and unlikely to improve net revenues unless most of the log volume processed is high value and larger logs.

As a consequence of large intense forest fires in eastern Washington over recent years, considerable public attention is being directed at the question of how to reduce hazardous fuel loads from the overly dense forests that characterize the region (DNR 2004). Removal of the many small trees that make up these fuel loads is known to be

costly. However, research findings indicate that comprehensive restoration prescriptions that selectively target for removal a combination of small and large diameter trees may be economically and environmentally desirable in overstocked fire-prone ecosystems where failure to reduce fuel loads can result in stand replacement wildfires (Brown et al. 1996, Fiedler et al. 1999, Fiedler et al. 2001). DNR should attempt as possible to design forest health timber sales that combine timber yields such that a viable economic activity results in desired environmental conditions. Where needed, new contracting flexibilities will allow DNR to contract fuels removals for forest health with revenue recovery occurring from the sale of harvested logs after treatment. Purchasers suggest that DNR thinning sales that allow operators to select trees for removal based upon harvest prescriptions as opposed to DNR selection through tree painting will reduce timber removal uncertainties and costs while lowering sale preparation costs for DNR.

The apparent growing shortage of trained and qualified natural resource managers, loggers, and mill workers combined with a lack of economic opportunities in rural communities should be of great concern to the DNR and other forest management agencies and companies. Confounding this situation, personnel shortages come at a time when there is question as to whether the current share of 25% of gross revenues will provide adequate operating funds to maintain DNR productivity in the face of rising management costs (Independent Review Committee 2004). With personnel and funding shortages, there is concern that DNR will be unable to meet its expanded harvest targets. Failure to meet harvest targets will result in increased economic and environmental costs for Washington. Trust beneficiaries will see reduced return on asset values, fire fighting costs will continue to climb, habitats for sensitive species will be destroyed by fire, insects and other disturbances, and rural communities will continue to experience high unemployment. Educational partnerships between the DNR, the forest products industry, and institutions of higher learning for the purpose of recruiting young people into resource management careers can help to ensure that an adequate work force will be available in the future. Establishment of state scholarship programs anchored in work commitments and employment recruitments such as the federal Student Career Experience Program (SCEP) (USDA Forest Service 2004) represent important opportunities for investment in the sustainable management of Washington forests. Additional revenues generated from maximizing timber sale stumpage returns while minimizing administrative costs may help to provide some funding relief for the DNR.

Third party certification of the management of state forest lands in western Washington is being considered by the Public Lands Commissioner. While there may be valuable public relations benefits from state investment in the certification process, this investigation found little evidence that premium prices or broader markets would result from investments in forest certification. The majority of purchaser survey respondents agreed with only a few willing to pay a premium for certified logs. As yet it is unknown what the implications of certification on west side DNR forestlands may be for implementation of forest health programs and the subsequent sale of uncertified logs from DNR managed forests on the east side.

The DNR sustainable harvest level is being challenged in court. If the courts rule against the department, harvest levels could be reduced along with revenues which would likely compromise implementation of forest health programs in eastern Washington. Effective implementation of forest health activities will be dependent upon the success of the entire state timber sale program to ensure that needed markets, infrastructure, funding, and personnel resources are available from a viable regional forest products industry.

Calls for forest certification and filings of law suits are indication that some influential elements of the Washington public have not been adequately informed about the environmental protections required by the State's forest practice regulations and Habitat Conservation Plan. Washington forests are managed under the strictest regulatory protections of any state forests in the U.S. As well, there is also growing recognition that the use of wood from forest harvests in place of alternative building materials may yield environmental benefits. For example, by using wood in residential construction rather than nonrenewable structural materials such as steel, aluminum, concrete, brick, and plastics, which are energy intensive to manufacture, less fossil fuel is consumed and emissions of carbon to the atmosphere are reduced (CORRIM 2004). Further, forest management activities that reduce wildfire risk lower the potential for carbon emissions to the atmosphere while protecting clean water. Information contained in this investigation, about the magnitude of the many market and non-market benefits, direct and indirect job multipliers, tax revenues, and economic develop opportunities associated with DNR harvest activities, should have broad review so that the consequences of adjustments in DNR management activities are widely known and given serious public consideration. Further research should continue investigation of the marginal social, economic, and environmental trade-offs associated with public resource management choices.

The forest products industry in the Pacific Northwest appears to be mature with most companies in business for decades and little opportunity for new entry; especially by small businesses. Major sectors such as pulp and paper and plywood industries continue to experience declines in productive capacity. Evidence presented in this report suggests that such declines will continue. While productive capacity of the sawmill industry appears to have grown, the number of companies in operation has been reduced and mill closures still occur. This is particularly true for eastern Washington. The need for forest health activities has resulted in an imperative to develop new regional forest product infrastructure to utilize small diameter timber. In partial response, there is growing public interest in forest biomass utilization as energy generating feedstock. Government price supports combined with increased fossil fuel prices may improve competitiveness of biomass-to-energy economics. Engineered wood products (EWP) are rapidly gaining market share (Adair 2004) and could provide economically attractive opportunities for utilization of small diameter timber and low value wood biomass but investment in new infrastructure is needed.

The forest products industry has undergone dramatic adjustments during the last decade that continue today. Generally there are much fewer players and the spectrum of product operations has narrowed. However, a large and viable forest products industrial sector remains. This investigation finds that aggressive timber sale marketing adapted to changing purchaser needs and preferences can maximize returns to trust beneficiaries while supporting greater opportunities for utilization of all log species, sizes, and qualities. As the largest public timber supplier in Washington, the DNR is well-positioned to provide reliable and attractive timber sale opportunities for purchasers throughout the region which will result in significant state revenues, environmentally responsible opportunities for economically viable forest management, encouragement for investment in needed regional infrastructure, and many other important public values including wildfire risk reduction.

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APPENDICES

Appendix A: Survey with Response Data



If you have an interest in purchasing timber from the Washington DNR, please fill out this UW survey.

May 2004

Dear Log Buyer,

The Washington Department of Natural Resources (WADNR) manages approximately 2.1 million acres of forest from which 543 million board feet of timber was sold in 2003 <http://www.dnr.wa.gov/base/publications/list.html>. The continued success of this program, designed to insure sustainable management of healthy forests while providing returns to trust beneficiaries and log supplies to local economies, is dependent upon satisfied timber sale purchasers. Response information to periodic purchaser surveys provides an essential communication link between the WADNR and its valued timber customers. The Rural Technology Initiative (RTI) from the College of Forest Resources at the University of Washington (UW) has been asked by the WADNR to survey regional timber purchasers in order to gain a greater understanding of how to best accommodate and integrate purchaser preferences with evolving management considerations.



For example: emerging forest health issues such as bug-kill, fire salvage, and overstocked stands warrant a reexamination of the scope of the timber sale program in east-side forests. These forests often contain a mixture of small and large diameter trees of different species, many of which will have to be removed to restore ecosystem health and reduce fire risk. Harvest volumes offered for sale are likely to increase for the next several years. Who will buy the logs? What is the best way to offer these logs to potential purchasers?

Please take a few minutes to fill out and return the survey questionnaire. Your help with this survey will ensure that future modifications to the DNR timber sale program will be informed by a current understanding of purchaser operations and expectations. The information collected from this survey will be analyzed at the College of Forest Resources and then presented to the WADNR to assist development of alternative contract strategies for future timber sales offerings. Responses will be kept **completely confidential** and will be used only for the purpose of advising the WADNR timber sale program. If you have any questions, please contact the Rural Technology Initiative at 206-616-3218 or rti@u.washington.edu. We have enclosed a stamped, addressed return envelope for your convenience.

Thank you for taking the time to share your information and recommendations.

While the immediate application of the results of this purchaser survey will be directed towards adjustments of the WADNR timber sale program in eastern WA, recommendations from survey analysis will likely influence west-side timber sale offerings as well. Your survey response information is important to us. Please fill out the information below regardless of where your company might prefer to purchase WA state timber.

Please check the box that best indicates your answer to each question.

- 1) How many years has your company been in business? NA = 0

Less than 5 years	5 to 10 years	11 to 20 years	More than 20 years
1	6	13	47

- 2) How many people does your company employ? NA = 1

Less than 20	20 to 100	101 to 250	251 to 500	More than 500
8	23	14	11	10

- 3) What was your company's average annual log purchase volume (volume in million board feet Scribner) during the last 5-year period?
NA = 2

1 to 10	11 to 25	26 to 50	51 to 100	More than 100
9	21	14	13	8

- 4) Where do you procure timber and/or logs? Please enter % total in each box (to equal 100%).

N

A = 2

Federal	WADNR	Other public	Fee lands	Other Private	Open market
30 – 4%	52 – 22%	35 – 7%	29 – 12%	54 – 26%	44 – 26%

- 5) What timber species does your company prefer to purchase?
(If possible enter as %, otherwise please check one or more boxes). NA = 1

DF/WL	WH/WF/ Spr	PP	LP	WP	RC	Hwd	Other
55 – 62%	36 – 39%	12 – 35%	9 – 15%	4 – 60%	18 – 35%	12 – 55%	1 – 1%

- 6) What log diameter ranges does your company normally prefer to purchase (check one or more)? NA = 1

Less than 5 "	5 to 7"	8 to 11"	12 to 24"	More than 24"
8	40	51	57	29

7) **What log qualities does your company purchase (check one or more)?** NA = 0

Pulp	Low Grade Saw logs	High Grade Saw logs
19	50	58

8) **What size (volume in million board feet Scribner) timber sale would your company prefer to purchase (check one or more and circle the preferred size)?** NA = 1, 14

Less than 1	1 to 5	5 to 10	10 to 20	More than 20
18 - 8%	59 - 52%	28 - 16%	9 - 0	4 - 0

9) **What would be your company's preferred contract life for a timber sale?** NA = 1

1 year	2 years	3 years	5 years	Depends on Market Conditions
2	15	34	6	4

If your check is "Depends on Market Conditions" please explain

10) **What type of timber sale do you prefer?** NA = 1

Lump sum	Scale	Contract/Direct	Log Yard Deck	Other
24	48	4	5	3

If your check is "Other" please explain

11) **What measure of log volume is best used to describe timber sales?** NA = 1

Tons	Board Feet (Scribner)	Cubic Feet	Cubic Meters
12	64	0	0

NA = 1

12) **How many sawmills or other manufacturing facilities does your company own?**

0	1	2	3	More than 3
16	22	11	5	12

If your company operates milling facilities, are you running at capacity?

33 - Yes 15 - No

NA = 19

- 13) **How are harvest operations conducted by your company?** NA = 4

Company Loggers	Contract Loggers	Both
5	44	14

- 14) **How are trucking operations conducted by your company?** NA = 2

Company Truckers	Contract Truckers	Both
1	47	17

- 15) **Has your company ever used rail or barge services to transport logs long distances?**
 38 - Yes 21 - No NA = 5

- 16) **How many miles will your company ship logs from the timber sale to the mill?** NA = 2

0 to 50	51 to 100	101 to 150	150 to 200	More than 200
4	13	14	7	27

- 17) **How would you describe current log availability?** NA = 2

Always Scarce	Sometimes Scarce	Adequate	Sometimes Oversupplied	Regularly Oversupplied
2	36	19	5	0

- 18) **Do you feel that volumes of U.S. Forest Service and BLM timber available for harvest are likely to increase appreciably in the future?** NA = 3

Impossible	Not Likely	Uncertain	Somewhat Likely	Very Likely
2	40	14	7	1

- 19) **Are you familiar with forest certification programs such as those offered by the Forest Stewardship Council and the Sustainable Forestry Initiative?** NA = 2

Not Familiar	Vaguely Familiar	Very Familiar
2	19	44

- 20) **The state of Washington is considering the certification of state forestlands. How does your company regard forest certification?** NA = 3

Waste of Money	Not Very Important	Neutral	Somewhat Important	Very Important
23	13	8	15	4

21) If the state forestlands were to become certified would state logs become more valuable to your company than logs from uncertified forests? NA = 4

6 - Yes 55 - No - Please explain

22) Many areas of the inland west are plagued by high risk of forest fire as a result of overly dense forests, drought, and insect infestations. Public and private forestland managers have been expanding the use of forest thinning to remove fuel loads in these fire-prone forests. How does your company regard the use of thinning to reduce fire risk on these east-side dry forests?

NA = 2

Totally Unnecessary	Not Important	Neutral	Somewhat Important	Very Important
0	0	6	12	47

23) For the next few years the WADNR has made reduction of fire risk through thinning a management priority on state-owned east-side forests. This could mean an increase in availability of small diameter timber. Would your company be interested in expanding its use of logs from 3 to 6 inches in diameter if long-term supplies could be made available? NA = 7

22 - Yes 37 - No - Please explain

24) What would you think could be the most likely use for these small diameter logs (check one or more)? NA = 8

Chips	Eng Wood Products	Fencing	Biomass for Cogen	Fiberboard	Other
48	11	6	21	11	11

If you checked more than one *or* if you checked "Other" please explain.

25) Has your company considered expanding capacity within the next five years? NA = 0

29 - Yes 38 - No If Yes, please explain which factors would be important to a company decision for investment in expansion?

26) **Timber sales that are designed to achieve improved forest health conditions may require management activities in addition to harvest such as the piling and burning of underbrush or the removal of surplus road surfaces. How should such activities be considered within the timber sale program?**

NA = 3

Purchaser Responsibility in timber sale	Doesn't matter; bid price will reflect the difference	WADNR Responsibility apart from timber sale
2	32	26

27) **In which regions has your company purchased state timber sales? (If possible enter as %, otherwise please check one or more boxes). NA = 10**

Olympic	Central	NW	S. Puget Sound	SW	NE	SE
20	26	13	19	21	12	15

28) **Do you have interest in purchasing WADNR timber from forests east of the Cascade Mountains? Yes - 43 No - 23 NA = 1**

29) **If you have other suggestions to improve the WADNR timber sale program for either the east or west side please offer them here:**

THANK YOU FOR TAKING THE TIME TO COMPLETE THIS SURVEY.

Would you like a WADNR representative to contact you about changes in the WADNR timber sales program and increases in available volumes from eastern Washington?

25 - Yes 34 - No NA = 8

NAME: _____

COMPANY: _____

ADDRESS: _____

PHONE: _____ EMAIL: _____

ADDITIONAL COMMENTS

Appendix B: Survey Comments

Question:

9) What would be your company's preferred contract life for a timber sale? (Depends on Market Conditions)

If it is worth sitting on vs. paying interest.

Operating seasons play a big part in when & what sales to purchase.

We don't buy sales; we buy logs from sale producers.

Variety of terms best meets our needs.

I would like to see more "scale or tonnage" sales to reduce risk to logger from market conditions.

Depends on sale size. We would not be able to use more than 4 to 5 million per year from one contract.

We will back a DNR bidder with a support price for cedar logs. The shorter the term the less risk of exposure to cyclical and falling markets.

10) What type of timber sale do you prefer? (Other)

Ton wood is best for small sort logs.

We would prefer any of above as long as the cash requirement is not too high.

Gatewood.

Each method has its place – scale sales seem the most useful due to increase in leave trees & wildlife clumps & large RMZ. Which make it hard to determine total volume & acreage. I do feel DNR needs to use both mbf on bid species & ton scale on minor species in a sale contract.

21) If the state forestlands were to become certified would state logs become more valuable to your company than logs from uncertified forests? (No)

Not sure.

A percentage of our customers prefer certified wood.

For years it's been shown consumer would not pay more so money would have to come out of sale profits.

That's not what we should do for the trustees.

If the mills that we sell to will pay a premium we will pay more for certified timber.

No value to finished product at this time.

No \$ premium for Green logs or lumber, but certification increases markets.

Too expensive to keep track of and keep separate. Our markets do not care or require certification. Really is a paperwork nuisance and nightmare.

No added value in market place.

No one pays a premium for certified wood. It probably would cost more to operate a certified timber sale so bids would reflect that.

Depends on the requirement from our buyers.

Currently our company does not sell certified lumber therefore we are indifferent to certified logs.

We have yet to see a market premium for certified lumber in the markets we sell into.

Not important for the markets we sell into.

Just because the forest is "certified", does not increase the value of the log or the value of what is produced from that log.

Guy Bennett Lumber Co is SFI certified and we believe it is important. However there is no increase in the value of our lumber because we're certified.

The lumber market does not reflect a premium from certified forests.

There is no demand for it. We do not get asked for certified wood.

We do not see more money from certification, just more markets in down times.

The market place provides no extra value for certified products.

We are SFI certified and as a company feel strongly about sustainability. However, there is not premium for certified products.

No market verification for claims of certified origin of lumber at this time.

The mills we sell logs to are not segregating yet—they may—they all ask if the logs come from cert. forest land.

As we talk with our customer base most do not care and are unwilling to support it financially. Needs more education at consumer level.

Certified logs are of equal value at current time.

Currently we have not seen an increase value of timber labeled as certified.

There's very little demand for certified lumber.

We are not certified but use certified contractors.

Just another layer of bureaucracy that wouldn't really increase demand in the long run - just cost.

There is no premium associated with certified lumber, the Washington FFR is sound; certification would be a waste of money for the DNR.

SFI certified logs are important to our lumber & paper buyers.

Typically, the lumber market forces and dictates log prices. We generally do not raise log prices from certified, non certified sources.

Our main customer "Home Depot" seems to want wood from certified forests but its not a condition of purchase of our lumber.

We do not find buyers asking or requiring certified lumber therefore we feel no advantage would be gained in price with certification.

Not yet - labeling is just around the corner – maybe then.

While some customers prefer or require certified logs – most do not and none pay a premium for them. This however could change.

We are not a conversion facility.

Lumber values remain the same whether Green certified or not. This should only be considered as an added cost to the seller at this point in time.

Supply and demand set values. The consumer has & will always seek the best \$.

Are you crazy?

It would eliminate a step, but we would not pay a premium for SFI or FSC certified logs. We can cover that with state FPA & certified loggers.

We've already conducted market/customer surveys on this issue and they're not going to pay more for certified lumber if there is a cheaper alternative.

We purchase logs based on current & projected lumber markets.

We are SFI certified have been for 4 years.

Saw mills are not willing to pay 10 cents more for certified logs. Consumers are not willing to pay more for certified logs – this is an advertising gimmick by the likes of "Lowe's & Home Depot". This would be a travesty.

Our customers will not pay the extra cost of tracking chain of ownership of products.

- 23) For the next few years the WADNR has made reduction of fire risk through thinning a management priority on state-owned east-side forests. This could mean an increase in availability of small diameter timber. Would your company be interested in expanding its use of logs from 3 to 6 inches in diameter if long-term supplies could be made available? (No)**

Logs too small.

We work on the west side.

Too small for our lathes.

(Yes) We would build a new barking system to handle this material.

Can not produce a marketable product from 3" & 4" logs and are very costly to run.

Mill that is in Tacoma uses large 12"+ logs. Mill in Beaver has adequate log supply.

No an end product user.

We might use 5" & 6" logs during good market periods.

5" limit.

The market will not support that action.

It would depend on the haul, but if lumber markets drop to the levels of last year, even with 0 stumpage, the handling costs are more than the product value for logs less than 4.5".

In addition to small log sawmill, we currently have to whole log chip lines which are used only 50% of the time due to limited chip markets.

Veneer values start at 7" & lumber values start at 6".

Because you're harvesting your future growth/supply.

We get enough.

We currently can use 5" & larger. But could not go down to 3" with making different products. Are any profitable at that size?

Logs less than 5" in diameter suitable only for fiber.

We are not a mill.

We would be very interested in a sort 5"+, this is our mainstay log.

The small log has little saw log value.

That size does not fit our mill.

(Yes) The minimum top should be no smaller than 5". With required removal at 5", rather than 3" we would utilize the additional resource in our Randle sawmill. (additional volume is need, but required utilization should be 5")

We would be interested in pulp. Our sawmills are too far away.

Our mill is set up based on an 8"+ small end log.

Our company uses a percentage of small cedar logs that we are currently getting from Canada.

Prefer 6"+.

We are not a conversion facility.

Manufacturing costs too high for value of end product.

Too small for our use.

4-6" is marginal. Most is chips and with low chip values, large investments in more are not likely. We get enough from fee lands anyway.

We're too far from these stands to economically transport these small logs to our plant. Also, currently not geared up for 5" & less diameter logs.

Does not fit our product line.

Not at this time.

3" - 4" too small for our mills.

We are not manufacturers. Right now the value of the logs does not justify the costs for thinning.

Material will not make poles.

24) What would you think could be the most likely use for these small diameter logs (check one or more)? (Other)

Whatever is the best use for the particular species and grade will dictate the use.

Lumber - 4" diameter log = 2 2x4.

Dimensional 2x4, 2x6, ships, poles.

In our experience pulp chips are the best use of this material, however to process the amount of biomass needed to restore our forests over a 10-20 year time frame, local biomass cogen facilities would be needed.

To grow into merchantable saw logs.

5" x 6" become 2x4s.

There will be a variety of qualities in this type of log. It won't be one size fits all.

The log under 5" has very little value to sawmill but can be utilized in various wood products. One of the main problems is how to remove bark on small logs and still be profitable.

Saw log value is minimal in 3-6 inch logs. Value is in chips & biomass.

These type of small diameter logs have virtually no lumber value.

Engineered glue lams.

Logs processed for chips must have bark removed. Equipment to do this on logs less than 3.5" is very expensive. Biomass is an option for very small trees but must be subsidized due to low market power prices in our area.

4" - 8" curve saw logs.

Would most likely chip all of the logs but some would probably end up using some for Biomass.

Very specialized harvest & very \$ - DNRs contractor send sawlogs to sawmill & pulp to chippers - this sale will probably result in cost to DNR. But what is cost of fire?

2x4s and 2x6s

Chips & EWP could be the same.

25) Has your company considered expanding capacity within the next five years? (Yes, explain factors important to company decision for investment in expansion)

(No) Due to uncertainty in timber supply.

Log supply of the quality we need to make FTR and MDD. Can't make clear faces out of small, rough logs.

New large log stud mill under construction.

Log supply and mill location.

A steady supply of wood so financing would be easier.

We are presently considering building a cogen plant w/partners.

We would consider taking our small log mill to 2 full shifts if adequate supplies of 6"-11" logs were available. Adequate for us means 25-30 MMBF.

Current upgrade under way.

Ongoing timber supply from the public trust.

Better layout less seasonal restrictions, scale sales.

Affordable raw material.

Dependable supply.

Market opportunities, resources availability, costs.

Log supply.

Resource availability.

Species diversification.

Timber supply!!!

Adequate log supply.

Washington has a timber base that is used for forest product production on both public and private lands.

- 1) offering more sales that are 250-300 MBF thinning sales.
- 2) Offering those sales on a scale or tonnage type.
- 3) Returning bid & performance bonds in a more timely manner.
- 4) Having contractors have points/ranking for their performance on previous timber sales.
- 5) Improving DNRs paperwork/change order time.

Availability of all species of logs.

Investment in debarking technology requires a more certain supply to be viable.

Log availability.

As always log supply and markets for our products are the primary considerations.

Adequate log supply.

Availability of adequate log supply.

Log supply, market conditions.

The market will dictate the values. Start small, see how it goes and expand with where the market is strongest.

Labor force, raw material, economic climate.

Timber supply not available.

Adequate log supply.

Large logs available.

Environmental issues at plant sites.

29) If you have other suggestions to improve the WADNR timber sale program for either the east or west side please offer them here:

More timber sales with winter time operating seasons on E & W side would be great.

More uniformity in the contract interpretation by region. More latitude in harvest timing and equipment. Use experienced not “green” administrators. Sell sales year round.

Forget about the “delivered log” sales. DNR is not capable of managing this type of sale and will lose valuable revenue even while their own number crunchers will show more revenue through bogus accounting & lack of understanding of the variables involved.

Pre-routed and short term scale sales.

Doing the best job on the west coast. Dept is well managed with thorough research and analysis of management options.

DNR has too many people producing too little, private sector does much more w/much less, doing the same thing. Big problem now is lack of expertise particularly in timber sales layout & admin.

In my opinion lump sum sales maximize revenue to the trust. Too many games can be played with scale sales (MBF & tons) and log sort sales.

Distance from our plants limits our interest to purchasing a delivered log. Contract administration and unfamiliarity with contractors are problems with distant sales.

Longer range timber sale programs, 2 yr planned volumes and areas to be harvested.

Scribner scale or weight scale only.

Have some of the smaller sales by oral auction.

The purchase of DNR sales are far too loaded with fees and taxes to ever know what price you actually are buying at. This needs to be addressed by DNR.

Timber sale cost and easements should be a one line figure.

Put up more, larger sales, more timber on the market.

Lump sum bidding is costly and therefore reduces our companies willingness to invest in the bid process. MBF or ton bids take less time and effort on purchaser’s part and are more attractive to us.

We are most likely to be able to bid on State timber when delivered, diameter/species sorted logs are offered.

Western Red Cedar needs to be made more available. Many do not wish to purchase the whole sale but want certain species like cedar which may only be 1% of the entire sale.

All thinning is a good investment but payback varies.

Consistent flow from Columbia/Garfield county. Not a large sale over 5 years.

Scale sales need to use ton value to sell minor species – example “hardwood species” in a D-fir stand – this would reduce need to scale MBF logs that aren’t saw material but fit contract required removal.

Hire foresters!!

Survey seems directed at west side, eh?

This is a good start. Keep the program as even flow as possible. Market timing rarely works over the long haul. Provide a wide array that best meets customer needs. Keep good cost data internally, then sell based on best returns to taxpayers, not how the bureaucrats think it should work!

Stop the contract ops, DNR marketing sales.

Audit of HCP. Make sure more timber than required is not being left for buffers.

Logging prices have not changed in 15 years. Prices for contract loggers would have to increase dramatically. To purchase more DNR timber there would have to be a small business program. We can not compete against the sawmill purchasers.

Offer more sales in spring and fall and less sales in winter.

ADDITIONAL COMMENTS

It seems most of the sales I preview have most if not all of the best timber set aside. For our plywood products we need quality, sizeable logs both cottonwood & fir.

FSC is an environmental organization disguising itself as an entity to help conservation, when it really only wants money to lock up more lands. I've told Doug Sutherland for years to forget certification and the state should just certify itself "Evergreen Certified". Forget certification – but if it is to be considered Sustainable Forestry Initiative should be looked at.

Too much alder is being buffered when the HCP should release, and account for, put up more alder sales also – they are there.

Changing the contract so title passes when logs are scaled reduces the risk to the purchaser. Oregon Dept of Forestry sells this way without problem. WA needs to do this. The convoluted and unclear amounts of deposits and WA taxes are a deterrent to purchasing WA state timber. Also the need for payment on the date of sale makes it tight to comply.

The DNR is slowly turning into an unyielding bureaucracy like the USFS. In order to remain profitable the DNR needs to avoid the pitfalls of the USFS and keep the chain of command short with managers that are empowered with authority to make decisions on the spot.

Make Specific Species available for sale. It should be easier for buyers to purchase "what they want" from the state forests. The state should bid out logging, hire contractors, and deliver logs to various mills. These logs could be bid on a monthly basis or by quarter. Many mills do not want to extend their log pricing for long periods of time. This way the state gets top dollar during periods of high prices and allows prices to drop and not put small mills in position of large losses as markets drop. Large sales are too speculative since it may take too long to remove entire sale.

Market conditions & operating losses have changed our ability to bid on state timber sales due to cash requirements. If markets continue the current trend we will once more be able to finance the sales. Small Timber can best be utilized by smaller mills closer to the harvest sites. This is not the current situation. We need to survive in spite of increased unit costs to be here for the thinning sales in the future.

I encourage DNR to use the reduced ton \$ in their scale contracts to allow pulp wood to move off sale area. Not a big money maker for trust but utilizes resources & helps TBR dependent communities & mills like ours.

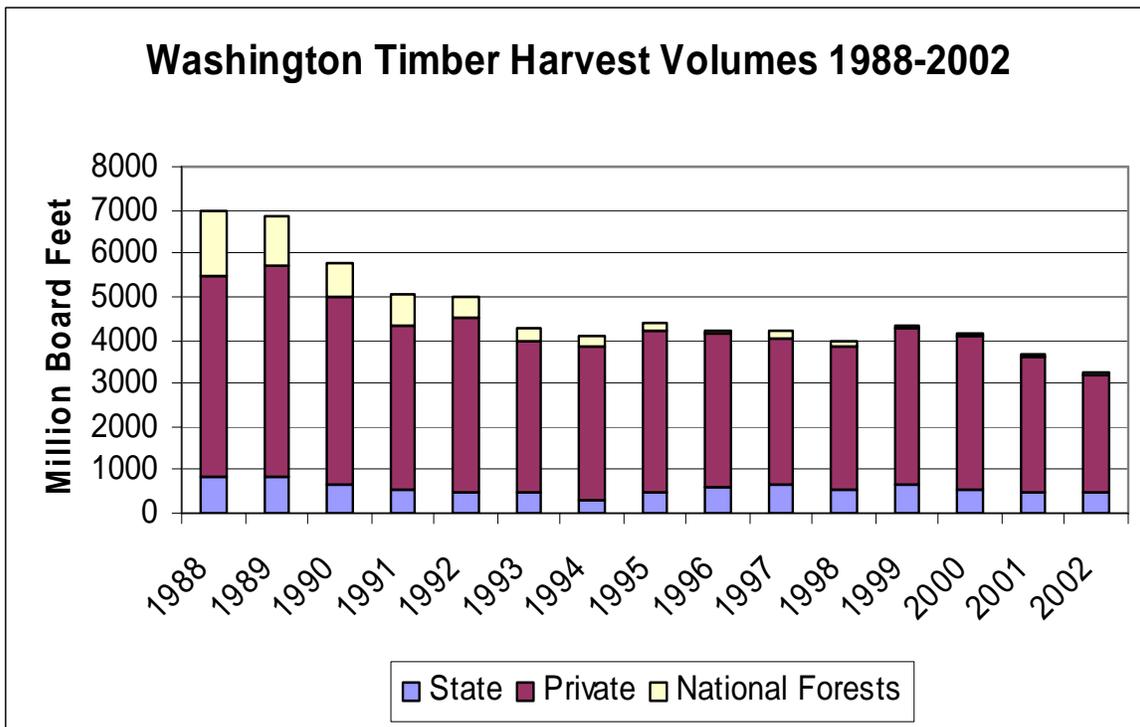
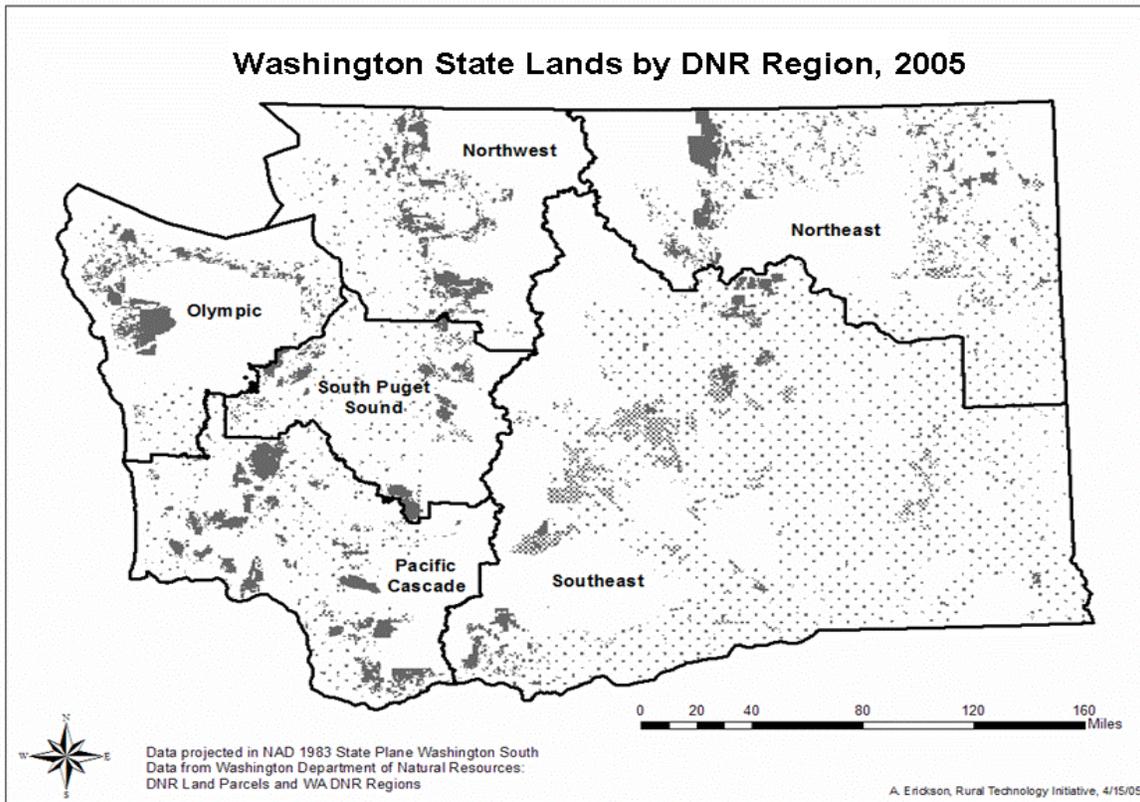
Why would DNR have to ask for certifications? Doesn't the sustained Harvest Calculations give all data needed to Cert. Also operating under HCP should be cause enough to give DNR a stamp of certification. I feel it would be waste to travel down the road to get 3rd part Cert. For those that think DNR needs certified I say "Good God go look at what DNR is doing".

We have some interest but we may be too far inland to be competitive (Clearwater Forest Industries, Kooskia, ID)

Add appraisal sheet to timber sale packet. Includes –logging, -hauling, -roads, -projects, etc.

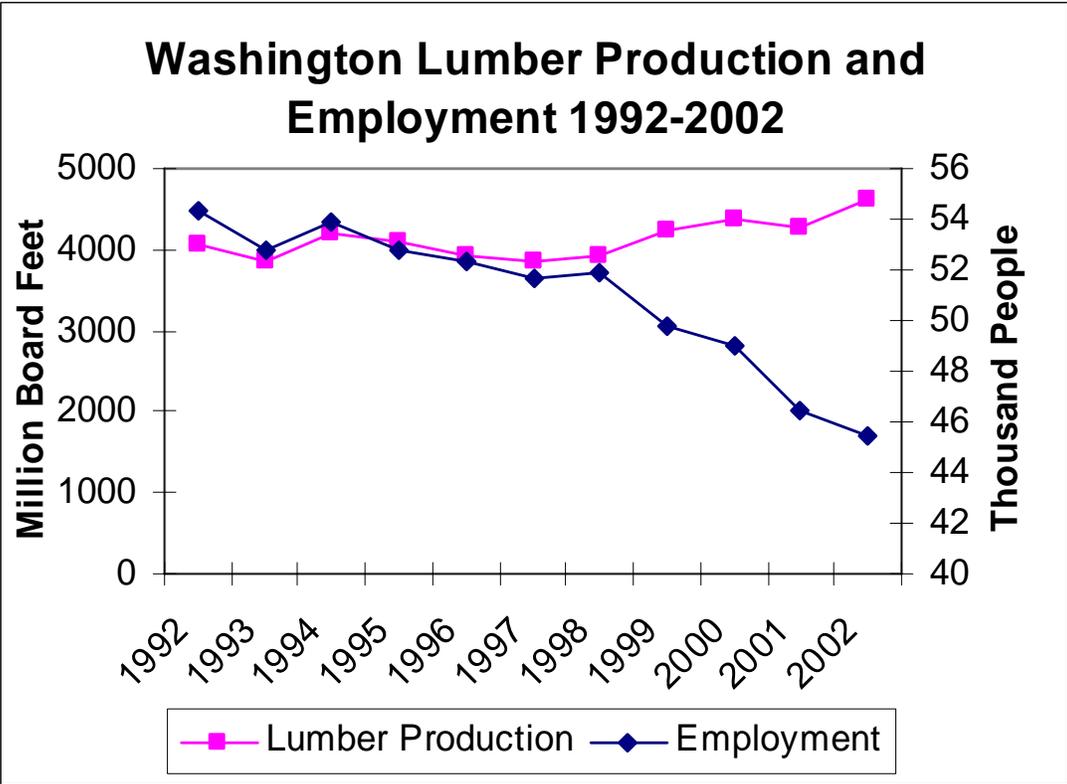
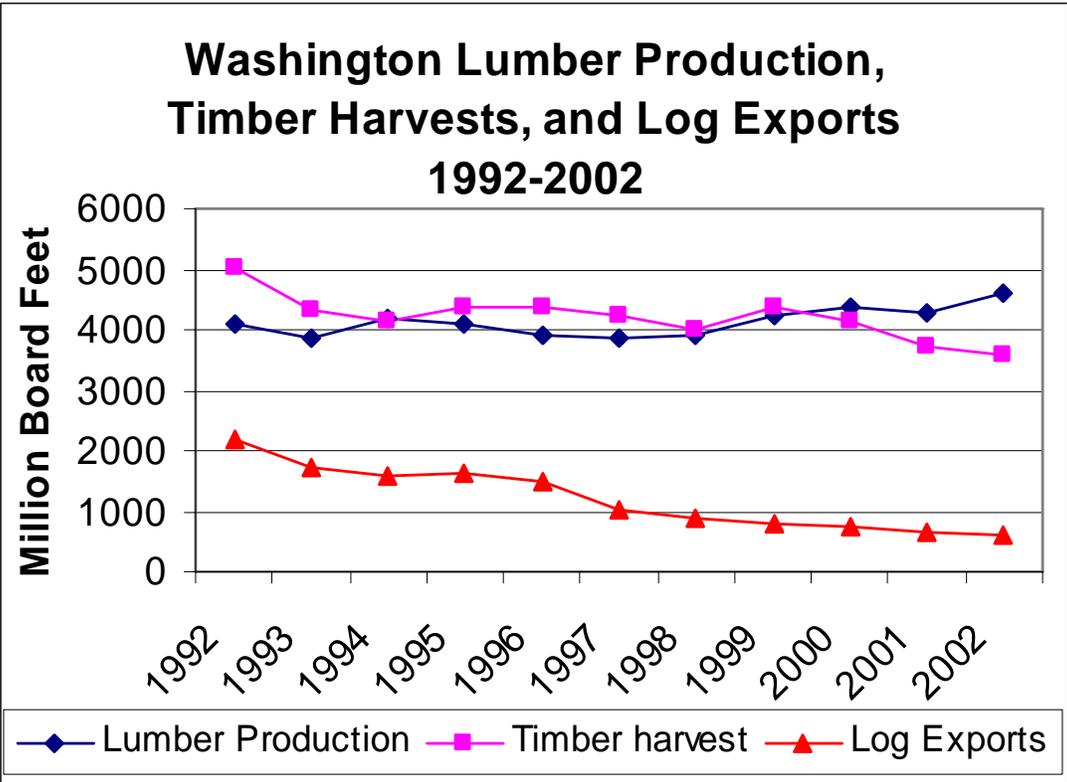
Kudos to RTI!! You guys have done some great work and your research and statistics have helped me on several projects! Good presentation at the Olympic Logging Conference.

Appendix D: Lands and Harvest



Source: Washington Department of Natural Resources

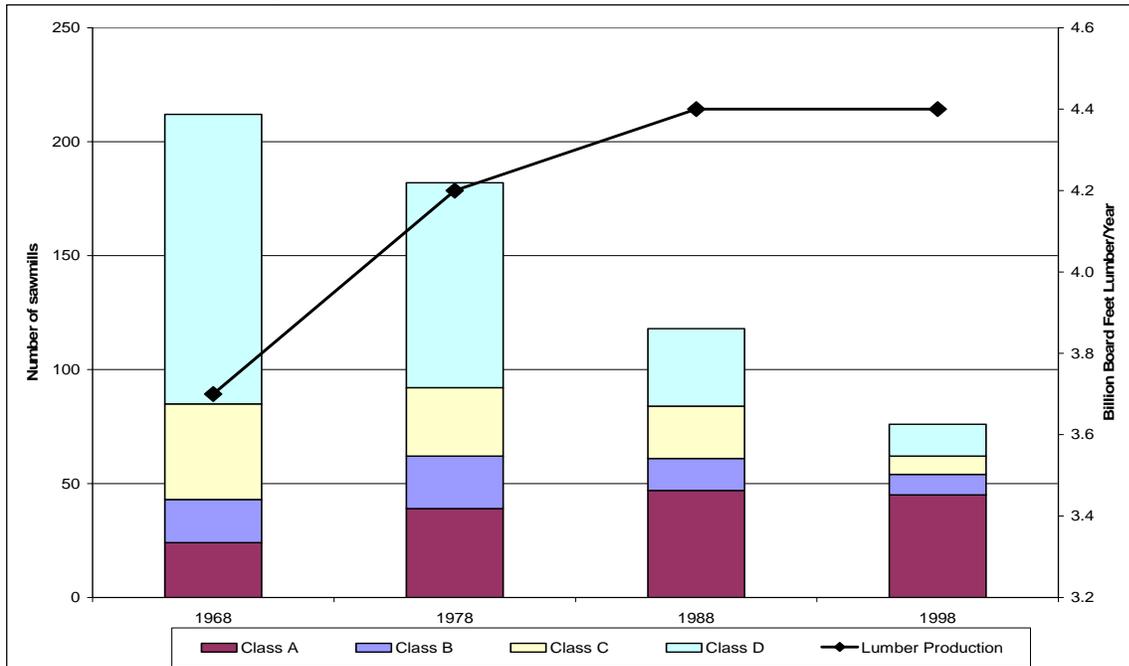
Appendix E: Harvest Production and Employment



Source: Warren 2004

Appendix F: WA Sawmills

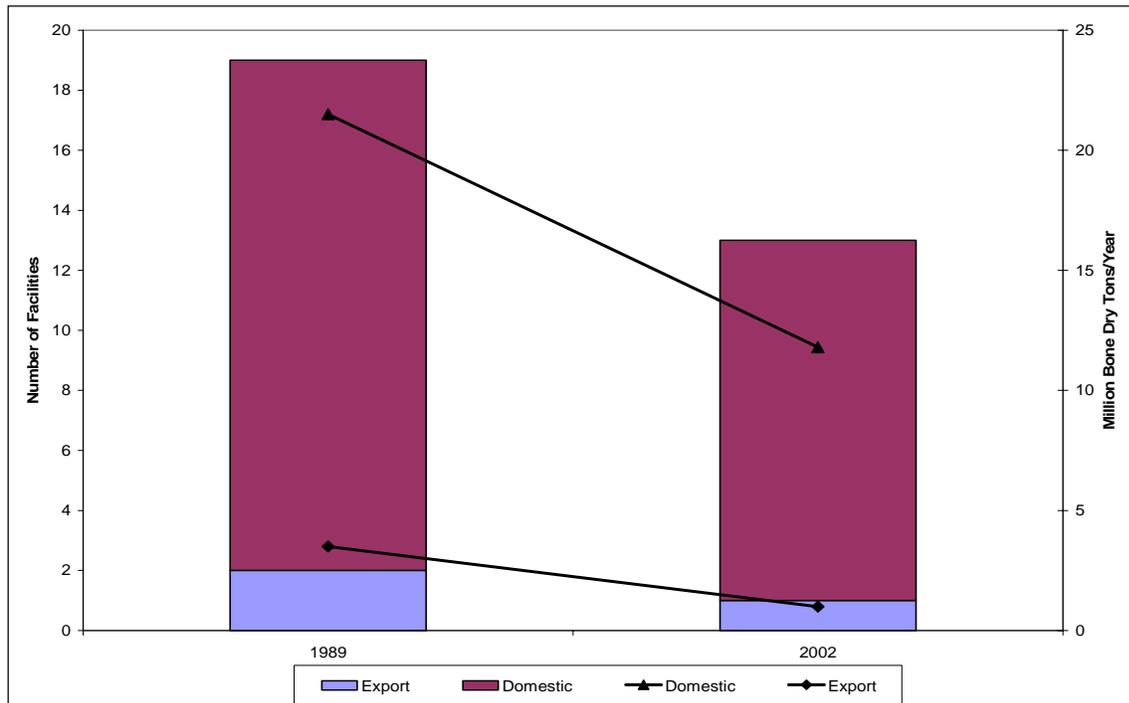
No. of WA Sawmills by Size Class & Total Annual Production 1968 - 1998



Source: Perez-Garcia 2005, Warren 2004

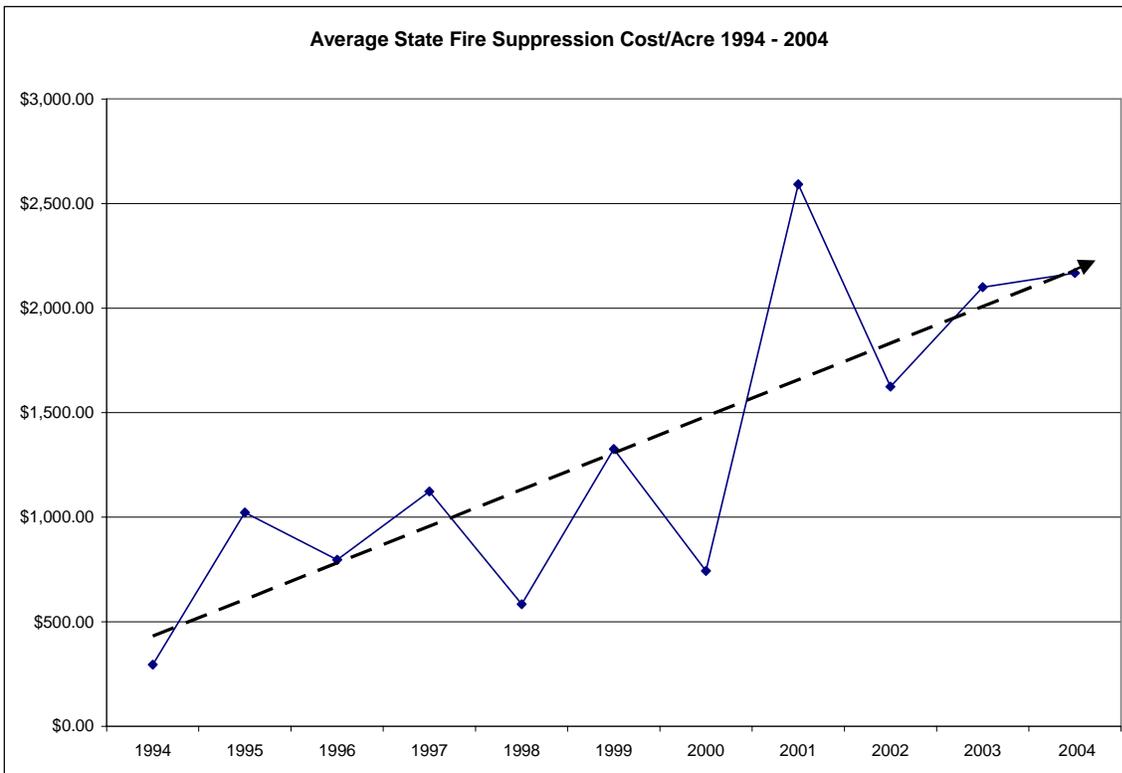
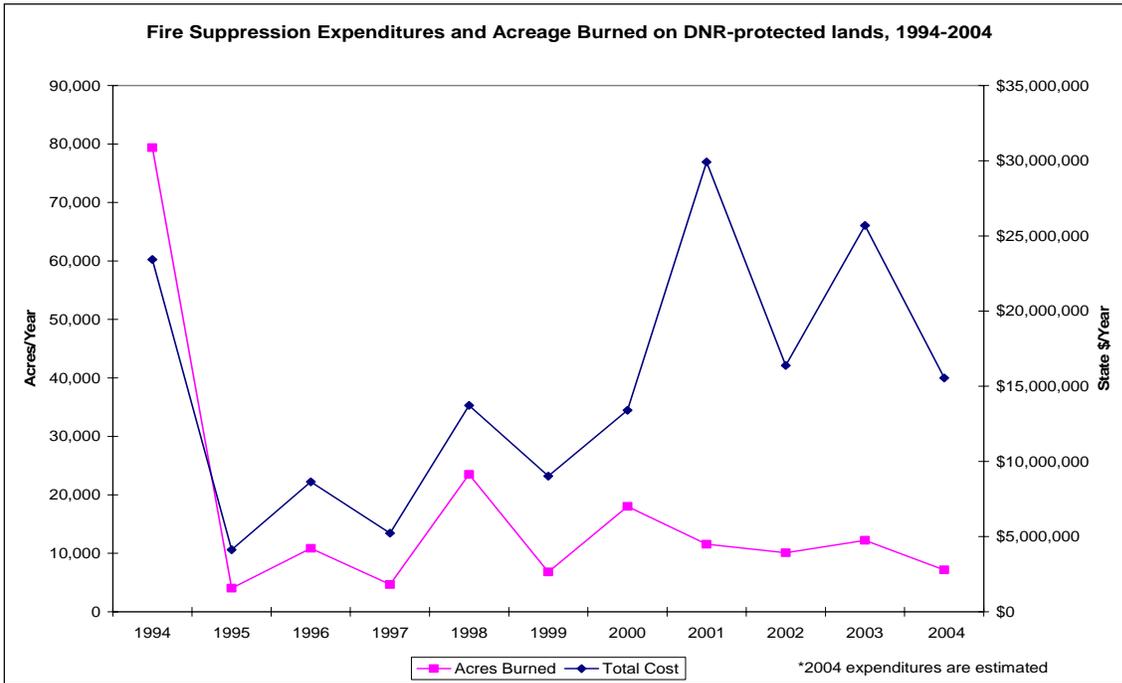
Class D mills produce less than 10MMBF/Yr; Class C mills produce 10-20 MMBF/Yr; Class B mills produce 20-30 MMBF/Yr; Class A mills produce greater than 30 MMBF/Yr
 Source: Bergvall and Gedney 1970; Bergvall et al. 1979; Larsen 1992, 2003.

No. of WA Pulp Mills & Pulp Export Facilities and Total Annual Production 1989 – 2002



Source: Bremer 2000

Appendix G: Fire Acres and Expenditures



Source: Washington Department of Natural Resources

Appendix H: Forest Certification

Forest Certification

American Tree Farm System

<http://www.treefarmssystem.org/>

The American Tree Farm System® (ATFS), a program of the American Forest Foundation, is committed to sustaining forests, watershed and healthy habitats through the power of private stewardship. Information on special events, landowner assistance, conservation projects, tree farm merchandise, and more.

Forest Certification Resource Center

<http://www.certifiedwood.org/>

On-line global database of Forest Products Council certificates. Comparison of certification alternatives.

Forest Stewardship Council

<http://www.fscus.org/>

Forest Stewardship Council (FSC) is a non-profit organization devoted to encouraging the responsible management of the world's forests. FSC sets high standards that ensure forestry is practiced in an environmentally responsible, socially beneficial, and economically viable way. Information on certification, standards and policies, buying and selling, and more.

Smartwood

<http://www.smartwood.org/>

SmartWood's purpose is to improve forest management by providing economic incentives to businesses that practice responsible forestry. SmartWood is a program of the Rainforest Alliance, a global nonprofit conservation organization.

Sustainable Forestry Initiative

<http://www.aboutsfi.org/about.asp>

The Sustainable Forestry Initiative program provides a standard of environmental principles, objectives and performance measures that integrates the growing and harvesting of trees with the protection of wildlife, plants, soil and water quality and other conservation goals.

Meridian Institute

Comparative Analysis of the Forest Stewardship Council (FSC) and Sustainable Forestry Initiative (SFI). 2001. <http://www.merid.org/comparison/>

At the request of The Home Depot Company (THD), the U.S. Forest Stewardship Council (FSC), and the Sustainable Forestry Initiative (SFI) of the American Forest & Paper Association (AF&PA) Meridian staff convened and facilitated a panel of experts to produce a comparative analysis of the FSC and SFI programs, across several subject areas, including origins, objectives, governance, standards, public involvement, accreditation, funding and the use of program logos and product labels.