# C I N T R A F O R

**Working Paper 97**

# Resource Inventory, Market Assessment and Analysis for Forest Products in Clallam and Jefferson Counties

**John Perez-Garcia**

**March 2005**

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Technical Editors:  Clara Burnett, Angel Ratliff

## EXECUTIVE SUMMARY

This project was established to examine current viable opportunities for the expansion of the wood products industry in Clallam and Jefferson counties. The study updated existing and future harvest level projections in Clallam and Jefferson counties, highlighting the potential new supplies. It also examined precommercial thinning volumes on state and federal lands. The harvest level findings are used to complete an analysis including the flow, species and size of the raw material supply required to manufacture value-added products. Three opportunities are explored: Oriented strand board production utilizing harvest and current manufacturing waste material, biomass-based energy production, and second tier value-added products from production of random length alder.

We projected harvest levels using timber harvest data by grade and species provided by the Department of Revenue Timber Tax Division and the Department of Natural Resources Marketing Division. These data provided a breakout of average volumes per acre by species and grade observed for timber sales in 2004. We applied the average volumes per acre to a projection of harvest acres constructed by Atterbury Consultants and published in their report for the council dated 2000. The analysis of the sales data indicated an average volume of nearly 40 thousand board feet (mbf) per acre. The majority of this volume is in #2 and #3 sawmill logs; over 15 mbf in each log class. The next highest volume is in the #4 sawmill log with 7.5 mbf. The greatest volume per acre is in western hemlock with over 15 mbf, followed by Douglas fir with 8.8 mbf. An estimated 8,070 acres are harvested annually during the projection period 2000 to 2004. Using the per acre averages calculated above we determined annual harvest levels to reach 322,265 mbf during this period. For the period 2015 to 2020, harvest acres are projected to reach 8,618 with an estimated annual harvest level of 344,148 mbf.

The majority of the annual harvest level during the period 2000-2004 is in #2 and #3 sawmill logs, over 300,000 mbf equally distributed. Western hemlock annual harvest levels are 124,236 mbf, followed by Douglas fir with 71,293 mbf. Red alder annual harvests are estimated at 22,849 mbf during the period 2000 to 2004.

Timber consumed by local mills amounted to 122,033 mbf for 2002, with an estimated slightly higher consumption for 2004. Total consumption of Clallam and Jefferson county timber by Washington sawmills reached nearly 230,000 mbf in 2002. Over 90,000 mbf of timber is exported to mills located in other Washington counties. The majority of this timber flow, about 77,000 mbf went across the Puget Sound to Whatcom, Skagit, Snohomish, King and Pierce county mills.

The annual volume of precommercial thinning is estimated at 125,000 to 180,000 green tons from federal and state lands. The majority of this thinned material is on State lands involving 4,000 to 6,000 acres annually for the next decade. The majority of the thinning volume is not commercial due to restrictions imposed by terrain conditions that lead to prohibitive harvesting and extraction costs.

Oriented Strand Board (OSB) represents a product that utilizes low grade materials to produce a substitute for plywood. First generation OSB manufacturing plants were about 50 million square feet 3/8 inch basis in size. Newer generation plants (continuous flow) are much larger in size; the latest plant capable of producing 800 million square feet 3/8 inch basis. The majority of new plants have a capacity of 500 million square feet 3/8 inch basis. Resource availability converting the volume of #4 sawmill and utility grade logs into chip materials was estimated at 492,000 green tons, or about enough material to produce 313 million square feet 3/8 inch basis of OSB. At most the projections reached 335 million square feet by 2020. Since the volume of required materials is much smaller than what a competitive new facility would consume, the potential for a new OSB plant in the region was determined early on during the study to be non-existent. Other limitations were also evident including the lack of sufficient hardwood resources, and the fact that current uses of chip materials and lower-sized saw logs would decrease the availability of raw materials to the new plant.

Biomass-based energy can be produced by burning wood waste. To evaluate this option we first determined the fuel value of materials in the region. If a sufficient fuel value was present, we then estimated the competitiveness of the material for use in energy production. To determine the fuel value of the materials in the region we estimated the size of a potential power plant by converting the volume of #4 saw mill and utility logs into green tons. This conversion indicated that the power plant sizes could ranged from 37 to 45 megawatts, representing substantial amounts of energy production. We then calculated the competitiveness aspects of the material if it were used to produce energy. Plants of these sizes in Vermont purchased chips at a price that ranges from $12 to $21 per green ton, a price that is substantially lower than current chip prices paid by local pulp mills, and lower than estimated harvesting and delivery costs (about $35 per dry ton). In addition the low price per kilowatt hour (about $0.03) acts as a disincentive to utilize woody biomass as an energy source. These calculations indicate that wood as an energy source is uncompetitive with current energy pricing. Also, harvesting and delivery costs are still too high for woody biomass to be viable, even if supply is not a constraining factor.

The utilization of red alder has increased dramatically, and the projected start of a new alder mill in 2006 suggested analyzing potential value-added products such as cabinetry, furniture and door manufacturing. We conducted interviews with the new mill manager and regional end-users of alder and determined constraints associated with attracting a value-added facility to the region. The constraints identified during these interviews included the inability to diversify products should a new manufacturing plant focus exclusively on alder. Various wood species are used in cabinetry, door and furniture manufacture. Currently alder is well received, but demand is highly responsive to changes in consumer preferences. Diversification of various species is perceived to be an important aspect of a successful end-user. The success of a value-added manufacturer will depend on its ability to utilize various sources of lumber and other materials.

Our study findings included the following. The two county region is a net exporter of wood fiber. The recent announcement of plans for a new sawmill in the Everett area suggests that wood fiber from the area will continue to have demand outside of the region. Less than half of the volume harvested is utilized locally by saw mills, even with the projected new mill in Port Angeles. Biomass-based energy has the potential supply, but costs for woody biomass as an energy alternative are too high and energy prices are too low for it to be competitive. Other fiber using industries, such as OSB, would require more fiber than is available. Finally, an alder value-added manufacturing plant would require diversification for it to be successful.

We recommend that future work analyze the potential for expanding the existing softwood lumber sawmill capacity in the region. The volume of sawmill logs that are exported from the area is estimated at less than 100,000 mbf and is insufficient for a modern large mill, which can be twice as big. Expanding the sawmilling capacity of the existing mills may provide benefits for the local region and enhance their competitiveness with mills outside of the region that currently successfully bid for local timber. The announced plans for a new mill in the Everett area suggests an evaluation of timber values for the region and its competitiveness. An analysis currently underway to examine these values should be consulted when completed. While woody biomass is currently too costly, options should be explored for promoting “green energy” options. Finally, since the region is an excess supplier of timber, it should promote its position in order to attract potentially new manufacturing that can consume underutilized resources and compliment the existing milling infrastructure in the area.

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## 1.0 INTRODUCTION

This project was established to examine current viable opportunities for the expansion of the wood products industry in Clallam and Jefferson counties. Harvest levels have stabilized in recent years since the decline in activity associated with the restrictions in logging led to the closure of lumber, plywood, and pulp mills. There is a perceived gap between potential harvest levels and local demand, particularly for lower-valued, smaller diameter trees. Possible new products that utilize the available resources were explored in this study.

The objective of this report was two-fold. The first objective was a resource inventory for Clallam and Jefferson counties. The report provides an update of the existing and future harvest levels for these two counties. The study projected the flow of timber products, including species and size of the raw material required to manufacture value-added products once harvest levels were determined. Current resource utilization rates by local mills are presented.

The second area of study consisted of product identification and market assessment. In this section the report analyzed potential value-added products that might attract a manufacturing plant to the Clallam or Jefferson county area. Several specific products were discussed. These products were identified after various meetings with the Forest Resource Industry Cluster Group in Port Angeles. They included bioenergy, alder valued-added manufacturing, and Oriented Strand Board. Monthly meetings from August to December 2004 with the Forest Resource Industry Cluster team were held during the development of this report.

## 2.0 THE HARVEST LEVEL AND FLOW OF RAW MATERIALS IN CLALLAM AND SURROUNDING COUNTIES

This phase of the work consisted of reviewing and evaluating existing projections of harvest levels for Clallam and surrounding counties. This project builds on the Atterbury Consultant's Report completed for Clallam County in 2000. Other reports that have published estimates of annual county removals for Clallam and Jefferson counties were consulted, but the Atterbury Report contained reasonable estimates of harvest level projections and also contained estimates of harvested acres. The report however did not have the information that would allow our study to determine both the species and log grade associated with the projected harvest levels. Both species and log grade information were required for the second section of this report.

### 2.1 PROJECTING SPECIES AND GRADE OF TIMBER HARVESTED

We used timber cruise data reported for individual timber sales from the Department of Revenue Tax Statistic Division and the Department of Natural Resources Marketing Division to determine the species and log grade breakout associated with harvest levels. An initial attempt using these data was successful, but the data at hand was dated, so a request was made to the Department of Revenue for their most current data and these data were then used to construct per acre volumes by tree species and log grades for Clallam and Jefferson counties.

Data identified from 1997 to 2004 were provided by the Department of Revenue. An analysis of these data indicated higher per acre volumes for earlier sales data (Figure 2.1.1). Average volume per acre for 2004 was close to 40 thousand board feet (mfb). Consultation with local industry leaders suggested that this average volume per acre reflected current stocking levels. We used the most recent year of sales data to estimate the average volume per acre by species and sawmill grade. The average volume per acre for Clallam County was calculated using 13 final harvest sales reported for 2004.

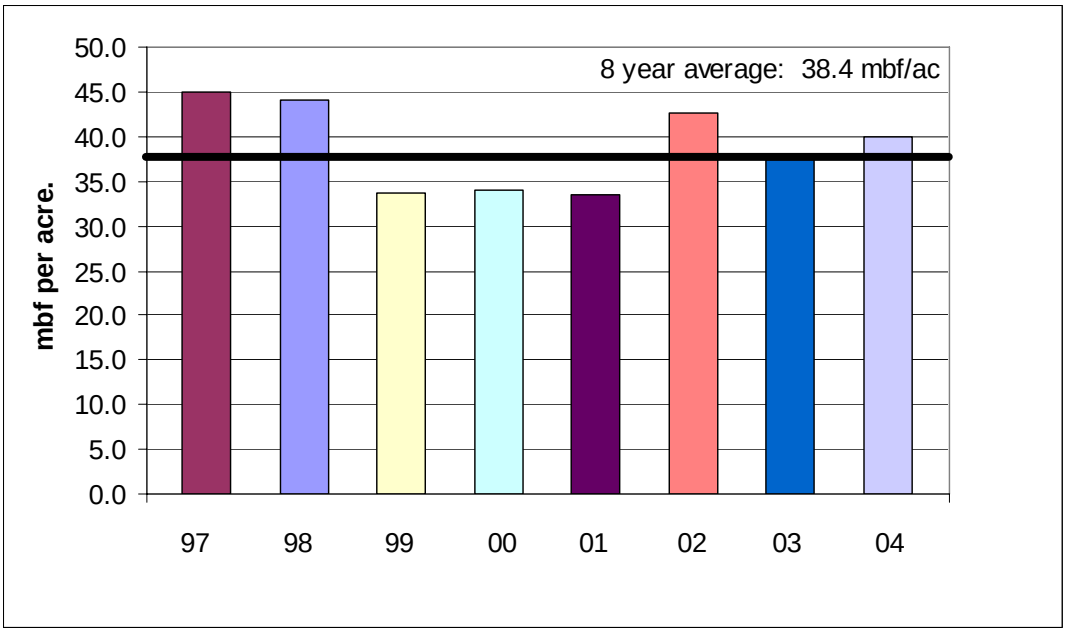



**Figure 2.1.1. Per acre volumes for Clallam County sales from 1997 to 2004.**

Sales data were also analyzed for changes in log grades over the period 1997 to 2004. Figure 2.1.2 suggests a downward trend in #2 sawmill logs, with a slight trend upwards for #3 sawmill logs and a more defined upward trend for #4 sawmill logs. We observed variation in volume over the time period however.

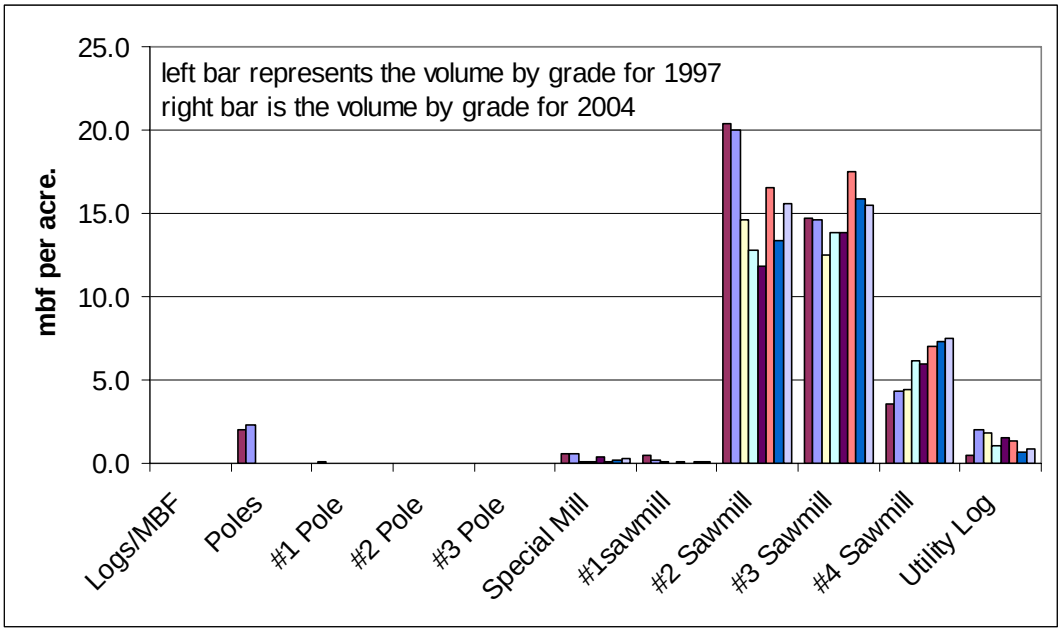



**Figure 2.1.2.** Per acre volumes for 1997 to 2004 by sawmill log grades.

The sawmill log grades are defined as follows. Special Mill log grade is a log with 6 rings per inch minimum in the outer portion, a minimum scaling diameter of 16 inches and minimum log length of 17 feet. The No. 2 Sawmill log grade has no minimum rings per inch, a 12 inch minimum scaling diameter and 12 feet minimum length. The No. 3 Sawmill grade differs from the No. 2 in the minimum scaling diameter: 6 inches. The No. 4 Sawmill differs with a 5 inch minimum scaling diameter.

The species volume per acre differences between years was also analyzed (see Figure 2.1.3). There appeared to be a slight increase in the volume of western hemlock from 1997 to 2004. Douglas fir volume per acre was trending downward until 2004.

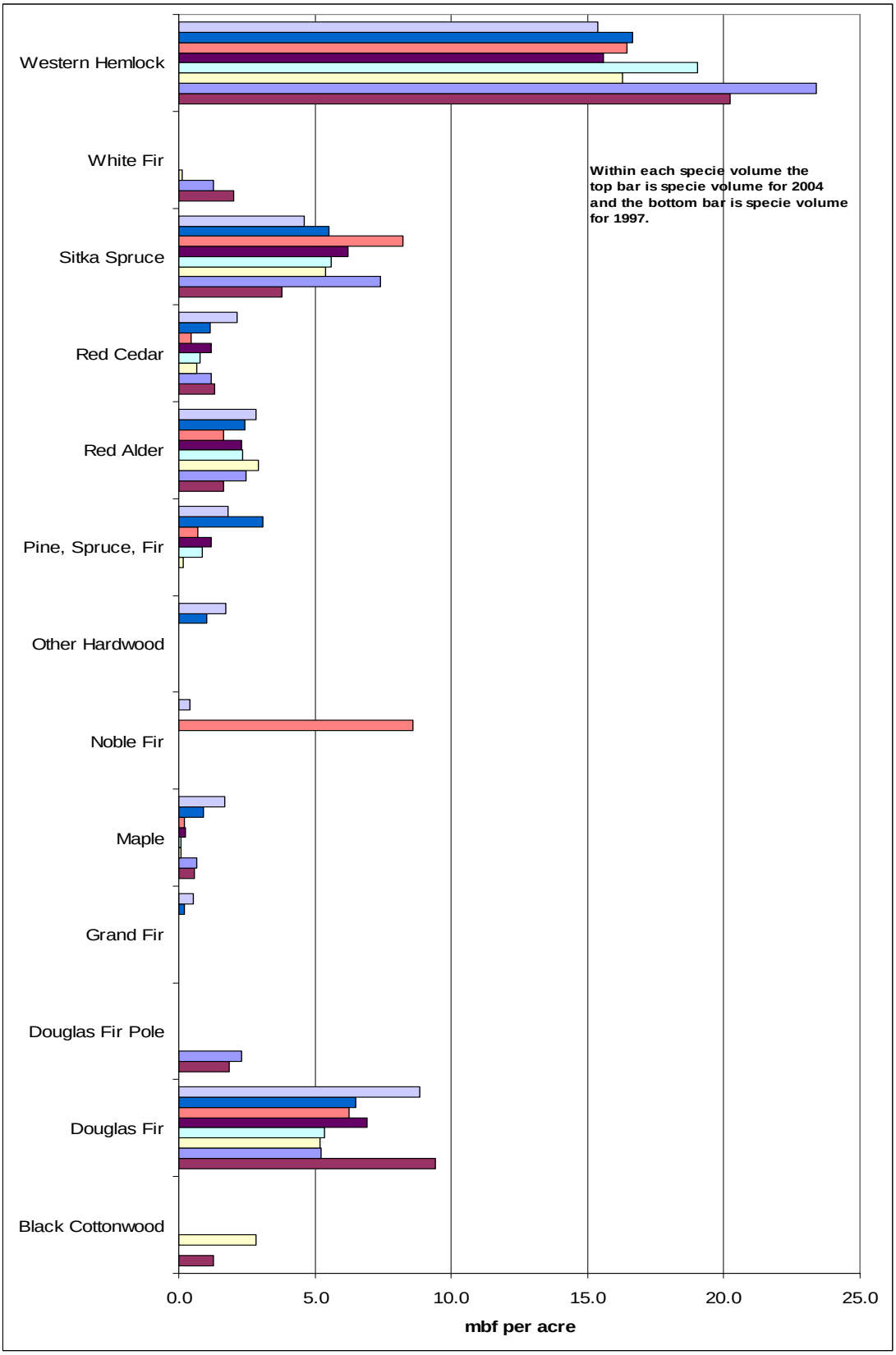



**Figure 2.1.3**. Species volume per acre from 1997 to 2004.

**Table 2.1.1.** Breakout of volume per acre by species and sawmill log grades.

| Species | #3 Pole | Special Mill | #1 Sawmill | #2 Sawmill | #3 Sawmill | #4 Sawmill | Utility Log | Total by Species |
|---|---|---|---|---|---|---|---|---|
| | Mbf Scribner Log Scale per Acre | | | | | | | |
| **Douglas Fir** | 0.035 | 0.192 | 0.060 | 4.390 | 3.361 | 0.665 | 0.131 | ***8.834*** |
| **Grand Fir** | -- | 0.058 | -- | 0.334 | 0.131 | 0.021 | -- | ***0.544*** |
| **Maple** | -- | -- | -- | 0.309 | 0.461 | 0.838 | 0.059 | ***1.667*** |
| **Noble Fir** | -- | -- | -- | 0.290 | 0.119 | -- | -- | ***0.409*** |
| **Other Hardwood** | -- | -- | -- | 0.343 | 0.274 | 1.097 | -- | ***1.713*** |
| **Pine, Spruce, Fir** | -- | -- | -- | 0.883 | 0.684 | 0.246 | -- | ***1.813*** |
| **Red Alder** | -- | -- | 0.066 | 0.350 | 0.547 | 1.651 | 0.217 | ***2.831*** |
| **Red Cedar** | -- | -- | -- | 0.333 | 1.347 | 0.424 | 0.017 | ***2.121*** |
| **Sitka Spruce** | -- | -- | -- | 2.702 | 1.416 | 0.397 | 0.091 | ***4.606*** |
| **Western Hemlock** | -- | 0.047 | -- | 5.635 | 7.160 | 2.179 | 0.375 | ***15.395*** |
| **Total by Grade** | ***0.035*** | ***0.297*** | ***0.126*** | ***15.569*** | ***15.499*** | ***7.517*** | ***0.890*** | ***39.934*** |

**Table 2.1.2.** Breakout of percent per acre by species and sawmill log grades.

| Species | #3 Pole | Special Mill | #1 Sawmill | #2 Sawmill | #3 Sawmill | #4 Sawmill | Utility Log | Total by Species |
|---|---|---|---|---|---|---|---|---|
| | Percent per Acre | | | | | | | |
| **Douglas Fir** | 0.09% | 0.48% | 0.15% | 10.99% | 8.42% | 1.66% | 0.33% | ***22.12%*** |
| **Grand Fir** | -- | 0.15% | -- | 0.84% | 0.33% | 0.05% | -- | ***1.36%*** |
| **Maple** | -- | -- | -- | 0.77% | 1.15% | 2.10% | 0.15% | ***4.17%*** |
| **Noble Fir** | -- | -- | -- | 0.73% | 0.30% | -- | -- | ***1.02%*** |
| **Other Hardwood** | -- | -- | -- | 0.86% | 0.69% | 2.75% | -- | ***4.29%*** |
| **Pine, Spruce, Fir** | -- | -- | -- | 2.21% | 1.71% | 0.62% | -- | ***4.54%*** |
| **Red Alder** | -- | -- | 0.17% | 0.88% | 1.37% | 4.13% | 0.54% | ***7.09%*** |
| **Red Cedar** | -- | -- | -- | 0.83% | 3.37% | 1.06% | 0.04% | ***5.31%*** |
| **Sitka Spruce** | -- | -- | -- | 6.76% | 3.55% | 1.00% | 0.23% | ***11.53%*** |
| **Western Hemlock** | -- | 0.12% | -- | 14.11% | 17.93% | 5.46% | 0.94% | ***38.55%*** |
| **Total by Grade** | ***0.09%*** | ***0.74%*** | ***0.32%*** | ***38.99%*** | ***38.81%*** | ***18.82%*** | ***2.23%*** | ***100.00%*** |

Tables 2.1.1 and 2.1.2 summarize the average breakout of volume and the percent distribution by species and sawmill log grades respectively. We estimated the harvest volume by multiplying the per acre volumes listed in Table 2.1.1 and an estimate of the acres to be harvested. The result of this calculation is presented in Table 2.1.3 for various estimates of harvest acres. The harvest acres are derived from the 2002 Atterbury Consultants report. Acres listed in Table 2.1.3 are for the Jefferson and Clallam county region in the aggregate.

**Table 2.1.3**. Projected harvest levels using acres under alternative scenarios.

| Harvest Description | Acres | Total (MBF) |
|---|---|---|
| All owners 2000 – 04 estimate with additional stream rules | **8,070** | **322,265** |
| All owners 2000 – 04 estimate with NO additional stream rules | **9,170** | **366,192** |
| All owners 2015 – 20 estimate with additional stream rules | **8,618** | **344,148** |
| All owners 2015 – 20 estimate with NO additional stream rules | **9,865** | **393,946** |

Sources: Acres are derived from Atterbury Consultants Report 2000.

The estimated annual harvest level for Clallam and Jefferson counties was 322,265 mbf for 2000 to 2004. This value was slightly higher than reported in the Atterbury Consultants report. They projected an annual harvest level of 277,000 mbf for the same period. Different data sources are responsible for the differences in the harvest levels projections. The average actual harvest levels in Clallam and Jefferson counties reported in the timber harvest reports by Washington Department of Natural Resource Timber Harvest reports was 300,000 mbf for the period 2000 to 2002.

The advantage of using the DOR sales data is that we can breakdown the harvest levels by species and sawmill log grades. Figure 2.1.4 illustrates the 2000 – 2004 annual harvest levels by sawmill log grade. These volumes follow directly from Table 1. The majority of the harvest volume is in the #2 and #3 sawmill grade logs. The #4 sawmill grade log, of interest in developing potential opportunities, amounted to 60,663 mbf. Along with the utility grade log, the harvest level projected suggested about 68,000 mbf in lower sawmill grade logs.

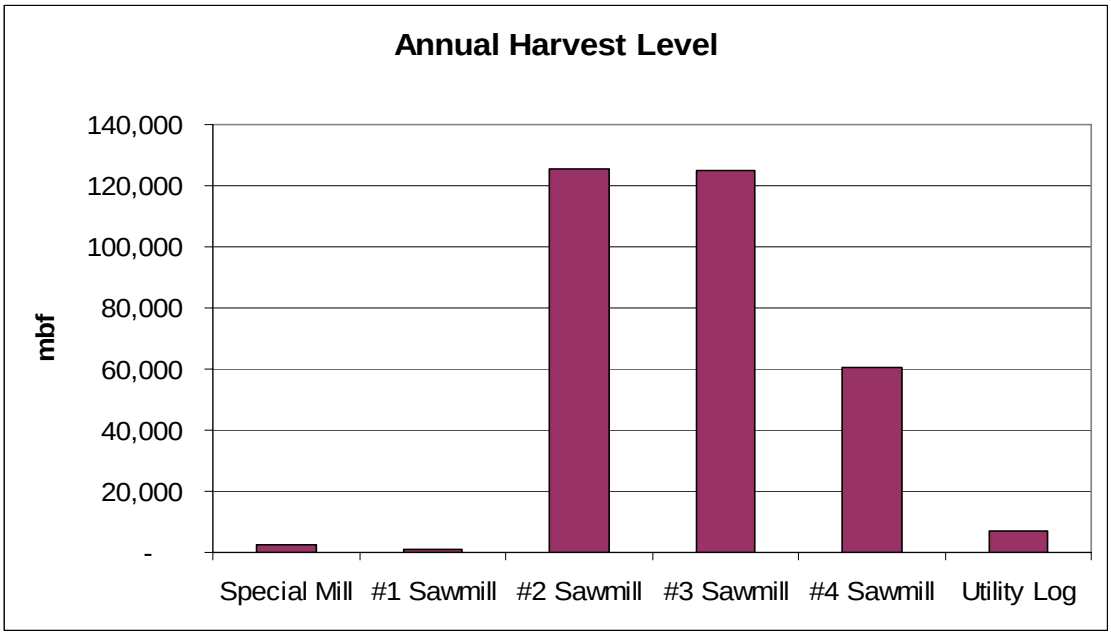



**Figure 2.1.4.** Annual harvest levels by sawmill log grades.

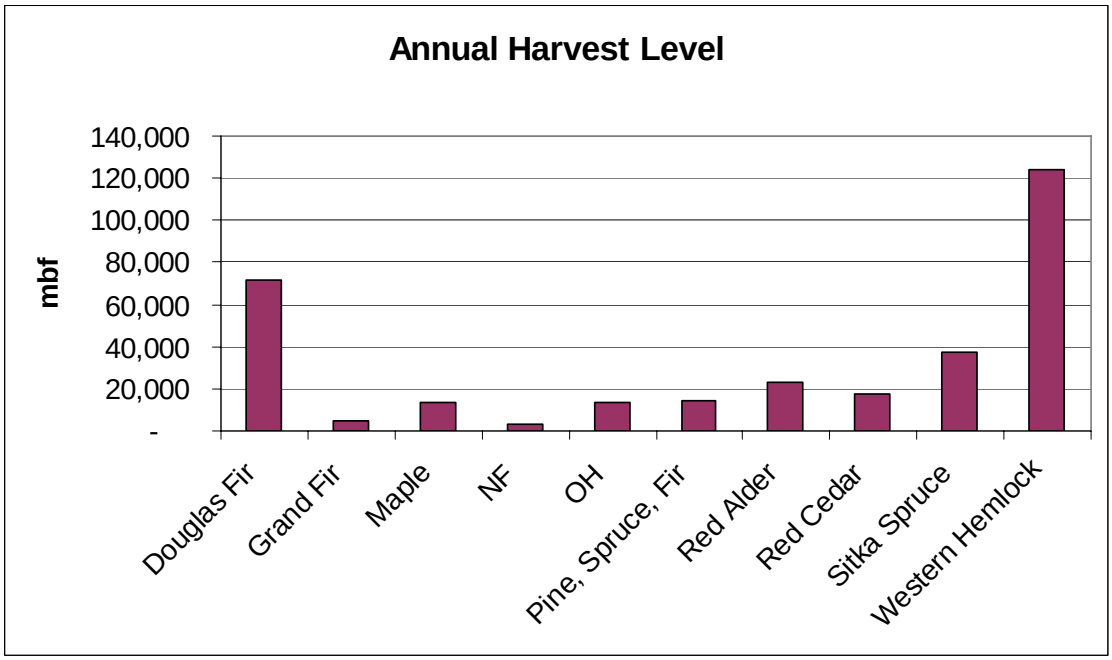



**Figure 2.1.5.** Annual harvest levels by species.

Figure 2.1.5 breaks out the annual harvest levels by species. These volumes follow directly from Table 2.1.1. Nearly 125,000 mbf was estimated to be western hemlock. There was another 71,000 mbf of Douglas-fir and about 22,000 mbf of red alder.

## 2.2 THE FLOW OF WOOD FIBER

The northern peninsula region has undergone a structural change since 1994 with respect to its harvest levels and utilization by local mills. While only a small fraction of the harvest was utilized by sawmills in the past, this condition changed drastically when public timber harvests collapsed. Prior to 1994, sawmills consumed the smallest percentage of the harvest levels. Other sectors including the pulp manufacturing, log exports and the plywood sectors have experienced greater declines than the sawmilling sector. This sharp decline is evident in Figure 2.2.1 where harvest levels are reported.

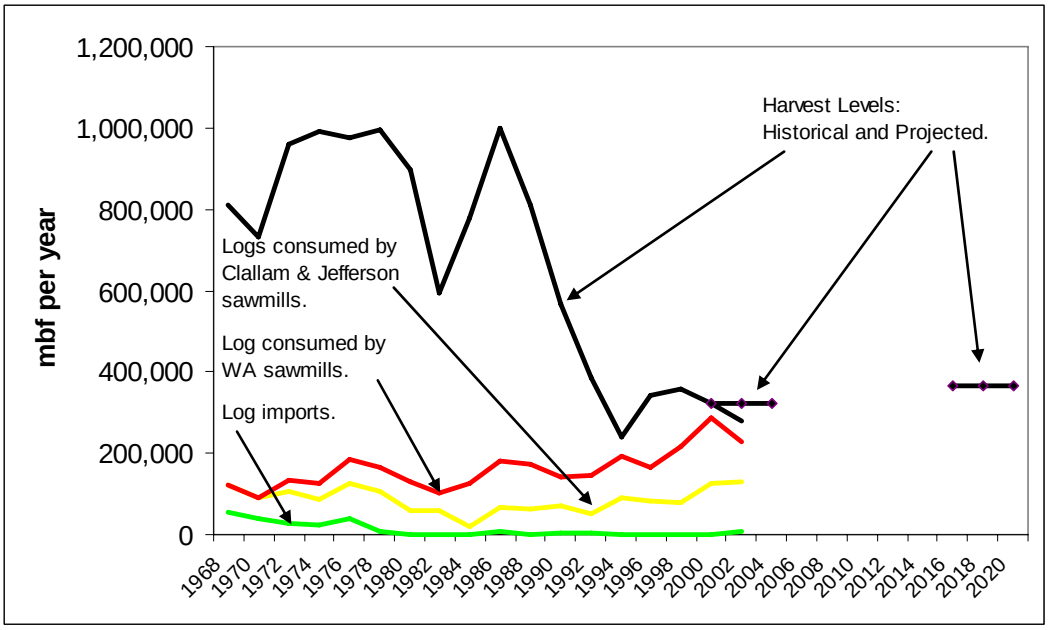



**Figure 2.2.1.** Clallam and Jefferson log harvest levels and amounts consumed by various sawmill.

Demand for wood fiber harvested from Clallam and Jefferson counties has become mainly a demand by sawmills. Figure 2.2.1 also indicates log consumption by local sawmills and compares them to log consumption by all Washington sawmills. From its low point in 1984, sawmills located in Jefferson and Clallam counties now consumed nearly half of the harvest volumes and over half of the volume that was used in sawmilling in Washington. Log consumption by Clallam and Jefferson county mills has shown a slow but positive long-term growth over the past two decades. The majority of Clallam and Jefferson counties sawmill logs not consumed by local mills was transported across the Puget Sound and was utilized by mills in Skagit, Whatcom, Snohomish, King and Piece counties.

About 130 million board feet were reportedly consumed by Clallam and Jefferson county mills in 2002 (WADNR 2002). With a new mill and a projected capacity to consume 25 million board feet of hardwood logs, the expected demand for local logs will surpass 150 million board feet, or about 40% of harvest levels. The region is likely to remain a major exporter of sawmill logs primarily to the Puget Sound and northern county mills. Figure 2.2.1 also presents the projected harvest levels estimated at 322,265 presently and growing to 344,148 mbf by 2020.

The availability of public timber volumes have declined over the course of two decades. We examined the potential for some volume associated with pre-commercial thinning operations on acres that have been neglected over the past. On Department of Natural Resource lands, there is an estimated 4,000 to 6,000 acres annually that require management over the next decade. The U.S. Forest Services estimates an additional 1,000 acres annually that are in the precommercial thinning conditions. There is a range in the volumes per acre, but a midpoint estimate was 5 mbf per acre or about 25 to 30 green tons per acre. We estimated that, at a minimum, there was an additional 125,000 to 180,000 green tons per acre available from precommercial thinning operations. There is currently no market for this material since these sites are difficult to harvest, which substantially increases harvest and delivery costs to the point where current prices are insufficient to cover their costs. It is unlikely that current economic conditions will permit this volume to become economical.

## 3.0 PRODUCT IDENTIFICATION AND ECONOMIC ANALYSIS

Part two of the analysis was to identify potential products that may be produced in the area utilizing the fiber resource currently considered underutilized. A preliminary list was developed and from that list several products were examined in some detail. These products included an Oriented Strand Board (OSB) facility, biomass for energy production and the potential for valued-added products from red alder random length lumber. Other potential products were discussed during meetings with local industry leaders, but were not pursued in this report. Several of these products discussed included compressed logs for firewood and biomass bales and parallel strand lumber, which should be considered further. In the following section we describe the results of the economic analysis and identify threats and barriers to the development of these products.

### 3.1 ORIENTED STRAND BOARD: A COMPETITIVELY-SIZED MILL IS LARGER THAN THE AVAILABLE RESOURCES

Initially, a wood composite industry, specifically an Oriented Strand Board facility, in the Clallam County area was explored. The steps taken to explore this possibility were to first calculate the potential fiber supply that would be available from the region. Then, this amount was compared with a potential plant size measured in production capacity of a plant. Finally, this plant size was compared to existing and new plants that have been recently established to examine the feasibility of attracting investments into the area.

**Table 3.1.1.** Volume of wood fiber by sawmill log grade under alternative acre scenarios and equivalent amounts in green tons and million square feet (MMSF) of OSB 3/8 inch basis.

| Harvest Description | Acres | Nos. 2 and 3 Grade Logs (mbf) | No. 4 and Utility Grade Logs (mbf) | No. 4 and Utility Grade Logs (tons) | OSB 3/8 inch basis (mmsf) |
|---|---|---|---|---|---|
| All owners 2000 – 04 estimate with additional stream rules | 8,070 | 254,421 | 67,844 | 491,869 | 313 |
| All owners 2015 – 20 estimate with additional stream rules | 8,618 | 271,697 | 72,451 | 525,269 | 335 |
| All owners 2000 – 04 estimate with NO additional stream rules | 9,170 | 289,100 | 77,092 | 558,914 | 356 |
| All owners 2015 – 20 estimate with NO additional stream rules | 9,865 | 311,011 | 82,934 | 601,274 | 383 |

Table 3.1.1 presents the potential volumes of fiber calculated from the projected harvest levels that we developed in the previous section utilizing the #4 sawmill and utility grade logs. These log grades are currently being utilized by sawmills for lumber production given the strong demand of current lumber markets. However, an estimate of the volume of wood fiber in these grades provides a first pass at potential wood fiber supply for an OSB plant in the area.

For a harvest area of 8,070 acres we estimated about 491,869 green tons of material available for an OSB plant. This volume of fiber translates into a plant size of 313 million square feet (mmsf) 3/8 inch. We assumed there are 1,570 green tons per mmsf 3/8 inch OSB. Average, planned new capacity of OSB in North America reported by PaperTree Letter (June 2004) is 500 mmsf 3/8 inch basis. The analysis suggested that there was insufficient material for an OSB plant to be competitive in the commodity market even if a new OSB plant could competitively bid away the #4 sawmill and utility grade logs from current uses.

### 3.1.1 Threats and Barriers

There is currently not enough fiber supply to support a small facility. OSB is a commodity product and substantial investments are needed to construct a plant. We conclude that the current fiber supply is insufficient to attract any new investments in the Clallam or Jefferson county region.

## 3.2 WOODY BIOMASS FOR ENERGY: ENERGY VALUES ARE TOO LOW TO COMPETE WITH CURRENT USES

A second product considered was bioenergy. The steps taken to explore this possibility were similar to the analytical steps used to evaluate a potential OSB plant. First, we calculated the potential fiber supply that would be available from the region. Then this amount was compared with a potential plant size measured in megawatt (MW) capacity.

**Table 3.2.1.** Woody biomass for energy (green ton basis)

| Green tons per year | Green tons per day | Size in Megawatts |
|---|---|---|
| 491,869 | 1,359 | 37 |
| 525,269 | 1,451 | 40 |
| 558,914 | 1,544 | 42 |
| 601,274 | 1,661 | 45 |

Source: MW size was taken from Primer on Wood Biomass for Energy (2001)
www.fpl.fs.fed.us/tmu/biomassenergyprimer.htm

Green tons per year are taken from Table 3.3.1. There is a similar argument with respect to competitive bidding for the material that holds here as it did with the OSB scenario. The high volumes for green tons per year corresponded to a scenario where no additional stream rules are put in place over the next 15 years. We noted that the fuel value of woody fiber was substantial when we converted it to a megawatt (MW) unit.

Having established this potentially large fuel value, our next step evaluated the economics of using this fiber for bioenergy. To do so we examined two case studies that were available to the author. Two power plants in operation in Vermont (a 50 and 20 MW electricity plant) reported the following cost for wood chips. They purchase chips at a price of $12 to $21 per green ton of whole tree chips. These chips represented lower quality chips as chips used for pulping are as much as $10 to $15 per green ton more. Their reported cost breakout was as follows: harvesting: $7 to $10 per ton; stumpage was $1 per ton; chipping was $4 per ton. Transportation was the most variable cost reported; typically chips were transported within a 50 mile radius of the plant. This scenario suggested that a power plant might be feasible utilizing lower-grade chips within a price range of $12 to $21 per green ton.

Further examination of the scenario included energy prices and the price that would make chip removals competitive. Recent research in Oregon (McNeil Technologies Inc, 2003) calculated the implied energy price with competitive pricing for wood chips at $0.16 per kilowatt hour. There is little to believe that these estimates would not be representative for the Clallam and Jefferson county region. If fact we believe them to be conservative. Current electricity prices are at about $0.03 per kilowatt hour. This suggests that wood costs would have to come down substantially for woody biomass to become a competitive alternative source of raw material.

The above volume calculations consider wood fiber that is currently utilized by sawmills in the region. Strong lumber demand in recent years has increased the use of #4 sawmill and utility grade logs by sawmills in the region. Given that the strong demand for these logs suggests their energy value may not be available during strong housing markets, we calculated additional sources of wood fiber that can potentially be a source for biomass-based energy. Table 3.2.2 provides woody fiber supply estimates of green tons based on a total harvestable volume based from 8,070 acres. Included in the table are the #4 and utility sawmill grade log volumes. The additional materials in crowns and branches represent 15% of stem volumes. All numbers are on an annual basis.

**Table 3.2.2.** Breakdown of volumes potentially available as woody biomass.

| | |
|---|---|
| Total Harvest | 322,265 thousand board feet |
| Volume in: | |
| #4 Sawlog | 60,663 thousand board feet |
| Utility grade log | 7,181 thousand board feet |
| Both#4 and Utility grades | 67,844 thousand board feet |
| Weight of this total volume | 491,869 green tons |
| Additional materials in crowns and branches | 364,762 green tons |
| Total potential available biomass | 856,631 green tons |
| Materials sold by 3 local sawmills | 185,003 green tons |
| Total biomass in some form of a chipped material | 1,041,633 green tons |
| Demand (at capacity) by 2 local pulp mills | 552,000 green tons |
| Demand (at capacity) by 3 surrounding pulp mills | 1,272,000 green tons |

Additional materials in crowns and branches by themselves represent a substantial source of woody biomass. These are calculated on the total harvest rather than just the #4 and Utility grade logs. Materials sold by three local sawmills represent hogfuel.

### 3.2.1 Threats and Barriers.

While there may be sufficient materials to consider biomass-based energy, the economics are not in its favor. Harvesting and delivery costs are substantial due to the terrain in the region. Local pulp mills demands for wood chips is substantial. While periods of high lumber production can increase supply of wood waste materials, these would be dependent on market conditions for lumber. In addition, the price of energy is too low to support biomass-based energy. There needs to be a substantial economic incentive for chips to be considered an economical source of energy.

## 3.3 RED ALDER VALUE ADDED MANUFACTURING: DIVERSIFICATION INTO OTHER SPECIES IS A NECESSITY FOR ECONOMIC SUCCESS

Red alder sawmill log production was estimated at 22,849 mbf. Commitments for a new alder mill have been made with projected production level of 30 million board feet. Eighty percent of the production is expected to be kiln-dried and sold in the domestic and export markets. About 20% of the production will be pallet material. Red alder has increased significantly as a material input in the cabinetry, furniture and door manufacturing industries in recent years. It commands high prices across several grades of lumber. The development of proprietary grades has allowed more of the lower grade material that formally went to pallet manufacturing to be used in high-valued applications. This material which contains sound knots has become accepted by consumers and is currently in high demand. Development of these grades has also permitted mills to sell directly to end users, although wholesale distributors are still in use.

Regional end users of alder were contacted and interviewed. They confirmed the rapid acceptance by consumers domestically and internationally of alder as a premier product. Red alder commands a high price and end users recovered their costs through selectively using the material. For example, materials pass through five machine centers to recover full value. While alder lumber is high priced, it may comprise only 10% to 15% of the materials used. Hence alder is one of many other species that are utilized by cabinetry and door manufacturers.

### 3.3.1 Threats and Barriers

Diversification of supply was determined to be a key to success for end users of alder and other species. The use of wholesale distributors was still common, but direct purchases from mills were becoming more common. Business success relies on the ability to diversify in products to counter changes in consumer preferences and to diversify in supply of raw materials to maintain low costs. For a value-added facility to locate in the Clallam and Jefferson county region it must be able to import materials from other sources, as well as have a variety of species to work with.

# 4.0 SUMMARY

The analysis determined that the region is a net exporter of wood fiber. It determined potential annual harvests of over 300,000 mbf over the next 15 years. Current use by local sawmills was below 50%. Nearly 100,000 mbf of sawmill logs are exported to mills located in other Washington counties.

Biomass-based energy production may have sufficient supply, but it is costly. Estimates of $0.16 per kilowatt hours produced using woody biomass in Oregon suggest a comparable or an even higher cost structure for the Clallam and Jefferson County region. Wood costs need to be reduced to make woody biomass a viable outlet for energy production.

Oriented Strand Board (OSB) utilizes low grade materials. However, economies of scale may require that a large plant be established to be competitive in a commodity market place. We concluded that there was insufficient supply for a OSB mill early on in the analysis. Other constraints such as insufficient hardwood materials would also be of concern.

Red alder value-added manufacturing can be feasible if sufficient alternative supplies of materials are made available. Relying on a single source of raw material for a value-added manufacturing plant makes the plant susceptible to market volatility. Diversification of supply sources and product lines is perceived to be an important factor for success in this sector.

## 5.0 RECOMMENDATIONS

We recommend that future work analyze the potential for expanding the existing capacity of softwood lumber production in the area. The volume of sawmill logs that are exported from the area was estimated at less than 100,000 mbf and was insufficient for a modern large mill, which can be twice as big. Expanding the sawmilling capacity of the existing mills may provide benefits for the local region and enhance their competitiveness with mills outside of the region that currently successfully bid for local timber.

The announced plans for a new mill in the Everett area suggests an evaluation of timber values for the region and its competitiveness. An analysis currently underway to examine these values should be consulted when completed.

While woody biomass is currently too costly, options should be explored for promoting "green energy" options. Many other benefits associated with using woody biomass as a fuel source should be promoted to help provide an economic incentive for the use of this waste material in energy production.

Finally, since the region is an excess supplier of timber, it should promote its position in order to attract potentially new manufacturing that can consume underutilized resources and compliment the existing milling infrastructure in the area.

## 6.0 ACKNOWLEDGEMENTS

I wish to acknowledge the funding support from Jim Haguewood, Executive Director of the Clallam County Economic Development Council and John Calhoun, Director of the Olympic Natural Resources Center; the assistance I received from the Forest Resource Industry Cluster group for allowing me to utilize their meetings as a sounding board for many of the numbers I present here; data assistance from Lawrence Reeves of the Department of Revenue, Jon Tweedale and Angus Brodie from the Department of Natural Resources.

I am indebted to Joe Guizzetti, Buffelen Woodworking Co., Jay Swanson, Jeld-Wen, David Swietzer, Western Hardwood Association and Gary Cantrell, Port Angeles Hardwoods. I also would like to acknowledge the assistance of J. Kent Barr for his help with the data analysis.

## 7.0 LITERATURE CITED

Atterbury Consultants Inc. 2000. North Olympic Peninsula Timber Inventory Harvest Level Projection: Clallam and Jefferson Counties, Washington. Report submitted to Clallam County Economic Development Council. Port Angeles, WA

McMeil Technologies, Inc. 2003. Biomass Resource Assessment and Utilization Options for Three Counties in Eastern Oregon. Report prepared for Oregon Department of Energy. Salem, OR

# APPENDICES

**APPENDIX 1.**
**SCOPE OF WORK**

CINTRAFOR shall use its capabilities in cooperation with COUNCIL staff and the Forest Resource Industry Cluster Team to lead the effort in the development of the study and deliverables specified below. The parties shall use the EDC hosted "collaboration center" as the means of communication with the Forest Resources team and as a document repository. The CINTRAFOR scope of work will cover the following areas:

1. Resource Inventory
    a. An update of the existing and future harvest levels in Clallam and Jefferson Counties including non-traditional materials such as small wood thinnings and highlighting the potential new supplies as a result of changes in the state and federal regulations.
    b. The harvest level findings will be used to complete an analysis including flow, species and size of the raw material supply required to manufacture valued added opportunities in the marketing portion of the project. This will also include pricing, quantity and sort type of material.
    c. Determine the capacity and consumption of the existing mills in the area.
    d. Identify the current suppliers in the region
    e. Inventory of existing vacant and underutilized industrial properties (FRC Team will assist in data gathering).
    f. Determine the economic fundamentals of the raw material and manufacturing in Clallam and Jefferson Counties.

2. Market Assessment and Analysis
    a. Identify values added products that might have potential to establish a manufacturing site in the Clallam and/or Jefferson County area. Two specific products will be selected from work completed and reviewed in the resource inventory work. The review will include but not limited to;
        1) Small diameter Hemlock
        2) Alder
        3) Douglas Fir
        4) Harvest and current manufacturing waste material
        5) Second tier valued added products from existing production of 2x4, 2x6, random length and alder
        6) Cedar
    b. Identify threats and barriers to the potential manufacturing plant.
    c. Identify current market size and trends for the valued added products

3. Deliverables
    a. Monthly meeting with industry leaders in Clallam or Jefferson County.
    b. Written report at the conclusion of the project in both bound (5 copies) and electronic.
    c. Oral presentation of findings at a site and date to be determined near the conclusion of the project.

## APPENDIX 2.
## REVIEWER COMMENTS

**Reviewer 1 Comments**

First paragraph on p. 3. The cost of harvesting and delivering PCT biomass is $35 to $40 per dry ton not green ton (see Oct.2004 cluster notes).

Response: Correction made

Last paragraph on p.3. You should consider a sentence about production expansion of existing mills being the best way to utilize more logs being harvested on the NOP. Our cluster has always looked for ways to help existing business before trying to attract new business that might compete.

Response: Suggestion incorporated in the Executive Summary and the final section of the report.

p. 15 first paragraph. Could you clarify where the additional 25,000 to 30,000 tons per acre of PCT would come from--private land?

Response: This volume is on federal lands. This is stated in the document. It is calculated from 1,000 acres the Forest Service precommercially thins (obtained through interview). Volume estimates are 25 to 30 green tons per acre.

p.16 Table 3. What is the > symbol in front of No. 4 log for? Also, I think the fourth column should just be utility log. Also, maybe the amount of OSB should be in a 5th column or under the total of the No. 4 and utility.

Response: The > stands for “greater than”. I have changed the table to make it clear. The added column was also incorporated.

p. 18. I think you should make the point that residual sawmill chips will never be used for energy. The paper mills are paying $100 to $125 per bone dry unit for them. A bone dry unit is 2400 pounds. Way too expensive for a cogen unit.

Response: I have taken your suggestion and made it clear by adding to the section titles the conclusion of the analysis for each product.

Table 5, p. 20. Additional materials--crowns and tops seems high. You state in the previous paragraph that they are about 15% of the stem mass which is 491,869 tons. 15% would only be 73,780 tons. Something doesn't fit here. Also, the materials sold by the 3 local sawmills--is this hogfuel? Daishowa was buying about 100,000 green tons per year of hogfuel when I was there. If you add Port Townsend Paper and K-ply to this the figure should be a lot higher?

Response: The 15% is calculated on the total harvest volume, not just the volume of the #4 and Utility grade logs. The materials sold by the local sawmills is hogfuel and I interviewed the mill managers to get the present number.

Recommendations p.23. Again I would hope you would recommend expansion of existing mills before analyzing the potential for a new mill, particularly since there is only about 100 MMBF available.

Response: I have accepted the suggestion and made the changes in the Executive Summary and Final section of the report.

**Reviewer 2 Comments**

There is a very serious error in Perez-Garcia's presentation on the OSB slide. There has not been an OSB plant yet that will produce in excess of 1 billion sq ft 3/8" basis and the smallest OSB plants (first generation plants) would produce 50 million sq ft 3/8" basis. Typical third generation plants now have an annual production of 500 million sq ft 3/8" basis. In addition, OSB requires at least a 60% deciduous component. We certainly do not have that deciduous component available to us in this region. I am not sure if this information is particularly important, but such a serious factual error in the presentation concerned me and I felt that you should be aware of this for any future discussion that you may be engaged.

Response: This was a misinterpretation on my part. The 5.8 billion square feet is associated with several plants owned by a single company. I have made the necessary changes in the document and the PowerPoint presentation. There was no impact on the conclusion reached since the number was used to further illustrate the notion that there is insufficient raw material available for an OSB plant.

**Reviewer 3 Comments**

1. During your review of the raw material that is exported out of the Clallam and Jefferson County region did you conduct some economic analysis of the cost differential vs. local processing?

Response: There is an additional analysis that I am working on for the ONRC that is looking at timber values on the Peninsula in more detail. When we agreed to move this project forward, we decided to give this project a priority and the ONRC project would be completed afterwards. This is an important question. Currently the excess logs find value by being purchased by mills outside of the region. Without these mills timber values would be lower. Additions to local existing capacity would increase the demand for local logs, and it would be necessary to understand how current purchasers of these logs would react. They may increase bid prices, or they may look elsewhere. This requires a market study approach and it is something that I am currently researching for the ONRC project.

2. Since pre-commercial thinning was a big part of the discussions with the cluster team can you expand on the economics of harvesting, collecting, transporting and handling the material? Generally at this point in time this would be very valuable information.

Response: Pre-commercial thinning appears to remain just that, pre-commercial. The research did not discover any new or existing product that could handle high-cost, low-valued material. The major stumbling factor is the terrain and difficulties in operating and removing material of a positive value under such conditions. Bioenergy Inc presented some potential new product, but the presentation cited costs that are much lower than regional costs for this material. This should be investigated further.

3. Is there anyway to identify were the future harvests are going to take place on the North Olympic Peninsula, western Jefferson County, Forks area, northwestern area, east Clallam or east Jefferson, etc.?

Response: This may be possible, but it was not done for this study. To do so you would need a breakout of the harvest acres into their regional components. The Atterbury report does breakout harvest by ownership types (not be locale) and it would be possible to establish harvest levels by ownership types, but this was not done in my report. I will attempt to breakout the harvest levels and include the results of the analysis in the ONRC report, but there are other issues as well to consider.

4. Can you provide some overview of the current economic value of the resources and what the overall opportunity value is of the harvest material?

Response: In terms of supply and demand for sawmill grade logs, the results indicate that there is the potential for supply to outpace demand growth. If this were to happen, then resource values would decline. On the other hand, should the mill in Everett actually take place, as well as the new mill in Port Angeles, then resource values should increase (or at least prevent them from declining). These two mills represent potential increases in the demand for the resource. There is still a considerable amount of precommercial materials currently in place. Costs really control the resource values, and these costs are currently too high for the values to be positive. Again this is an important question and is considered a part of the ONRC project that is evaluating the value of timber resources on the Peninsula.

**APPENDIX 3.**
**REVISED POWERPOINT PRESENTATION**

## Resource Inventory, Market Assessment and Analysis

For Forest Products in Clallam and Jefferson Counties

John Perez-Garcia
Center for International Trade in Forest Products, University of Washington

February 23, 2005

## Scope of Work

- Update existing and future harvest levels in Clallam and Jefferson Co.
- Analyze the flow, species and size of raw material supply
- Determine the capacity and consumption of existing mills
- Identify current suppliers
- Inventory properties
- Provide economic fundamentals

## Scope of Work II

- Market Assessment and Analysis
- Two specific products from
- Small diameter hemlock
- Alder
- Douglas fir
- Waste materials
- Second tier valued added Alder
- Cedar
- Identify threats and barriers
- Identify current market size and trends

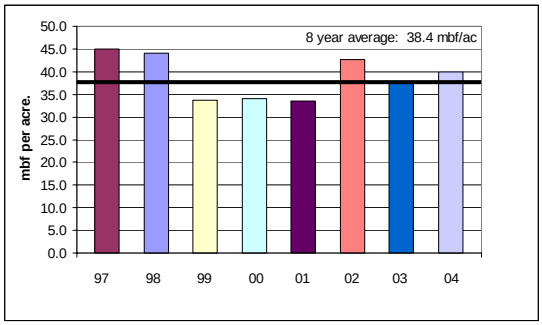
## Presentation Outline

- Part 1: Harvest levels and flow of materials
  - Projecting species and grade of timber
  - Describing the flow of fiber
- Part 2: Product identification and economic analysis
  - OSB
  - Bio-energy
  - Alder Value added
- Summary and Recommendations

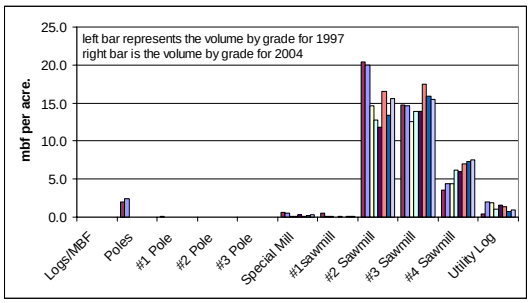
## Harvest Level Projections

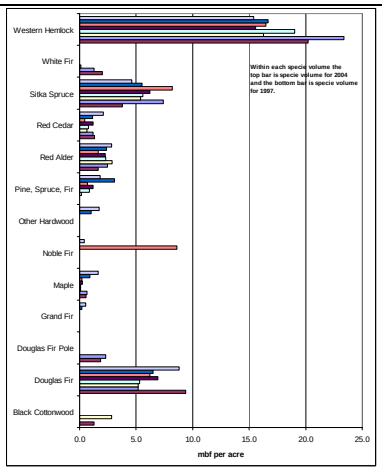
- Used existing data on timber harvest by grade and species (DOR data)
- Applied projected harvest acres from Atterbury Report
- Determined the volume and percent per acre by species and log grade

## Per Acre Volumes



## Log Grades per Acre: 1997 - 2004




## Volumes Per Acre by Species: 1997 - 2004

## Breakout of Volume per Acre

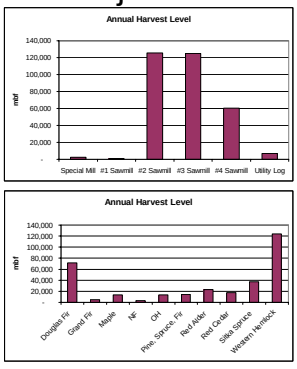
| | #3 Pole | Special Mill | #1 Sawmill | #2 Sawmill | #3 Sawmill | #4 Sawmill | Utility Log | Total by Species |
|---|---|---|---|---|---|---|---|---|
| | | | | Mbf Scribner Log Scale per Acre | | | | |
| **Douglas Fir** | 0.035 | 0.192 | 0.060 | 4.390 | 3.361 | 0.665 | 0.131 | ***8.834*** |
| **Grand Fir** | | 0.058 | | 0.334 | 0.131 | 0.021 | | ***0.544*** |
| **Maple** | | | | 0.309 | 0.461 | 0.838 | 0.059 | ***1.667*** |
| **Noble Fir** | | | | 0.290 | 0.119 | | | ***0.409*** |
| **Other Hardwood** | | | | 0.343 | 0.274 | 1.097 | | ***1.713*** |
| **Pine, Spruce, Fir** | | | | 0.883 | 0.684 | 0.246 | | ***1.813*** |
| **Red Alder** | | | 0.066 | 0.350 | 0.547 | 1.651 | 0.217 | ***2.831*** |
| **Red Cedar** | | | | 0.333 | 1.347 | 0.424 | 0.017 | ***2.121*** |
| **Sitka Spruce** | | | | 2.702 | 1.416 | 0.397 | 0.091 | ***4.606*** |
| **Western Hemlock** | | 0.047 | | 5.635 | 7.160 | 2.179 | 0.375 | ***15.395*** |
| **Total by Grade** | ***0.035*** | ***0.297*** | ***0.126*** | ***15.569*** | ***15.499*** | ***7.517*** | ***0.890*** | ***39.934*** |

## Breakout of Percent Volume per Acre

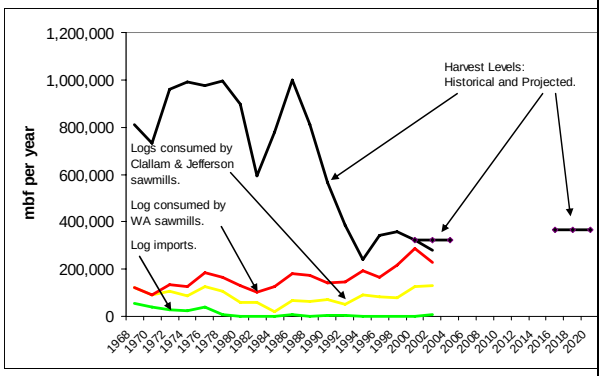
| | #3 Pole | Special Mill | #1 Sawmill | #2 Sawmill | #3 Sawmill | #4 Sawmill | Utility Log | Total by Species |
|---|---|---|---|---|---|---|---|---|
| | | | | Percent per Acre | | | | |
| **Douglas Fir** | 0.09% | 0.48% | 0.15% | 10.99% | 8.42% | 1.66% | 0.33% | ***22.12%*** |
| **Grand Fir** | | 0.15% | | 0.84% | 0.33% | 0.05% | | ***1.36%*** |
| **Maple** | | | | 0.77% | 1.15% | 2.10% | 0.15% | ***4.17%*** |
| **Noble Fir** | | | | 0.73% | 0.30% | | | ***1.02%*** |
| **Other Hardwood** | | | | 0.86% | 0.69% | 2.75% | | ***4.29%*** |
| **Pine, Spruce, Fir** | | | | 2.21% | 1.71% | 0.62% | | ***4.54%*** |
| **Red Alder** | | | 0.17% | 0.88% | 1.37% | 4.13% | 0.54% | ***7.09%*** |
| **Red Cedar** | | | | 0.83% | 3.37% | 1.06% | 0.04% | ***5.31%*** |
| **Sitka Spruce** | | | | 6.76% | 3.55% | 1.00% | 0.23% | ***11.53%*** |
| **Western Hemlock** | | 0.12% | | 14.11% | 17.93% | 5.46% | 0.94% | ***38.55%*** |
| **Total by Grade** | ***0.09%*** | ***0.74%*** | ***0.32%*** | ***38.99%*** | ***38.81%*** | ***18.82%*** | ***2.23%*** | ***100.00%*** |

## Harvest Level Projections

- 2000-2004
  - 8,070 acres
  - 322,265 mbf
- 2015-2020
  - 8,618 acres
  - 344,148 mbf




## Flow of Timber



## Product Identification: OSB

| Harvest Description | Acres | Nos. 2 and 3 Grade Logs (mbf) | No. 4 and Utility Grade Logs (mbf) | No. 4 and Utility Grade Logs (tons) | OSB 3/8 inch basis (mm sf) |
|---|---|---|---|---|---|
| All owners 2000 – 04 estimate with additional stream rules | 8,070 | 254,421 | 67,844 | 491,869 | 313 |
| All owners 2015 – 20 estimate with additional stream rules | 8,618 | 271,697 | 72,451 | 525,269 | 335 |
| All owners 2000 – 04 estimate with NO additional stream rules | 9,170 | 289,100 | 77,092 | 558,914 | 356 |
| All owners 2015 – 20 estimate with NO additional stream rules | 9,865 | 311,011 | 82,934 | 601,274 | 383 |

## Threats and Barriers

- Currently not enough fiber resources to support a small facility
- Competitive OSB plants produce 500 million sq ft 3/8 inch basis

## Product Identification: Bio-energy

| Green tons per year | Green tons per day | Size in MW |
|---|---|---|
| 491,869 | 1,359 | 37 |
| 525,269 | 1,451 | 40 |
| 558,914 | 1,544 | 42 |
| 601,274 | 1,661 | 45 |

An additional 364,762 green tons in crowns and branches:

Current potential demand at capacity (2 local pulp mills): 552,000 gt

## Threats and Barriers

- Sufficient material but economics not in favor
- Price of energy is too low to support biomass-based energy
- Local pulp mills make up current demand (able to pay prices and must bid away chips)

## Product Identification: Red Alder Value-added

- New Alder mill projected to start next year
- Production: 30 million bd ft
- 80% kiln-dried
  - 70% domestic
  - 30% export
- 20% pallet material

## Red Alder Value-added

- Cabinetry, furniture and door applications
- Direct sell
- Proprietary grades
  - Knotty Alder in high demand
  - Trend product

## Threats and Barriers

- Ability to diversify: Valued added doors and cabinetry utilize various species based on consumer demand, do not rely on a single species
- 10% - 15% of material utilized is lumber
- Competitiveness depends on ability to import other materials

## Summary of Findings

- Area is a net exporter of wood fiber
- Less than half the volume is utilized locally
- Biomass-based energy has the supply but needs to reduce wood costs to be feasible
- OSB needs greater supply
- Valued added Alder needs diversification

## Recommendations

- Examine potential for new sawmill
- Examine timber values (ONRC study)
- Examine “green energy” options to subsidize biomass-based energy
- Advertise availability of fiber supply