

2006 Tongass Spectrum Model

Draft

Summary of Costs and Activities Modeled in Spectrum

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1. Road Construction, Reconstruction, and Maintenance

Definition:

Road construction is building roads for access to harvest activities. Reconstruction is re-building a previously constructed road to re-enter a harvest activity area. Maintenance is the routine upkeep of existing roads.

What it Does:

Tracks the number of miles and costs of road activity associated with the Tongass timber program.

Rationale (why needed):

Allows the model to realistically consider road costs associated with harvest activities. Provides summary outputs for effects evaluation.

2006 Process:

Existing maintenance level 3-5 roads incur annual maintenance costs. Road building requirements were evaluated on a VCU basis, based on road needs identified in the LSTA. Roads built by the model were system roads and did not incur maintenance costs; they were assumed to be closed after harvest and put into storage. Road construction and reconstruction needs were determined for each VCU by roaded and unroaded portions as well as regulation class.

Construction was modeled as follows:

- Even-aged prescriptions without commercial thinning incur road construction and reconstruction costs as necessary upon first harvest. Upon subsequent harvests, these prescriptions incur reconstruction costs on the roads that were constructed or reconstructed in association with the first harvest.
- Even-aged prescriptions with commercial thinning incur road construction and reconstruction costs as necessary at the time of the thin. When the stand is clearcut, roads reconstructed at thin are reconstructed and roads constructed at thin are reconstructed.
- The two-aged* (partial cut) prescription used in alternative 5 works as the even-aged prescription; roads are constructed and reconstructed upon first entry and they are all reconstructed upon subsequent entries.

- The Regulation Class 3 (uneven-aged) prescription works similar to the even-aged prescription; roads are constructed and reconstructed upon first entry and they are all reconstructed upon subsequent entries.

Forest-wide construction cost is based on slope %:

- 0%- 20% - \$147,663/Mile
- 20% - 40% - \$179,553/Mile
- 40% - 55% - \$246,644/Mile
- 55% plus \$327,741/Mile

This was converted into costs per Regulation Class; Regulation Class 1 used the 0%-20% slope cost (\$147,663), Regulation Class 2 was the average of the 20%-55% costs (\$213,098), and Regulation Class 3 used the 55% plus cost (\$327,741). Reconstruction (maintenance and repair) costs were \$50,000 per mile. Road maintenance cost was \$2712 per mile per year.

Miles per acre of necessary construction and reconstruction was calculated for VCUs with 100 or more acres of suitable land. For VCUs with less than 100 acres, an average for the administrative area was used.

Sources:

Updated road mileage requirements based on new Forest-wide Logging System and Transportation Analysis (LSTA), Randy Fairbanks, Tetra Tech. Road costs from Jack Oien, Forest Roads Engineer, based on recent average costs.

Also see project record “Road Construction/Reconstruction Assumptions” documentation paper for further discussion.

- * Note: the two-aged prescription referred to in this paper is specific to goshawk/marten standards and guidelines applied in alternative 5. This differs from the two-aged prescription summarized in the EIS, which TetraTech calculated.

2. Sawlog board foot volume and value

Definition:

Board-foot volume from the various harvest activities. Volume is an aggregate across all species. Volumes are distinguished by geographic zone and volume strata.

What it Does:

Provides basis for tracking volume output from harvest activities. Prices and costs can be tied to these levels in order to evaluate the economic impacts of harvest activities.

Rationale (why needed):

Used in key constraint formulation such as non-declining flow and demand scenario modeling.

2006 Process:

For old-growth volume, 1990's FIA cluster plot inventory data were stratified by geographic zone (Yakutat, North Island, North Mainland, South Island, and South Mainland) and volume strata (High, Medium, and Low), and average standing volume was calculated. The Regional timber valuation forester determined the net sawlog portion of these volumes (see "Utility board foot volume" below for further discussion).

For young-growth stands, yields were determined for each of three productivity classes. The highest productivity class (Prod Class I) was modeled using plot data collected in the summer of 2005 on Prince of Wales and the Revillagigedo Islands. Productivity Class I plots were further split into those stands that had been precommercially thinned and those that had not been thinned. Productivity Class II was modeled using FIA tree data downloaded from the FIA website. Productivity Class III (the lowest productivity class) was modeled using bare ground as a starting point. Forest Vegetation Simulator (FVS) runs (June, 2006) were made to estimate the volume at different ages.

The Regional timber valuation forester evaluated the old-growth volumes to determine the merchantable sawlog portion of the determined volume. The pond log value of the average sawlog based on species mix of the average stand in that condition was then calculated.

The pond log value of a young-growth log for an age 80 young-growth stand was also calculated. These values were then adjusted proportionally based on the 1997 proportion assumptions to get pond log value for other ages.

Sources:

Jim Russell, Forest silviculture program manager, old-growth volumes based on FIA analysis. See document "060502_exhibit_0_yield_table_process_old-growth_Sept-29-2006", which resides on the Tongass intranet.

Jim Russell, Forest silviculture program manager, young growth volumes based on FVS runs using FIA and forest data. Runs completed June 27, 2006. See document "what_we_did_and_why_young_growth_yield_table_development", which resides on the Tongass intranet.

Bob Housley, Regional timber valuation forester, old-growth net sawlog proportions; based on applying defect information from historic cruise data to gross volume data from FIA plot information and consultation with Ken Dinsmore, Regional measurements specialist.

Bob Housley, Regional timber valuation forester, in consultation with Ken Dinsmore, Regional measurements specialist, old-growth and young growth value information, October 3, 2006, based on gross volume data from FIA plots, historical cruise data for defect and log quality information, log test studies of local mills, publications on young growth lumber yields.

1997 Tongass National Forest FORPLAN model (young growth value proportions).

Also see Appendix 1 for value adjustment discussion and “MASTER Forest Plan 2nd Growth Values Oct 3 2006” spreadsheet for Regional timber valuation forester calculations. See Appendix 2 for calculated young growth sawlog pond log values.

3. Utility board foot volume

Definition:

Useable portion of the stand volume that is not used as sawlogs, but can be used for pulp and/or fiberboard. Utility volume is associated with old-growth stands only.

What it Does:

Tracks the amount of utility wood present in harvested stands

Rationale (why needed):

Utility volume will be used in alternatives with integrated industry that assume the presence of pulp and/or medium-density fiberboard plants.

2006 Process:

Old-growth utility volume was calculated by the regional timber valuation forester (October 3, 2006). Utility only occurs in hemlock and spruce species; cedar has no utility portion. Utility volume only occurs in old-growth stands.

Below is a table of Regional timber valuation forester calculations of sawlog and utility volumes (“Net MBF Sawlog Removed per Acre” was the net sawlog volume expressed in thousands of board feet, and “Net MBF utility per Acre” was the net Utility volume expressed in thousands of board feet). The other columns show the methodology used to derive the final numbers. “Total GMBF Stand wUtility per acre” is gross volume (thousands of board feet) calculated by Jim Russell and Ken Dinsmore from FIA plot data. “Gross MBF w/utility per acre” is the gross volume assumed to be of good sawlog quality that is actually removed from the acre. It does not include known breakage, known cull and seen defect. The seen defect is also known as utility volume and is represented in “Net MBF utility per acre”. Utility volume is the portion of the difference between “Gross MBF w/utility per acre” and “Gross MBF Sawlog Removed per Acre” that is not known cull and breakage left in the woods. The difference between “Gross MBF Sawlog Removed per Acre” and “Net Sawlog Removed per Acre” is hidden defect, breakage and cull that is brought to the mill and discovered at the mill. However, none of the hidden defect, breakage or cull volume at the mill qualifies as utility volume.

Young-growth was assumed to yield no utility volume, based on Regional measurement specialist's analysis.

Zone VolStrat	Gross MBF w/utility per Acre	Gross MBF Sawlog Removed per Acre	Net MBF Sawlog Removed per Acre	Net MBF utility per Acre	Utility expressed as % of Sawlog
NI High	39.81	32.35	25.59	4.84	19%
NI Low	17.84	14.34	11.07	1.82	16%
NI Medium	27.77	22.51	17.69	3.04	17%
NM High	39.81	30.08	24.58	4.58	19%
NM Low	12.38	9.93	7.62	0.94	12%
NM Medium	34.98	24.71	19.61	4.52	23%
SI High	41.27	35.99	29.28	5.08	17%
SI Low	20.89	17.87	13.72	1.95	14%
SI Medium	30.26	26.32	20.67	2.88	14%
SM High	41.27	35.63	30.17	5.37	18%
SM Low	22.88	19.29	15.06	1.96	13%
SM Medium	30.26	25.89	21.03	3.04	15%
YAK High	45.23	37.90	32.71	4.06	12%
YAK Low	6.51	5.53	4.76	0.52	11%
YAK Medium	40.40	31.68	27.72	5.00	18%

NI = North Islands, NM = North Mainland, SI = South Islands, SM = South Mainland, YAK = Yakutat

Utility pond log value was calculated by the Regional timber valuation forester. Value is a function of the selling value of different product thicknesses and the manufacturing and "profit and risk" costs of medium density fiberboard.

Sources:

Ken Dinsmore, Regional measurements specialist, updated defect data, based on forest-wide felled tree studies of sitka spruce and hemlock conducted in 2005.

Jim Russell, Forest silviculture program manager, old-growth volumes based on FIA analysis. See document "060502_exhibit_0_yield_table_process_old-growth_Sept-29-2006", which resides on the Tongass intranet.

Bob Housley, Regional timber valuation forester in consultation with Ken Dinsmore, Regional measurements specialist, utility yield formula development and application, based on historic cruise data.

Bob Housley, Regional timber valuation forester, utility value information, base year 2004. Base Year 2004 is considered a good middle market point. The

composite average value of Base Year 2004 is within 1% of the inflation adjusted composite values between 2000 and 2005. Utility value information was based on:

- "Technical & Economic Feasibility of Constructing a Medium Density Fiberboard Plant in Southeast Alaska". Leonard Guss Associates, 31 May, 2005.
- Discussions with Dr. Allen Brackley, USDA Forest Service, Sitka Wood Utilization Center

4. Planting Costs

Definition:

Costs associated with planting and regeneration survey due to harvest activities

What it Does:

Enumerates planting and regeneration/survey costs

Rationale (why needed):

These costs are incurred due to harvest practices

2006 Process:

Planting costs are incurred when there is a yield from a harvest activity. The cost is assumed to occur within 5 years of treatment. Cost is a per-acre average and is significantly less than the actual cost per acre; not all acres require planting on the ground. The Forest silviculture program manager estimated not more than 2-3% of the acres need to be planted. When planting occurs, it costs \$200/acre; therefore, the average planting cost is \$6 per acre.

In addition to planting costs, there is a regeneration/survey cost of \$18 per acre that will be included in the planting cost. The total planting cost per acre of even-aged management is \$24.

Planting costs on Regulation class 3 lands or in clearcuts where not all volume is removed are adjusted by the percentage removed (i.e., if a two-aged management treatment removes 77.5% of the acre, 77.5% of the planting cost is incurred).

Sources:

Jim Russell, Forest silviculture program manager, historic regeneration survey and planting costs

5. Log Transfer Facility Costs

Definition:

Log Transfer Facilities are built or rebuilt when logging occurs in an area where the wood must be barged or rafted to the mill. The logs are assumed to be hauled by truck to the transfer site where they are loaded onto the watercraft.

What it Does:

Associates timber harvest with the cost of the Log Transfer Facility that must be present in order to transport the volume removed.

Rationale (why needed):

To distinguish areas of relatively inexpensive or no log transfer costs from those with higher costs.

2006 Process:

Using the Log Transfer Facility map and database, each LTF, existing or proposed, was associated with the VCU or VCUs that would use the LTF. LTF costs are then figured as total cost of the LTF to be constructed divided by the number of suited acres in that VCU to arrive at an average per-acre cost for the VCU. LTF construction costs are classified by four different categories to reflect the total cost of constructing the LTF

- Category 1: Existing LTF constructed/used within the last 10 years = \$50,000
- Category 2: Existing LTF constructed/used more than 10 years ago = \$125,000
- Category 3: New Construction (large; >30 MMBF total volume) = \$175,000
- Category 4: New Construction (small; <30 MMBF total volume) = \$125,000

The LTF costs associated with the harvest of regenerated stands is one-half that of the existing Old-growth harvest. This assumes reconstruction only, and is used for consistency with the 1997 process (1997 Appendix B-4).

Sources:

Jack Oien, Forest roads engineer, provided sizes and construction/maintenance costs, and Forest GIS layer provided locations, for each LTF or potential LTF on the Forest, based on historic costs.

6. LTF Camp costs

Definition:

Costs associated with camp development and maintenance or commuting to and from Log Transfer Facilities

What it Does:

Recognizes the additional costs of remote logging where commute costs or camp costs are high

Rationale (why needed):

Some logging operations require a camp or commute.

2006 Process:

Average camp cost per \$22/MBF. Average commute cost is \$7/MBF. Weighted averages are used where not all acres of a VCU require LTFs to incur camp or commute costs.

Sources:

Bob Housley, Regional timber valuation forester, camp costs based on cost collection for base year 2004.

Jack Oien, Forest roads engineer, and Randy Fairbanks, Tetra Tech, provided camp costs and which VCUs were camp or commute VCUs based on locations relative to communities.

7. Haul Costs

Definition:

Costs associated with hauling one MBF volume to the mill. Appropriate costs are identified for truck hauling, barge hauling, and raft hauling.

What it Does:

Defines how much it costs to haul timber volume to a mill/processing facility

Rationale (why needed):

To distinguish areas of higher haul costs from those with lower costs. Costs are considered in an economically optimal solution.

2006 Process:

This assumption was broken into three costs: 1) road haul (one average per MBF for the forest), 2) Barge haul (dependent on distance from LTF to sawmill), and 3) Raft haul. However, for some alternatives, it may be determined that utility wood would be left on-site, and haul cost would not be incurred.

Barge haul costs were calculated by Eric Henderson, analyst, with a formula provided by Regional timber valuation forester, based on total barge distance (Fairbanks) and scaling defect (Regional timber valuation forester)

Raft haul (i.e. tow) cost was determined in the same manner as Barge Haul (i.e. tow) cost, but raft haul was only used in higher- market demand alternatives (3 and 4), assuming the construction of new MDF plants. Rafting does not adversely affect the quality of wood used in MDF plants and may be used as a more efficient method of transport to these plants.

Sources:

Jack Oien, Forest roads engineer, forestwide average for road haul, based on historic costs.

Bob Housley, Regional timber valuation forester, barge/raft formulas based on cost collection, base year 2004.

Bob Housley, Regional timber valuation forester, scaling defect calculation, based on historic cruise data and consultation with Regional measurements specialist.

Randy Fairbanks, TetraTech, calculated average distance from LTFs to the mill using GIS LTF locations and assumptions of mill locations for each alternative.

8. Logging (Yarding) Costs

Definition:

Cost per MBF of harvest with a particular yarding system. The systems tracked were: Shovel, short-span cable, long span cable, short helicopter, medium helicopter, and long helicopter.

What it Does:

Defines the cost of harvest with the appropriate yarding system

Rationale (why needed):

To distinguish the costs of logging in different areas; to distinguish those areas that are less costly vs. more costly to manage.

2006 Process:

Logging costs were developed per geographic region (e.g. South Islands), volume strata (H/M/L), harvest prescription (e.g., clearcut, commercial thinning, clearcut with reserves, etc.), and yarding system (shovel, short span cable and long span cable).

Helicopter costs were determined by 3 categories of distance (.5 mile, 1.375 mile, and 2+ miles). Helicopter costs are constant costs independent of volume strata and geographic zone, so they can be applied wherever helicopter logging must be used.

A felling and bucking cost was determined by geographic zone and volume strata and added to the cost of the required conventional yarding system (felling and bucking is included in helicopter costs). Road maintenance costs were added to logging costs. Young-growth harvest costs were determined initially from FVS outputs at age 80. They were then adjusted for geographic zone, age, and prescription (i.e., clearcut or thin) using South Islands (Prince of Wales Island and others, where the data was collected).

Cost curves from 1997 were used as the basis for determining young-growth treatment costs. While the actual costs of young growth treatment have changed,

the relative values were assumed to be similar to values used in 1997. Assume an 80 year old stand in 1997 cost \$200/acre to treat and a 100 year old stand cost \$100. The 1997 relationship was the 100-year old stand treatment cost is 50% of the 80 year-old stand. In 2006, if the cost to treat an 80 year old stand was \$220, we assumed the cost to treat a 100-year old stand was 50% of \$220, or \$110.

See Appendix 1 for value adjustment discussion.

Sources:

Bob Housley, Regional timber valuation forester, costs and dollar values based on cost collection data, Base Year 2004.

Updated logging system and yarding data was based on new Forest-wide Logging System and Transportation Analysis (LSTA), Randy Fairbanks, Tetra Tech.

Young growth cost relationships used in 1997 Tongass National Forest FORPLAN model. See Appendix 1, below, for further detail.

Also see “MASTER Forest Plan Old-growth Values Oct 3 2006” spreadsheet for Regional timber valuation forester calculations and Appendix 1 for value adjustment discussion. See Appendix 2 for calculated young growth yarding costs.

Appendix 1: Young-growth Cost and Price Calculation for the Tongass National Forest Spectrum Model Runs

Eric Henderson
October 26, 2006

Problem Statement:

1996 Young-growth Logging costs were assumed to vary by Administration Area, Productivity Class, Operability, Regulation Class, prescription, and age. Operability was assumed to be either Normal, Isolated or Difficult, and Regulation Class was perhaps used as a surrogate to distinguish between the different types of logging systems used in each (i.e., Normal is defined as either short helicopter, shovel, or short span cable logging).

2006 Young-growth logging costs are assumed to vary by Administration area, Productivity Class, Logging System, prescription, and age. Regulation Class is no longer needed to help define the logging systems, as all applicable logging systems are enumerated in the model directly (short-span cable, long-span cable, shovel, and 3 different helicopter distances). Even with lumping together relevant age ranges, this results in the need to define approximately 40 different young-growth logging costs per Administration Area (about 120 total). Logging costs for each logging system are calculated by the Regional timber valuation forester as a function of trees per acre, size class, species and harvest system. Since this is a rather complex calculation, logging costs for each system were calculated for a single timing choice for two different prescriptions, namely, clearcutting and partial cutting at age 80 a stand that was precommercially thinned at age 20 [pctonly008_pt1]. This information pertains to Prince of Wales Island, where the input data was collected (corresponding to the Ketchikan area).

The problem is to take the information generated for the two prescriptions at age 80 and use this information as a basis for determining costs for other age classes/administration areas.

Calculation of Logging Costs for other ages/Administration Areas

The 1996 logging costs were used as a basis of calculation of costs for 2006. The table below shows how values for other harvest systems were determined using the young-growth information calculated by the Regional timber valuation forester (2006).

The procedure is somewhat difficult to describe, and so a table is included to illustrate how the costs were adjusted. The table shows the different stratifications used to adjust 1996 costs as well as a crosswalk between the two cost tracking methods. The numbers in blue are the numbers estimated by the Regional timber valuation forester (2006). Since the data used came from precommercially thinned young-growth stands on Prince of Wales Island, the 2006 costs are cross walked to the Ketchikan area to a precommercially thinned stand, normal operability, and part of Regulation Class 1. Since Regulation Class is not considered in 2006, only regulation class 1 numbers from 1996 are used in the calculation. The green 185 signifies the base 1996 crosswalk cost used in the calculation.

Numbers in yellow are the rest of the costs used in the 1996 model. Numbers in blue are from the Regional timber valuation forester and represent what the costs of the comparable area are in 2006. In 1996, the cost for clearcutting a precommercially thinned stand in Reg Class 1, Normal Operability at age 80 is 185. In 2006, harvesting that same stand with a “normal” shovel system would cost \$66.16, or with the “normal” short span system would cost \$126.98.

Pink numbers directly below the blue numbers show how applicable 2006 costs vary with age based on the 1996 cost variation. The “Factor” column shows the magnitude of the other 1996 costs relative to the 185 and is used to apportion the blue numbers in the same proportions as used in 1996. The formula was applied by noting that at age 11, the 1996 cost is 150, which is 81% of the 185. Thus, using the \$66.16 as a base for shovel (“SV”) costs in 2006, the cost at age 11 drops to \$53.64 (81% of \$66.16). The first set of pink numbers are costs for clearcutting in normal operability which can either be shovel (“SV”) or short span cable (“SS-CC”). The set of pink numbers under the “LS” column show the logging costs for 1996 difficult operability and what in 2006 is long-span cable. The third set of pink numbers under “SV-PC” and “SS-PC” show the costs of partial cutting the stand with two different normal harvest systems (shovel and short-span cable respectively). They apply when the stand is commercially thinned (denoted by the “N” in the first column). Finally, the last set of pink numbers under “LS” shows the cost of long-span cable commercial thinning. There is no distinction made for long span partial cuts and so the costs are assumed to be the same as the clearcut.

This method for calculating logging costs was applied to all non-helicopter harvest systems, all age classes, prescriptions and administration areas. They all used the 185 as a base as well as the set of blue numbers calculated by Regional timber valuation forester. Helicopter logging costs were constant per MBF and did not vary by age or administration area.

Prod Class	Ad Area	Oper-Ability	Harvest System		Age	Age	Cost	Factor	SV	SV-PC	SS-CC	SS-PC	LS	
F	KTNPG1	KETCHN	NORMAL	EVTHIN	MBF	AGE DECADES	7 10	185	1	\$ 66.16	\$ 97.90	\$ 126.98	\$ 143.54	\$ 141.28
F	KTNPG1	KETCHN	NORMAL	EVTHIN	MBF	AGE DECADES	11 13	150	0.810811	\$ 53.64	\$ 79.38	\$ 102.96	\$ 116.39	\$ 114.55
F	KTNPG1	KETCHN	NORMAL	EVTHIN	MBF	AGE DECADES	14 16	125	0.675676	\$ 44.70	\$ 66.15	\$ 85.80	\$ 96.99	\$ 95.46
F	KTNPG1	KETCHN	NORMAL	EVTHIN	MBF	AGE DECADES	17 40	115	0.621622	\$ 41.13	\$ 60.85	\$ 78.93	\$ 89.23	\$ 87.83
F	KTNPG1	KETCHN	DFCULT	EVTHIN	MBF	AGE DECADES	7 10	235	1.27027	\$ 84.04	\$ 124.35	\$ 161.30	\$ 182.34	\$ 179.47
F	KTNPG1	KETCHN	DFCULT	EVTHIN	MBF	AGE DECADES	11 13	195	1.054054	\$ 69.73	\$ 103.19	\$ 133.85	\$ 151.30	\$ 148.92
F	KTNPG1	KETCHN	DFCULT	EVTHIN	MBF	AGE DECADES	14 17	170	0.918919	\$ 60.79	\$ 89.96	\$ 116.69	\$ 131.91	\$ 129.83
F	KTNPG1	KETCHN	DFCULT	EVTHIN	MBF	AGE DECADES	18 40	160	0.864865	\$ 57.22	\$ 84.67	\$ 109.82	\$ 124.15	\$ 122.19
N	KTNPG1	KETCHN	NORMAL	EVTHIN	MBF	AGE DECADES	7 10	185	1	\$ 66.16	\$ 97.90	\$ 126.98	\$ 143.54	\$ 141.28
N	KTNPG1	KETCHN	NORMAL	EVTHIN	MBF	AGE DECADES	11 13	150	0.810811	\$ 53.64	\$ 79.38	\$ 102.96	\$ 116.39	\$ 114.55
N	KTNPG1	KETCHN	NORMAL	EVTHIN	MBF	AGE DECADES	14 16	125	0.675676	\$ 44.70	\$ 66.15	\$ 85.80	\$ 96.99	\$ 95.46
N	KTNPG1	KETCHN	NORMAL	EVTHIN	MBF	AGE DECADES	17 40	115	0.621622	\$ 41.13	\$ 60.85	\$ 78.93	\$ 89.23	\$ 87.83
N	KTNPG1	KETCHN	DFCULT	EVTHIN	MBF	AGE DECADES	7 10	235	1.27027	\$ 84.04	\$ 124.35	\$ 161.30	\$ 182.34	\$ 179.47
N	KTNPG1	KETCHN	DFCULT	EVTHIN	MBF	AGE DECADES	11 13	195	1.054054	\$ 69.73	\$ 103.19	\$ 133.85	\$ 151.30	\$ 148.92
N	KTNPG1	KETCHN	DFCULT	EVTHIN	MBF	AGE DECADES	14 17	170	0.918919	\$ 60.79	\$ 89.96	\$ 116.69	\$ 131.91	\$ 129.83
N	KTNPG1	KETCHN	DFCULT	EVTHIN	MBF	AGE DECADES	18 40	160	0.864865	\$ 57.22	\$ 84.67	\$ 109.82	\$ 124.15	\$ 122.19

Appendix 2: Young-growth Price and Cost information – Age 80

Regional timber valuation forester
 October 3, 2006

Appraisal Species	Pond Log Value (Net MBF/acre)	Felling and Bucking per \$/Net MBF	Shovel CC, \$/Net MBF	Shovel PC, \$/Net MBF	Short Span Cable CC, \$/Net MBF	Short Span Cable PC, \$/Net MBF	Long Span Cable CC/PC, \$/Net MBF
ALL	\$245.16	\$46.52	\$66.16	\$97.90	\$126.98	\$143.54	\$141.28

CC = Clearcut, PC = Clearcut with reserves or Partial Cut