



User's Guide to the Timber Productivity Option's Valuation Method – 2005

"User's Guide"



Idaho State Tax Commission



Intermountain Forest Association



Idaho Forest Owners Association

With consultation services provided by



Northwest Management, Inc.

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Forestland Taxation Law 2004

Idaho's Forest Tax Law

Forest landowners with at least five acres but less than 5,000 acres statewide have a choice between two tax systems: a Productivity Tax system or a Bare Land and Yield Tax (BL&Y) system. These two tax systems provide Idaho's 12,200 owners of forestlands with property tax options which recognize their diverse ownership goals. Forest landowners with tracts of 5,000 acres or more statewide are taxed under the Productivity Tax system. Forest landowners with less than five acres are assessed at the property's market value.

The Two Tax Systems

The Productivity Tax system is a property tax based on the ability of the land to produce an annual income from wood products. Idaho is divided into four Forest Value Zones. Within these zones, forestland is graded as Poor, Medium, or Good based upon its ability to produce wood fiber. The appropriate growth rates are shown in the table below:

Productivity Class	Avg. Board Ft. Per Acre	
	Zones 1 & 2	Zones 3 & 4
Poor	100	100
Medium	225	213
Good	350	320

Each year the forest landowner will pay property taxes amounting to about 1% of the listed forestland productivity values. The yield tax does not apply to timber harvested from land in this option.

The Bare Land and Yield Tax system requires that the landowner pay a yearly tax based on the present value of his bare forest land plus a 3% yield tax on the stumpage value at the time of harvest. Within each of the four Forest Value Zones, land is again graded as either Poor, Medium, or Good.

The Bare Land Values to be used in each zone are shown on Table 2, and represent per acre figures. The forest landowner will pay about 1% of each of these figures in property taxes. When harvesting timber, a landowner will pay a 3% yield tax on the stumpage value of the timber harvested in addition to the annual property tax. The party receiving the logs or forest products is required to provide the Idaho Department of Lands with a report listing the quantity, species and source of the logs or products cut. The yield tax payment will be due to the county treasurer at the same time as the property tax payment.

Table 2. 2004 Forestland Value and Stumpage Value Zones in Idaho.

Zone 1: Land Grade			
Good	Medium	Poor	
\$154	\$107	\$63	Bare Land & Yield
\$507	\$325	\$143	Productivity
Zone 2: Land Grade			
Good	Medium	Poor	
\$150	\$94	\$48	Bare Land & Yield
\$485	\$311	\$137	Productivity
Zone 3: Land Grade			
Good	Medium	Poor	
\$119	\$75	\$40	Bare Land & Yield
\$383	\$255	\$119	Productivity
Zone 4: Land Grade			
Good	Medium	Poor	
\$80	\$51	\$27	Bare Land & Yield
\$262	\$174	\$81	Productivity

Justification for Changing the Valuation Methodology

The Committee on Forestland Taxation Methodologies was formed by the Idaho Legislature to address significant calculated valuations in the productivity option that resulted from raising timber values coupled with historically low interest rates. The resulting valuations used under statute by the Idaho State Tax Commission resulted in a drastic increase to the tax burden borne by the forestland owners in each County.

The Committee on Forestland Taxation Methodologies was given the task to develop an alternative valuation methodology that would more accurately reflect the value of lands in the productivity option “*based on the ability of the land to produce an annual income from wood products*”. The report is to be delivered to the Idaho Legislature in January 2005. This publication describes the valuation methodology used and identifies where to obtain data used in the analysis.

The Committee Process

The Idaho State Commission, represented by Tax Commissioner Larry Watson, formed the Committee on Forestland Taxation Methodologies to address this issue. The committee was comprised of two basic groups; forestland owners and county government. From the forestland owner side, the Intermountain Forest Association and the Idaho Forestland Owners Association represented their stake holders with 5 sitting members on the committee. From the County Government side, the Idaho Association of Counties represented their stakeholders, also representing 5 voting members. Voting members included:

Table 3. Voting members of the Committee on Forestland Taxation Methodologies.

Name	Representing
Mark Benson	Potlatch Corporation
Kevin Boling	Forest Capital Partners
Phil Davis	Valley County Commissioner
Steve Fiscus	Latah County Assessor
Scott Gray	Stimson Lumber Company

Table 3. Voting members of the Committee on Forestland Taxation Methodologies.

Name	Representing
Stan Leach	Clearwater County Commissioner
Michael G. McDowell	Kootenai County Assessor
Mark Munkittrick	Idaho Forest Owners Association – CDA
George B. Perala	Boise Cascade
Dave Ryals	Boundary County Assessor

People representing additional stakeholders attended many of the meetings, including representatives of the Rural School Districts, other County Government representatives, and other representatives of forestland owners. While these guests often participated in discussions, they were not allowed to vote on matters decided on by the committee. Employees of the Idaho State Tax Commission also attended and facilitated the meetings, taking notes, and providing clarifications of the tax code, policies and procedures.

The Committee on Forestland Taxation Methodologies advertised for, interviewed, and selected a Natural Resource Economist to assist the Committee in developing the model of valuation. The Committee hired Dr. William E. Schlosser, Northwest Management, Inc., of Moscow, Idaho, to provide these services in May 2004. Commissioner Watson set the agenda for each meeting, with Dr. Schlosser conducting most of the meeting discussions while providing information and analysis.

Dr. Schlosser’s philosophy in conducting these meetings was to serve as a resource for all of the committee. He was available for all committee members in the meetings and outside of the formal meeting setting. Dr. Schlosser introduced all of the relevant valuation models in use around the west, provided insights and analyses on these models, and proposed the usefulness of each.

After evaluating the available valuation methods in use across the west, the Committee on Forestland Taxation Methodologies selected a method commonly called the Soil Expectation Value. This formula calculates the present value of bare land based on its ability to grow successive crops of timber products into perpetuity.

Once the model was accepted and agreed on, the Committee agreed to enter discussions on determining the input variables to the model. Dr. Schlosser was very specific in his instructions to the Committee that the results would not be discussed until all of the input variables had been agreed to. The discussions had to be focused on the definition of the input variable, where to obtain it, and how to update it in the future. It was the desire of everyone on the Committee that the input variables would be as transparent as possible, allowing everyone involved to use the model and the input variables to calculate the results.

This process of Committee cooperation worked extremely well. Discussions were very focused, cordial, and professional. Since resource economics was not necessarily a forte of many of the members of the Committee, the members were equally “*out of their comfort zones*”, allowing everyone to learn the basics together, while asking questions in a cooperative environment. All of the Committee Members came “to the table” seeking an equitable solution to the forestland valuation question.

As individual questions involving each of the input variables were decided on by the committee members, Commissioner Watson held a vote of the Committee, identifying the individual issue as “*agreed*” by a majority. In every instance, the votes were unanimous.

Once all of the sources of information and methods of determination were discussed and settled on, the model was “activated” to see the results. Although it took a couple of iterations, the model began producing land valuations in each zone, by land productivity option.

Discussions during the Committee Meetings asked numerous “what if” questions, looking at the changes of significant variables, and their impact on the land valuation results. Through team caucuses, the individual teams negotiated certain variables and came to agreement on how to use the model into the future.

The remainder of this document will describe in detail the input variables used in this model, and conclude with the actions taken by the Committee members to finalize the valuation methodology. It is significant to note, the final vote of the committee was unanimous.

Present Value of a Perpetual Periodic Series: the Soil Expectation Value

The **Soil Expectation Value** is very useful formula because as we will see, it helps to define the value of the forestry resource. Many forest properties yield income periodically at the end of a growth cycle also called the end of a rotation, rather than annually (like agricultural land). It is often desirable to find the present value of a perpetual periodic series to determine the potential value of this land for forestry use (Schlosser 2004).

Equation 1. Soil Expectation Value Formula.

$$V_0 = \left[\frac{a}{(1+i)^t - 1} \right] = a \left[\frac{1}{(1+i)^t - 1} \right]$$

Present Value of a Perpetual Periodic Series

Where: a = Net returns at the end of the rotation

i = Guiding discount rate

t = Rotation Length

Consistent with the use of this formula, it is assumed that for valuation purposes the Committee will not consider intermediate stand harvests, silvicultural treatments intended to increase the volume or value of timber products at harvest, or other “non custodial” treatments to forestlands. The costs and revenues will be consistent with the landowner that has a “hands off” management style, but adheres to the Idaho State Forest Practices Act, and completes reasonable management activities on the property.

This concept of “Custodial Management” is meant to recognize that landowners provide inputs to their forestlands at differing levels. At one end of the spectrum, the “hands-off investor” purchases a tract of land, holds it for some number of years, and then logs it or sells it solely as an investment property. On the other end of this spectrum, there are landowners who intensively manage their property through pruning, thinning, planting genetically improved stock, fertilize their property, and complete management inputs which are intended to increase the value of the forest products sold at a future date, increase the volume per acre growth, or to derive other amenities from the forestlands such as improved wildlife habitat. “Custodial Management” is intended to reflect a landowner who manages their forestland property in a way which adheres to the Idaho Forest Practices Act, is prudent in protecting forest health and forest protection, provides for reasonable expenses and revenues from the resource, and harvests the timber in an economically justifiable manner, providing for long term management of the forestlands.

In order to reflect this “Custodial Management” style, the CFTM has provided for inputs to the valuation process which reflect this level of inputs and outputs. That is to say, the costs of forest management may be more or less than a landowner actually experiences based on their specific management style, and the volume harvested from their property might also be more or less than a specific landowner experiences for the same reasons. The CFTM strived to match these input levels to the resulting financial outcomes.

Identification of Key Variables

It is important therefore, to identify key variables in the analysis. It is the desire of everyone involved to make sure these variables are easily obtained, reflective of the economic climate the counties and the forestland owners face, provide equity when calculating values, and are understandable by those impacted by the analysis. These variables include:

- i = Guiding discount rate
- n = number of years in the rotation period
- Vol = Harvest Volume at "maturity"
- Val = Value of timber products
- Cost = Forest Management Costs

Guiding Discount Rate

There are a number of possible sources for obtaining a guiding discount rate for use in this valuation model. Through discussions and negotiations, the Committee has selected the 10-Year Treasury Constant Maturity Rate reported by the Board of Governors of the Federal Reserve System (FRS 2004).

Both historic valuations and monthly reports of the 10-Year Treasury Constant Maturity Rate are reported on the Internet; at the Federal Reserve System Internet web site and others. For ease of access and availability, the authors of this Guide have accessed these numbers at "The Financial Forecast Center; Business, Finance, and Economic Data", at <http://www.forecasts.org/data> and follow links to "Interest Rate Data, 10 Year Treasuries".

Table 4. Recent 10-Year Treasury Constant Maturity Rates.

DATE	10 Year T Bill Rate
1/1/2003	4.05
2/1/2003	3.90
3/1/2003	3.81
4/1/2003	3.96
5/1/2003	3.57
6/1/2003	3.33
7/1/2003	3.98
8/1/2003	4.45
9/1/2003	4.27
10/1/2003	4.29
11/1/2003	4.30
12/1/2003	4.27
1/1/2004	4.15
2/1/2004	4.08
3/1/2004	3.83
4/1/2004	4.35
5/1/2004	4.72
6/1/2004	4.73
7/1/2004	4.50

The Treasury sells marketable bills, notes, and bonds in more than 150 regular auctions per year. Treasury bills are 13-week, 26-week, or 52-week securities that are auctioned at a discount from face value, rather than carrying an interest coupon. Short-term cash-management bills are also auctioned when required by the Treasury's cash-flow needs. Coupon-paying securities include notes and bonds. Treasury notes are currently auctioned in 2-year, 3-year, 5-year, 7-year, and 10-year maturities. Treasury bonds are currently auctioned in a 30-year maturity. The Treasury also issues non-marketable securities, such as savings bonds and certain government account issues.

The Treasury uses a sealed-bid, multiple-price auction mechanism. Competitive bidders for Treasury securities to be held in the commercial book-entry system submit their tenders in writing at Federal Reserve banks. Each successful competitive bidder is awarded securities at a price that reflects the yield bid. As a result, successful bidders for a security may pay different prices for that security.

The 10-Year Treasury Constant Maturity Rate is a before tax, un-inflated interest rate set through a competitive pricing structure, therefore it is not as vulnerable to policy related fluctuations as is the prime rate.

The 10-Year Treasury Constant Maturity Rate is considered to be the "Risk Free" rate of return for institutional investors. While it may not be totally risk free, it is a relatively low risk investment. Because it is a long term investment vehicle, the reported rates include a component of inflation. For the purposes of this valuation model, inflation will be taken out of this reported number.

Inflation can be calculated from a variety of sources, but the most commonly accepted method is to use either the Consumer Price Index or the Producer Price Index. Both of these indices are maintained by the U.S. Bureau of Labor Statistics (<http://www.bls.gov>).

The Bureau of Labor and Statistics maintains detailed information on the US economy. This information is used to determine at what rate the US economy is growing, shrinking, inflating, or deflating. As a general trend, the US economy has been going through a long term of inflation. Since 1913, the BLS has published monthly and annual data on the economy. This data is presented in the Consumer Price Index (CPI). The CPI is a representation of what a "basket of selected goods" might cost in many urban areas of the USA. As the cost of these "basket items" increase, so does the CPI index and thus a rate of inflation is determined. For instance, in 1913, these "basket of goods" might have cost a consumer \$9.90. By 1950, those same goods might have cost \$24.10. By the year 2000, they had risen to \$169.00. While these actual numbers are not really what one would have paid for the BLS basket of goods, the analogy is accurate. We can explain this comparison by a general trend of inflation in the US economy; over time the same goods and services cost more than before.

In 1947, the BLS started publishing data on the production sector of the US economy. This index is called the Producer Price Index (PPI). The PPI is a very useful tool for estimating annual inflation rates for producers. Its uses are many and its application important to the production sector. In addition to producing this index for all producers, the BLS maintains very detailed information on many sectors of the economy. This data series has been selected as the most appropriate index for determining inflation for the forestland investment group (Table 5).

Table 5. Recent Producer Price Index monthly data reports provided by the Bureau of Labor Statistics.

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1980	85.2	86.9	87.5	87.8	88.3	88.7	90.3	91.5	91.7	92.8	93.2	93.8	89.8
1981	95.2	96.1	97.0	98.0	98.3	98.5	99.0	99.0	98.8	98.9	98.8	98.8	98.0
1982	99.7	99.8	99.6	99.6	99.8	100.0	100.4	100.3	100.0	100.2	100.3	100.5	100.0
1983	100.2	100.5	100.4	100.4	100.8	101.0	101.3	101.8	102.0	102.2	102.1	102.3	101.3
1984	102.9	103.2	103.9	104.0	104.1	104.0	104.2	103.8	103.4	103.4	103.7	103.5	103.7
1985	103.4	103.3	103.1	103.3	103.5	103.3	103.2	102.7	102.1	102.9	103.4	103.6	103.2
1986	103.2	101.7	100.3	99.6	100.0	99.9	99.4	99.3	99.4	99.7	99.8	99.7	100.2
1987	100.5	101.0	101.2	101.9	102.6	103.0	103.5	103.8	103.7	104.1	104.2	104.2	102.8
1988	104.6	104.8	104.9	105.8	106.5	107.2	107.9	108.0	108.1	108.2	108.3	109.0	106.9
1989	110.5	110.8	111.5	112.3	113.2	112.9	112.8	112.0	112.4	112.8	112.7	113.0	112.2
1990	114.9	114.4	114.2	114.1	114.6	114.3	114.5	116.5	118.4	120.8	120.1	118.7	116.3
1991	119.0	117.2	116.2	116.0	116.5	116.4	116.1	116.2	116.1	116.4	116.4	115.9	116.5
1992	115.6	116.0	116.1	116.3	117.2	118.0	117.9	117.7	118.0	118.1	117.8	117.6	117.2
1993	118.0	118.4	118.7	119.3	119.7	119.5	119.2	118.7	118.7	119.1	119.0	118.6	118.9
1994	119.1	119.3	119.7	119.7	119.9	120.5	120.7	121.2	121.0	120.9	121.5	121.9	120.4
1995	122.9	123.5	123.9	124.6	124.9	125.3	125.3	125.1	125.2	125.3	125.4	125.7	124.7
1996	126.3	126.2	126.4	127.4	128.1	128.0	128.0	128.3	128.2	128.0	128.2	129.1	127.7
1997	129.7	128.5	127.3	127.0	127.4	127.2	126.9	127.2	127.5	127.8	127.9	126.8	127.6
1998	125.4	125.0	124.7	124.9	125.1	124.8	124.9	124.2	123.8	124.0	123.6	122.8	124.4
1999	122.9	122.3	122.6	123.6	124.7	125.2	125.7	126.9	128.0	127.7	128.3	127.8	125.5
2000	128.3	129.8	130.8	130.7	131.6	133.8	133.7	132.9	134.7	135.4	135.0	136.2	132.7
2001	140.0	137.4	135.9	136.4	136.8	135.5	133.4	133.4	133.3	130.3	129.8	128.1	134.2
2002	128.5	128.4	129.8	130.8	130.8	130.9	131.2	131.5	132.3	133.2	133.1	132.9	131.1
2003	135.3	137.6	141.2	136.8	136.7	138.0	137.7	138.0	138.5	139.3	138.9	139.5	138.1
2004	141.4	142.1	143.1	144.8	146.8	147.2	147.4	147.9	147.7	149.8	151.3	150.1	146.6

The numbers in the dataset are used to determine the annual or periodic inflation rate. A simple inflation rate from 2002 to 2003 can be calculated by subtracting the PPI number of 2002 from the PPI number of 2003. For example, 138.1-131.1 for a result of 7.0 (Table 5). That is, there was a 7.0% inflation in the Producer Price Index from 2002 to 2003. Similarly, from 2001 to 2002, producers in the US economy experienced a 3.1% deflation (overall reduction) of costs (Table 5).

The comparisons from one year to the next can be calculated in this way, however, the consideration of inflation in this index covering multiple years requires the user to consider the effect of compounding (Equation 2).

Equation 2. Calculation of Compound Inflation using the Producer Price Index.

$$f = \sqrt[n]{\frac{PPI_n}{PPI_0}} - 1$$

Where:

- f = annual inflation rate
- PPI_n = Producer Price Index at year "n"
- PPI₀ = Producer Price Index at year "0"
- n = interval, in years, between PPI_n and PPI₀

Formula 2 would allow the user to calculate the average annual compound inflation rate from 1980 to 2003 as follows:

$$f = \sqrt[23]{\frac{138.1}{89.8}} - 1 = 1.89\%$$

In order to obtain the Guiding Discount Rate for Formula 1, the monthly reported 10-Year Treasury Constant Maturity Rate is reduced by the rate of inflation reported in the PPI for the 12 months ending on that report month. In Table 6, that would be the B – D = E.

Table 6. Calculating the Discount Rate using some recent data.

A Date	B 10-Year T Bill	C PPI All commodities	D Annualized Inflation	E Investment Rate	F 10-Year Moving Average Rate
1/1/2003	4.05	135.3	0.068000	-0.0275	0.0444
2/1/2003	3.90	137.6	0.092000	-0.0530	0.0436
3/1/2003	3.81	141.2	0.114000	-0.0759	0.0426
4/1/2003	3.96	136.8	0.060000	-0.0204	0.0422
5/1/2003	3.57	136.7	0.059000	-0.0233	0.0417
6/1/2003	3.33	138.0	0.071000	-0.0377	0.0411
7/1/2003	3.98	137.7	0.065000	-0.0252	0.0406
8/1/2003	4.45	138.0	0.065000	-0.0205	0.0400
9/1/2003	4.27	138.5	0.062000	-0.0193	0.0395
10/1/2003	4.29	139.3	0.061000	-0.0181	0.0389
11/1/2003	4.30	138.9	0.058000	-0.0150	0.0385
12/1/2003	4.27	139.5	0.066000	-0.0233	0.0379
1/1/2004	4.15	141.4	0.061000	-0.0195	0.0373
2/1/2004	4.08	142.1	0.045000	-0.0042	0.0369
3/1/2004	3.83	143.1	0.019000	0.0193	0.0367
4/1/2004	4.35	144.8	0.080000	-0.0365	0.0359
5/1/2004	4.72	146.8	0.101000	-0.0538	0.0349
6/1/2004	4.73	147.2	0.092000	-0.0447	0.0340
7/1/2004	4.50	147.4	0.097000	-0.0520	0.0330
8/1/2004	4.28	147.9	0.099000	-0.0562	0.0321
9/1/2004	4.13	147.7	0.092000	-0.0507	0.0313

Table 6, column E, represents the monthly risk free (or low risk), and inflation free investment rate in the US Economy using the assumptions detailed above. This rate can be positive or negative depending on the other components (columns B and D). The CFTM agreed to use a

moving average rate encompassing the past 10 years (120 months) of the Investment Rate (Column E) to represent the long-term investment rate for use in calculations (Column F). This is obtained from the data by averaging the monthly Investment Rates over a 120 month period, updated monthly.

In building the Guiding Discount Rate for use in the valuation process, however, the forestlands owners have a component of risk to contend with. This “Risk Premium” was debated and discussed by the CFTM with a negotiated agreement reached on how to determine the risk premium.

The Risk Premium for use in determining the Guiding Discount Rate will be calculated as being 25% of the calculated “10-year Moving Average Rate” presented in Table 6, column F. It was recognized that as interest rates in the US economy increase, so does the relative risk of investments, including forestland ownership. Conversely, as the economy experiences deflation periods, the relative risk to investors decreases, each proportional to the other (Table 7).

Table 7. Calculating the Composite Discount Rate and the Risk Premium using some recent data.

A Date	F 10-Year Moving Average Rate	F Risk Premium	G Guiding Discount Rate
1/1/2003	0.0444	0.011090	0.055448
2/1/2003	0.0436	0.010893	0.054467
3/1/2003	0.0426	0.010657	0.053284
4/1/2003	0.0422	0.010545	0.052724
5/1/2003	0.0417	0.010435	0.052177
6/1/2003	0.0411	0.010284	0.051421
7/1/2003	0.0406	0.010140	0.050700
8/1/2003	0.0400	0.010005	0.050023
9/1/2003	0.0395	0.009868	0.049340
10/1/2003	0.0389	0.009734	0.048671
11/1/2003	0.0385	0.009614	0.048069
12/1/2003	0.0379	0.009472	0.047362
1/1/2004	0.0373	0.009333	0.046667
2/1/2004	0.0369	0.009229	0.046144
3/1/2004	0.0367	0.009164	0.045819
4/1/2004	0.0359	0.008975	0.044876
5/1/2004	0.0349	0.008728	0.043642
6/1/2004	0.0340	0.008492	0.042459
7/1/2004	0.0330	0.008258	0.041291
8/1/2004	0.0321	0.008022	0.040112
9/1/2004	0.0313	0.007820	0.039098

The Guiding Discount Rate presented in Table 7, column G, represents an annual rate reported monthly. To further mitigate swings in the resulting moving average, the CFTM has agreed to install what are being called “side-boards” on the calculated Guiding Discount Rate (Table 7, Column F). That is to say, after averaging the past 10 years of monthly rates, the minimum acceptable rate will be no less than 4.00% and no more than 5.00%.

Annual calculations of the productivity option land value will use the Guiding Discount Rate calculated for December of the previous year, unless the previous December is unavailable, in which case the data for the last reported month of the previous year will be used.

Rotation Length and Harvestable Volume

The rotation length for each of the productivity classes must be determined. Each of the zones identified by the Idaho State Tax Commission has three different average volumes per acre per year already identified based on its productivity. An assessment of over what time period these average volumes are attained must be determined. This question is doubly important because it not only impacts the “n” variable (rotation length), but also the total volume at harvest, and thus the total revenue at harvest.

The CFTM reviewed site index tables developed for Idaho, considered values prescribed in pre-existing code (Table 1), and made decisions to make minor modifications to the representative average annual growth rates (or Mean Annual Increment – MAI) and to set rotation lengths corresponding to these average growth rates. The results of these discussions are summarized in Table 8.

Table 8. Rotation length and total volume at harvest in each zone and site productivity class.

Productivity Class	Average board feet per Acre per Year (MAI)	Zones 1 & 2		Rotation Length in Years	Total Volume at Harvest (BF)
		Range of MAI Values (bf/Ac/Yr)			
Poor	125	0 – 175		73	9,130
Medium	225	176 – 287		68	15,300
Good	350	288 +		63	22,050

Productivity Class	Average board feet per Acre per Year (MAI)	Zones 3 & 4		Rotation Length in Years	Total Volume at Harvest (BF)
		Range of MAI Values (bf/Ac/Yr)			
Poor	125	0 – 169		73	9,130
Medium	213	170 – 266		68	14,480
Good	320	267 +		63	20,160

Value of Timber Products

The Idaho State Tax Commission already collects stumpage values from each forest valuation zone in Idaho for use in determining the value of stumpage for both the Productivity option and the Bare Land and Yield option. These values have been used for all projections in the land valuation process. It is recommended that these values be used in the future.

Real Price Appreciation

All of the discount rates discussed for use in the valuation process have been considered absent of inflation. However, the value of forest products calculation uses current stumpage values to estimate the value of a rotation 63 to 73 years in the future.

Long term rates for stumpage have traditionally increased at a long-term rate faster than the general trend in the economy. It is said to have a real price appreciation. When compared to the Producer Price Index, the value of stumpage has increased at a greater rate than inflation. Unfortunately, the Bureau of Labor Statistics (BLS) does not track Idaho’s stumpage values specifically, in fact they do not specifically track stumpage for any region. A specific dataset

tracked by the BLS is Softwood Logs and Bolts (Series ID PCU1133101133101), and has been selected to serve as an indicator for determining the rate of price appreciation into the future.

The BLS has electronically published data dating back to 1981 for this dataset. It would be much preferable to have data extending at least 50 years for use when making projections to the end of a rotation cycle, but that data is not readily available.

In order to use this data, the annual reported price appreciation must be calculated in the same manner presented in Equation 2. This results in the periodic (or annual) rate of price increases for this commodity either simple, or compounded. However, this result includes the inflation experienced in the overall economy and is not the real price appreciation for this commodity. The Producer Price Index results for the same period (1981-2004) should be used for removing the portion of price increases attributable to the inflation in the economy.

Table 9, Column A shows the PPI – Softwood Logs and Bolts data series, column B is the compound price increase rate from the date indicated back to the beginning of the series (1981), and column C displays the annual rate of change (one year to the next). The PPI inflation rate (Table 5) for this same period has been removed from the cells in Table 9, column D, to show the real price appreciation for Softwood Logs and Bolts from the date indicated back to the beginning of the dataset (1981).

The resulting rate of 1.61% (last row of column D) is the real price appreciation of this commodity from 1981 to 2004. As earlier indicated, this is a short time horizon for this type of a commodity, to base the real price appreciation on. It would be much preferable to have 50 or more years of data in this database.

Other projections of the Real Price Appreciation for stumpage, including those completed by the USDA Forest Service Pacific Northwest Research Station in Corvallis, Oregon, have placed estimates for the coming years at numbers between 0.50% and 1.25% (Warren 2004). Other forecasters have estimates between 0.50% and 1.50%.

During discussions by the Committee the appropriate Real Price Appreciation rate to use was debated for an elongated period of time. Dr. Schlosser felt that the 1.61% calculated from the BLS dataset was unreliable because of the short time period in the dataset. He shared the 1% rate estimated by other researchers. He suggested that the Committee debate this variable to come to a solution.

Through a series of “what if” questions played out in the model, and caucuses held by the teams, an agreement was reached. The “Timber Team”, offered the “County Team” a solution whereby the Committee would reach agreement by setting the Real Price Appreciation for stumpage in Idaho at 1.25% while simultaneously setting the Guiding Discount Rate at 4.00%. The intent of this agreement is to stabilize the equation from annual swings in these variables, while agreeing to continue watching changes in these input variables over time. The issue of both of these variables will be addressed again in 2012.

Table 9. Bureau of Labor Statistics data on Softwood Logs and Bolts used for calculating Real Price Appreciation for Stumpage.

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	A Annual PPI	B Avg RPA	C Annual RPA	D RPA w/o 'i'
1981												100.0	100.0	N/A		
1982	98.5	100.0	101.3	101.5	99.5	98.8	95.3	93.9	92.3	89.5	88.7	91.3	95.9	-4.1%	-4.1%	-4.10%
1983	90.3	91.9	93.1	92.8	92.4	93.4	93.1	93.4	94.9	92.6	93.5	93.4	92.9	-3.6%	-3.1%	-5.29%
1984	92.4	97.9	93.3	94.5	96.9	97.4	95.7	90.5	92.5	88.8	88.9	89.1	93.2	-2.3%	0.3%	-4.22%
1985	89.9	92.5	92.7	93.3	93.2	93.5	92.6	91.4	90.2	91.3	91.0	90.8	91.9	-2.1%	-1.4%	-3.39%
1986	89.8	85.9	87.2	87.4	88.1	88.6	87.5	88.0	87.9	88.3	88.0	88.6	87.9	-2.5%	-4.4%	-2.99%
1987	89.4	91.3	93.0	92.6	92.7	94.2	96.0	100.8	107.8	112.7	116.6	118.6	100.5	0.1%	14.3%	-0.72%
1988	120.2	121.2	121.6	122.4	122.1	120.0	120	119.0	119.3	119.6	120.1	121.8	120.6	2.7%	20.0%	1.46%
1989	124.1	126.0	127.8	132.6	133.6	137.1	140.6	144.8	145.0	148.8	149.0	148.6	138.2	4.1%	14.6%	2.42%
1990	150.4	150.8	152.6	153.2	153.6	153.8	155.6	154.4	151.9	148.6	146.8	145.8	151.5	4.7%	9.6%	2.80%
1991	150.0	150.2	148.7	149.6	152.8	152.3	153.1	155.5	154.4	156.8	154.6	154.2	152.7	4.3%	0.8%	2.58%
1992	162.3	167.8	171.8	178.9	179.7	180.1	180.7	181.9	184.8	187.4	188.1	194.7	179.9	5.5%	17.8%	3.84%
1993	203.2	216.8	226.2	254.3	268.3	256.9	252.0	238.9	238.9	239.4	243.3	238.8	239.8	7.6%	33.3%	5.94%
1994	253.5	257.2	261.8	256.8	248.3	245.0	242.1	238.6	237.8	237.7	237.7	240.0	246.4	7.2%	2.8%	5.59%
1995	244.1	252.7	254.1	258.5	256.6	256.0	245.1	240.8	240.9	238.9	236.2	237.3	246.8	6.7%	0.2%	4.93%
1996	240.0	239.1	232.6	221.7	225.0	224.3	224.3	227.2	230.8	233.1	234.9	236.1	230.8	5.7%	-6.5%	3.95%
1997	239.3	241.5	241.9	241.5	242.6	240.8	241.1	240.0	239.7	235.0	234.5	234.0	239.3	5.6%	3.7%	3.94%
1998	235.8	238.0	237.9	238.8	233.6	227.3	225.2	225.6	223.8	221.9	220.2	218.7	228.9	5.0%	-4.3%	3.58%
1999	220.0	223.6	225.7	229.1	230.1	229.4	230.0	232.3	234.6	237.0	238.7	239.8	230.9	4.8%	0.9%	3.38%
2000	243.5	245.0	242.9	240.5	236.4	233.7	228.6	217.9	217.8	216.5	215.1	213.9	229.3	4.5%	-0.7%	2.86%
2001	212.4	205.6	205.7	205.6	208.6	211.0	209.0	207.6	207.9	204.8	203.4	202.6	207.0	3.7%	-9.7%	2.12%
2002	201.1	202.1	203.7	207.4	208.0	208.0	208.2	207.4	207.4	208.6	206.7	205.2	206.2	3.5%	-0.4%	2.11%
2003	202.0	204.4	203.5	202.6	200.7	198.3	197.1	199.5	201.7	203.6	203.4	204.9	201.8	3.2%	-2.1%	1.67%
2004	206.6	208.5	211.5	211.7	213.0	215.1	217.0	217.1	218.5	219.6	218.7	215.6	214.4	3.4%	6.2%	1.61%

Forest Management Annual Costs and Annual Income

In 1997, the ISTC commissioned a survey of Idaho's Forestland Owners to determine the costs of forest management. The implementation of the survey revealed that while large landowners provided extremely valuable data to the survey process, the number of respondents representing smaller acreages was less than desirable. The variability of the responses was extreme, especially in some questions.

The Committee reviewed the summarized responses and negotiated values for some of the items in the survey by setting some values to zero, reducing others, and leaving some unchanged. The results of that negotiated set of costs is presented in Table 10.

Table 10. Annual costs of forest management.

	2004 Values			
	Zone 1	Zone 2	Zone 3	Zone 4
IDL Fee (Cost)	\$0.70	\$0.70	\$0.70	\$0.70
Grazing (Income)	\$0.02	\$0.09	\$0.26	\$0.93
Management Fee (Cost)	\$12.84	\$12.98	\$7.71	\$7.71
Net Total	\$13.56	\$13.77	\$8.67	\$9.34

The values summarized in Table 10 were agreed to by the CFTM with the condition that the ISTC will conduct a forest management cost study every five years to determine the annualized custodial expenses to be used in the timber productivity valuation process. The first study will be conducted in 2005 and evaluated by the CFTM, with the results incorporated into this timber productivity valuation process on January 1, 2007. The forest management cost study will be funded by the ISTC, subject to appropriation by the legislature.

The methods of the cost study may include a targeted mail survey of forestland owners in the productivity option, interviews, observations, and other methods deemed by the CFTM and the ISTC to be appropriate in order to garner the data needed to reliably determine expenses consistent with custodial management.

The definition of the expenses consistent with a custodial management regime was discussed at length by the CFTM and has been included in Legislative Rule 960, with relevant sections summarized below.

- 3) **Custodial Expenses - defined.** Custodial expenses are some of the expenses incurred in the management of forest lands.
 - a) **Included Expenses.** Custodial expenses include the following expenses, except as provided in paragraph 960.03.b. of these rules:
 - i) **Reforestation expenses.** Reforestation expenses are the cost of seeds, seedlings, and planting for the establishment of a forest to the specifications of the Idaho Forest Practices Act (Title 38, Chapter 13);
 - ii) **Road maintenance expenses.** Road maintenance expenses are those costs necessary to prevent major deterioration or maintain the integrity of forest roads including culvert maintenance, public access control, and erosion prevention, but not including the cost of original construction, opening roads for silviculture, driveway maintenance or recreational access;
 - iii) **Managing Public Use expenses.** Expenses for managing public use are limited to the costs of installing and maintaining gates and signage;

- iv) **Forest Inventory expenses.** Forest inventory expenses are the costs of collection and analysis of forest inventory data;
 - v) **Forest Management Planning expenses.** Forest Management Planning expenses are the costs associated with a GIS or similar information database and those activities integral to the planning process;
 - vi) **Facility Operations and Maintenance expenses.** Facility operations and maintenance expenses are those costs of maintaining and operating facilities necessary for forest land management;
 - vii) **Environmental Analysis and Documentation expenses.** Environmental analysis and documentation expenses are analysis and documentation costs associated with federal and state environmental requirements;
 - viii) **Appeals and Litigation expenses.** Appeals and litigation expenses are those costs associated with litigating federal and state environmental requirements;
 - ix) **Land survey expenses.** Land survey expenses are those costs associated with surveying forest land;
 - x) **Forest Fire Suppression expenses.** Forest fire suppression expenses are the portion of those costs associated with the suppression of wildfires on forest lands borne by the forest land owner, that exceed the annual fire protection fee;
 - xi) **Other Management expenses.** Other management expenses are unspecified costs agreed to by the CFTM and determined to be annualized custodial expenses by the forest management cost study conducted pursuant to section 63-1705, Idaho Code.
- b) **Excluded Expenses.** Custodial expenses exclude the following:
- i) Fertilization;
 - ii) Precommercial thinning;
 - iii) Tree Improvement;
 - iv) Genetic improvement;
 - v) Site preparation;
 - vi) Harvesting;
 - vii) Road building;
 - viii) Timber harvest layout and silvicultural layout;
 - ix) Slash management;
 - x) Pruning;
 - xi) Brush control;
 - xii) Litigation pertaining to subparagraphs 960.03.b.i - xi.

It is expected that some landowners make expenditures for included custodial management costs while others do not. The survey process will be conducted once every 5 years to determine at what level custodial management expenses are made in each forest valuation zone in the state. This data will be used in the productivity option valuation process as this information becomes available.

The actual annual cost values to be used each year will be adjusted for inflation using the Bureau of Labor Statistics Producer Price Index (example in Table 5) dataset for the matching time periods. Specifically, cost figures in 2007 would be adjusted for inflation, or deflation, to 2009 when used to represent costs in 2009.

Allocation of Costs by Productivity Class

The average annualized management cost of custodial forest management is allocated to lands in each of the productivity categories within a zone. It was recognized by the CFTM that the allocation of annual custodial management expenses would show more costs per acre on higher productive lands, and fewer costs on lower productive lands. This allocation process is weighted within each zone, based on the number of acres of designated forestlands in each productive class.

The mathematical process of cost allocation is summarized in Equation 3.

Equation 3. Allocation of custodial management costs process.

$$\text{Allocated Costs} = \left(\left[\begin{array}{c} \text{Zone} \\ \text{Average} \\ \text{Annual} \\ \text{Cost} \end{array} \right] \div \left(\text{FACTOR} \times \left\{ \begin{array}{c} \text{Stumpage} \\ \text{Value} \end{array} \right\} \right) \right) \times (\text{MAI}) \times \left(\begin{array}{c} \text{Stumpage} \\ \text{Value} \end{array} \right)$$

Where;

$$\text{FACTOR} = \left(\begin{array}{l} \text{[Percent of designated forestlands of Zone in "Good"]} * \text{[MAI of "Good"]} \end{array} \right) + \left(\begin{array}{l} \text{[Percent of designated forestlands of Zone in "Medium"]} * \text{[MAI of "Medium"]} \end{array} \right) + \left(\begin{array}{l} \text{[Percent of designated forestlands of Zone in "Poor"]} * \text{[MAI of "Poor"]} \end{array} \right)$$

Table 11. Example allocation of Custodial Expenses within Zone II, 2005.

	Zone 2			
	Good	Medium	Poor	All
Percent of designated forestlands in each category within Zone 2	0.6085	0.3333	0.0533	100%*
MAI of Each Productivity Class in Zone II	0.350	0.225	0.125	
Zone 2 Stumpage Value				\$230.81
Zone 2 Average Annual Management Cost for 2005				\$12.98
FACTOR (calculated from Equation 3)				0.2946
Allocated Cost per acre per year (2005)	\$15.42	\$9.91	\$5.51	

* An additional fraction of the total area in Zone II, 0.0049, is classified as waste land which receives a separate valuation process.

Forestland Valuation Process

In order to calculate a value of forest lands in the Productivity Option, the input variables must be combined accurately. The use of modern computer systems and software is a must in this process. All of the variables and the value model have been created in an Microsoft® Office Excel Spreadsheet. This spreadsheet has multiple worksheets and imbedded look-up formulae. Copies of the Spreadsheet are available from the Idaho State Tax Commission:

Forest Tax Administrator
Idaho State Tax Commission

PO Box 36
Boise ID 83722
phone: (208) 334-7733
fax: (208) 334-7741
email: rbrevig@tax.state.id.us

Tables 13-16 detail the calculation results for each zone and will be discussed in subsequent paragraphs. Cell references will be made by column (letters) and rows (numbers). Therefore, A3, references the stumpage values, while B3 references the stumpage value for “Good” rated lands.

Row 3, Stumpage, represents the 5 year moving average of stumpage values currently calculated by the Idaho State Tax Commission for use with the Bare Land and Yield Tax option. The stumpage value is the same for all productivity classes within a zone, however, it is generally different between zones.

Row 4, MAI , is the growth potential of each productivity class. MAI stands for Mean Annual Increment and is a representation of the volume of wood per acre potentially grown annually on each site. The units of the numbers is in thousands of board feet (MBF).

Row 5, “t”, is the rotation length expected in each productivity class (time). This is the number of years between harvest events, with a harvest of all timber on the site. This “even aged management” scenario is not expected to be the harvest system of choice of private forestland owners in the state, but for the purposes of determining land values, the CFTM decided to use this management regime. Landowners are not bound by this management scenario in any way.

Row 6, “Guiding Discount Rate”, is determined from the calculation of the 10-year treasury constant maturity rates as reported by the Federal Reserve System minus the inflation factor, plus the risk premium, discussed earlier, to calculate the Guiding Discount Rate. In Tables 13-16, this rate has been set at 4.00% as per a negotiated agreement within the CFTM. For future calculations, data for the Guiding Discount Rate calculations should be collected and the moving averages calculated.

Row 7, Harvest MBF, is the product of multiplying Row 4 by Row 5. This is the expected amount of timber volume at the final rotation age “t” (Row 5).

Row 8, Harvest Income, is calculated by compounding the current stumpage value (Row 3) by the Real Price Appreciation for stumpage (1.25%) for a period of years equal to the rotation length – “t” – (Row 5). The actual calculation is detailed in Equation 4.

Equation 4. Calculating the estimated harvest income.

$$\text{Harvest Income (\$)} = [\text{Stumpage Value (\$)}] \times [(1+\text{RPA})^t] \times [\text{Harvest MBF}]$$

Rows 8, 9, 10, and 11, represent annual income and management costs previously discussed in this document.

Row 12, the Present Value Annual Cash Flow represents the discounted value of the annual costs and revenues in the projected series, into perpetuity. The precise formula used to discount these annual costs and revenues is detailed in Equation 5.

Equation 5. Calculating the present value of annual costs and revenues, into perpetuity.

$$\text{Present Value Annual Cash Flow} = \left[\frac{\text{Revenues} - \text{Costs}}{\text{Guiding Discount Rate}} \right]$$

Row 13, Present Value of Periodic Cash Flows, represents the present value of the periodic income stream generated from timber harvests in the future, into perpetuity. The process of discounting this periodic cash flow uses the value of future harvests calculated in Row 8, discounted by the Guiding Discount Rate (Row 6). The formula used for this calculation is detailed in Equation 6.

Equation 6. Calculation of the present value of future periodic revenues.

$$PV = \left[\frac{\text{Row 8}}{(1 + (\text{Row 6}))^t - 1} \right] = \left[\frac{\text{Periodic Income}}{(1 + i)^t - 1} \right]$$

Row 14, the Pre-Property Tax Soil Expectation Value (SEV), represents the calculated value of the land to produce timber products, based on the assumptions detailed in this document (Row 13 + Row 12). However, this value is a pre-property tax value. Property taxes will be deducted from this amount to calculate a post-property tax land value.

Row 15, Post-Property Tax SEV, is the pre-property tax SEV minus the burden of current and future property taxes discounted to the present time. The calculation for annual property taxes uses average property tax rates for landowners in the Productivity Tax option, within each zone, for the previous tax year (Table 12). The process of calculating the average forest land levy rate is detailed in Rule 960, and summarized below:

960-06. County Average Forest Land Levy Rate. The county average forest land levy rate is calculated by summing the levy rate for each forested tax code area in each county, and dividing this sum by the number of forested tax code areas in each county.

960-07. Weighted Average Forest Land Levy Rate. The weighted average forest land levy rate is the county average forest land levy rate defined in subsection 960.06 of this rule, multiplied by the total number of designated forest land acres in each county. The sum of the product of this calculation for each county in each forest value zone is then divided by the total number of designated forest land acres in the forest value zone.

The results of this series of calculations is summarized in Table 12.

Zone	2005 Rate
I	1.1130%
II	1.0959%
III	0.9069%
IV	1.1528%

Determining the exact property tax burden in each zone and each productivity level (Good, Medium, Poor), requires that the post-property tax value is known:

$$(\text{Post Tax Land Value}) * (\text{Tax Rate}) = (\text{Property Tax Due})$$

$$(\text{Pre-Tax Land Value}) - [(\text{Property Tax Due}) \div (\text{GDR})] = (\text{Post Tax Land Value})$$

However, the post-property tax value is dependant on the property tax due amount. At the same time, the amount of taxes due cannot be determined without knowing the post-property tax value. In mathematical terms, this is known as a circular reference. The two must be determined simultaneously and interactively.

This can be accomplished through example by multiplying the tax rate by the pre-property tax land value for Medium Lands in Zone 2:

Pre-Property Tax Land Value.....	\$350.41
Zone 2 Tax Rate	1.0959%
Property Tax Amount #1	\$3.84

This property tax amount of \$3.84 is then discounted back into the land valuation equation to show up as an expense which reduces the value of the land, due to the tax burden today and into the future. The process of calculating this discounted expense is detailed in Equation 5. This has the effect of reducing the land value to a preliminary post-property tax #1 land value, based on this modified cost:

Discounted cost due to Property Tax Amount #1.....	\$96.00
Preliminary Post-Property Tax #1 Land Value	\$254.41
Tax Rate.....	1.0959%
Property Tax Amount #2	\$2.79

Because the first property tax calculation result (\$3.84) reduced the land value to \$254.41, the second calculation of the Property Tax Amount (#2) has reduced to \$2.79. A lower land value results in a lower tax amount, given the same rate. Conceptually, this means that a higher tax rate results in a devaluation of the lands the tax rate is applied to. The land value must be recalculated based on the burden of a \$2.79 tax amount, instead of a \$3.84 tax amount. The process is repeated using the new preliminary values:

Discounted costs due to Property Tax Amount #2.....	\$69.70
Preliminary Post-Property Tax #2 Land Value	\$280.71
Tax Rate.....	1.0959%
Property Tax Amount #3	\$3.08

This new property tax amount (#3) is between the first estimate and the second estimate. The process is again repeated:

Discounted costs due to Property Tax Amount #3.....	\$76.91
Preliminary Post-Property Tax #3 Land Value	\$273.51
Tax Rate.....	1.0959%
Property Tax Amount #4	\$3.00

And again:

Discounted costs due to Property Tax Amount #4.....	\$74.93
Preliminary Post-Property Tax #4 Land Value	\$275.48
Tax Rate.....	1.0959%
Property Tax Amount #5	\$3.02

At this point, the evaluator can see that the land values from one step to the next are beginning to stabilize in the direction of a central number (between \$280 and \$273), in this case, five additional iterations are needed to arrive at the land value of \$275.06 and a property tax amount of \$3.01. At this tax amount, the pre-property tax land value of \$350.41 is offset by \$75.36 ($\$3.01 \div [\text{GDR}]$) to result in a post-property tax value of \$275.06. This is also the land value resulting in a property tax burden of \$3.01 at a tax rate of 1.0959%. It is the simultaneous solution of both problems detailed from above:

$$(\text{Post Tax Land Value}) * (\text{Tax Rate}) = (\text{Property Tax Due})$$

$$(\text{Pre-Tax Land Value}) - [(\text{Property Tax Due}) \div (\text{GDR})] = (\text{Post Tax Land Value})$$

Fortunately, Microsoft® Office Excel has a feature called “Goal Seek” which allows this process to be accomplished with extreme speed and accuracy. The spreadsheet accompanying this manual has macros imbedded into the appropriate cells which will calculate the post-property tax land value and the property tax amount, each dependant on the other. This is accomplished by clicking on the button titled “Recalculate Zone” at the bottom of the summary information. These buttons activate a macro which recalculates the post-property tax land value and the property tax amount until the two are “matched” giving the accurate post-property tax land value.

Changes in the input variables will cause changes in the calculated post-property tax SEV and annual tax amount. To see the impact of these changes the user can make selected changes in the input variables and then click the “Recalculate Zone” button to see the recalculated post-tax land value in Row 15, and the recalculated property tax per acre (Row 16).

Tables 13 – 16 detail information based on projections for 2005, for each zone.

Table 13. Zone 1 Land Value Calculation, 2005 data.

	A	B	C	D
1			Zone 1	
2	Item	Good	Medium	Poor
3	Stumpage =	\$ 237.80	\$ 237.80	\$237.80
4	MAI =	0.350	0.225	0.125
5	t =	63	68	73
6	Guiding Discount Rate =	4.00%	4.00%	4.00%
7	Harvest MBF =	22.05	15.30	9.13
8	Harvest Income =	\$ 11,469	\$ 8,468	\$5,374
9	Annual Income =	\$0.02	\$ 0.02	\$0.02
10	Fire & FPA Fees =	\$0.70	\$ 0.70	\$0.70
11	Management Cost =	\$16.30	\$ 10.48	\$5.82
12	PV Annual Cash Flow =	\$(424.40)	\$(278.90)	\$(162.50)
13	PV Periodic Cash Flow =	\$1,058.65	\$ 632.07	\$325.37
14	Pre Prop Tax SEV =	\$ 634.25	\$ 353.17	\$162.87
15	Post Prop Tax SEV =	\$496.18	\$ 276.29	\$127.42
16	Property Tax/Ac. =	\$5.52	\$ 3.08	\$1.42

Table 14. Zone 2 Land Value Calculation, 2005 data.

	A	B	C	D
1			Zone II	
2	Item	Good	Medium	Poor
3	Stumpage =	\$230.81	\$ 230.81	\$230.81
4	MAI =	0.350	0.225	0.125
5	t =	63	68	73
6	Guiding Discount Rate =	4.00%	4.00%	4.00%
7	Harvest MBF =	22.05	15.30	9.13
8	Harvest Income =	\$11,131	\$ 8,219	\$ 5,216
9	Annual Income =	\$0.09	\$ 0.09	\$ 0.09
10	Fire & FPA Fees =	\$0.70	\$ 0.70	\$ 0.70
11	Management Cost =	\$15.42	\$ 9.91	\$ 5.51
12	PV Annual Cash Flow =	\$(400.75)	\$(263.49)	\$(152.93)
13	PV Periodic Cash Flow =	\$1,027.53	\$ 613.49	\$315.81
14	Pre Prop Tax SEV =	\$626.78	\$ 350.41	\$162.88
15	Post Prop Tax SEV =	\$ 491.99	\$ 275.06	\$ 127.85
16	Property Tax/Ac. =	\$ 5.39	\$ 3.01	\$ 1.40

Table 15. Zone 3 Land Value Calculation, 2005 data.

	A	B	C	D
1			Zone III	
2	Item	Good	Medium	Poor
3	Stumpage =	\$148.13	\$ 148.13	\$148.13
4	MAI =	0.320	0.213	0.125
5	t =	63	68	73
6	Guiding Discount Rate =	4.00%	4.00%	4.00%
7	Harvest MBF =	20.16	14.48	9.13
8	Harvest Income =	\$ 6,532	\$ 4,993	\$3,347
9	Annual Income =	\$ 0.26	\$ 0.26	\$0.26
10	Fire & FPA Fees =	\$ 0.70	\$ 0.70	\$0.70
11	Management Cost =	\$ 11.12	\$ 7.40	\$4.35
12	PV Annual Cash Flow =	\$(289.08)	\$(196.10)	\$(119.63)
13	PV Periodic Cash Flow =	\$602.93	\$ 372.73	\$202.68
14	Pre Prop Tax SEV =	\$313.85	\$ 176.63	\$83.05
15	Post Prop Tax SEV =	\$ 255.84	\$ 143.99	\$67.70
16	Property Tax/Ac. =	\$ 2.32	\$ 1.31	\$0.61

Table 16. Zone 4 Land Value Calculation, 2005 data.

	A	B	C	D
1			Zone II	
2	Item	Good	Medium	Poor
3	Stumpage =	\$147.61	\$147.61	\$147.61
4	MAI =	0.320	0.213	0.125
5	t =	63	68	73
6	Guiding Discount Rate =	4.00%	4.00%	4.00%
7	Harvest MBF =	20.16	14.48	9.13
8	Harvest Income =	\$ 6,509	\$4,976	\$3,336
9	Annual Income =	\$ 0.93	\$0.93	\$0.93
10	Fire & FPA Fees =	\$ 0.70	\$0.70	\$0.70
11	Management Cost =	\$ 11.12	\$ 7.40	\$4.35
12	PV Annual Cash Flow =	\$(272.33)	\$(179.35)	\$(102.88)
13	PV Periodic Cash Flow =	\$600.81	\$371.42	\$201.97
14	Pre Prop Tax SEV =	\$328.48	\$192.07	\$99.09
15	Post Prop Tax SEV =	\$254.99	\$149.10	\$ 76.92
16	Property Tax/Ac. =	\$2.94	\$1.72	\$ 0.89

Next Steps

The CFTM debated and negotiated a number of factors given the data available in 2004 for an equitable process of determining land values in the Timber Productivity Option for Idaho. The committee recognized additional data would be beneficial to the valuation process and in the future additional data will be required.

Custodial Management Cost Survey

The CFTM has identified detailed management cost data as critical to the land valuation process. The forest management cost survey (1993-1997) of Idaho's forestland owners commissioned by the Idaho State Tax Commission was very useful, but this survey will need to be conducted periodically in order to insure that the cost component of this land valuation process keeps pace with the other data in the valuation model.

The CFTM has recommended to the Idaho State Legislature that a forest management cost survey be repeated every 5 years beginning in 2005. The data derived from the survey will be used in the land valuation process for 2007 land values. Data derived from subsequent surveys would be used in the valuation model two years following the collection of the data. While Legislation and Rules have been developed, further explanation is warranted.

A theme that has been repeated in this manual and in the Rules, is the concept of "Custodial Management" of the resource. The CFTM desired land values in the Productivity Option to reflect growth rates, rotation lengths, costs, and revenues that reflected a landowner's management consistent with a hands-off management style. The landowner would astutely manage the resource controlling insects, diseases, and wildfire risk, adhere to the Idaho Forest Practices Act, and make sound financial decisions, but would not intensively manage the property with fertilizers, herbicides, and improved genetic stock. This improved management would increase management costs, potentially increase growth rates, change rotation lengths, and therefore land values would change.

In light of this, the cost survey to be conducted by the Idaho State Tax Commission will attempt to collect information about the magnitude of costs in a variety of categories consistent with a Custodial Management regime.

The Forest Management Cost survey will be developed in 2005. Communications to Idaho's Forestland Owners will include a brief discussion of the uses of this data, the scope of the survey, and a clear definition of Custodial Expenses. The results will be analyzed and included in the land valuation process beginning in 2007.

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