



Valuation of a Portion of the O&C Lands in Western Oregon

Prepared for:

O&C Counties

Prepared by:

John Sessions, Consultant

Mark Rasmussen, Mason, Bruce & Girard, Inc.

17 August, 2010

MB&G

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Executive Summary

The O&C Counties propose a plan to sell about 1.2 million forested acres of the O&C lands with timber of age classes 0-110 years to fund: (a) a portion of the next Secure Rural Schools (SRS) safety net payment program; and (b) an O&C county trust fund. Under the proposal, the timberland would be sold to the private sector over a ten-year period (presumably 2011-2020) in roughly equal increments.

Based on the valuation exercised explained in this report, we think it is likely that the planned sales would generate somewhere close to \$6 billion for the 1.2 million forested acres with timber stands 110 years old and younger.

In this report we explain the valuation calculation, test the results against different log price assumptions and discount rates, and offer our observations about the market for timberland in the Pacific Northwest.

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Background

The O&C Counties propose a plan to sell about 1.2 million forested acres of the O&C lands with timber of age classes 0-110 years to fund: (a) a portion of the next Secure Rural Schools (SRS) safety net payment program; and (b) an O&C county trust fund.

Under the proposal, the timberland would be sold to the private sector over a ten-year period (presumably 2011-2020) in roughly equal increments. A citizen advisory board would assist with designating the timing and structure of the annual timberland sale offerings.

Objectives

An estimate of the market value of the subject timberland is needed to evaluate the feasibility of the proposal. To that end, this study:

- Estimates market value of the 1.2 million acres of O&C land that is 110 years of age and younger¹ -- the subject timberlands;
- Tests the sensitivity of the estimated market value to a range of discount rates and log price projections;
- Discusses the market for investment grade timberland, relative to the proposed timberland offering

The intended use of this valuation is to help the O&C Counties evaluate the feasibility of a policy proposal. This report provides an estimated value for the subject timberland, sold in unspecified parcels over the course of the next ten years. This valuation assignment presents special challenges not typically found in more standard timberland appraisals, as discussed below. While we rely on standard appraisal techniques and insights from timberland appraisals, this report does not constitute a formal timberland appraisal nor does it meet the Uniform Standards for Professional Appraisal Practice appraisal requirements. We suggest that formal appraisals be performed on parcels as they become ready for sale.

Methods

We rely primarily on the Discounted Cash Flow (DCF) approach to value for this valuation.² The DCF value of a timberland property is the present value of the future cash flows flowing from the property, plus a reversion value.³ The relevant cash flows are based on harvest levels, log prices, logging and haul

¹ Age class is derived from BLM data used in the Western Oregon Plan Revision (WOPR). Throughout this report, reference to acres “110 years and younger” is based on the stand age in 2006.

² The comparable sale approach is considered, but the unique nature of the BLM timberland makes it less reliable. The cost approach is not generally used in timberland appraisals.

³ Reversion value is the value of the timberland at the end of the harvest schedule used for valuation, discounted to the present.

costs, management costs and discount rates expected by likely bidders for the timberland. These may be quite different from the harvest schedule, revenues and costs contemplated by the BLM.

To evaluate the BLM’s recent Western Oregon Plan Revision (WOPR), the O&C Counties retained Dr. John Sessions, Oregon State University, to build a timber harvest scheduling model covering the WOPR’s 2.5 million acre land base. This model is a heuristic harvest scheduling model that uses land base and growth and yield projections developed by the BLM to develop and analyze WOPR alternatives.

While the underlying data are the same, the valuation model used for this analysis differs significantly from the WOPR model used by the BLM. For valuation it is desirable to carry more detail about expected log characteristics and log extraction and hauling costs than was available in the strategic planning model that the BLM created for the WOPR. Since that detail was not captured in the data supporting the WOPR model, we made a number of assumptions as explained in **Appendix B**. The WOPR models, furthermore, focused on calculating even-flow harvest levels allowable under different management and policy standards. Harvest levels specified in the valuation model, on the other hand, reflect purchasers’ financial objectives, resulting in accelerated harvest of timber that is past financial maturity.

Sensitivity analysis is used to evaluate how the estimated market value might change under different price assumptions and under different expectations of return.

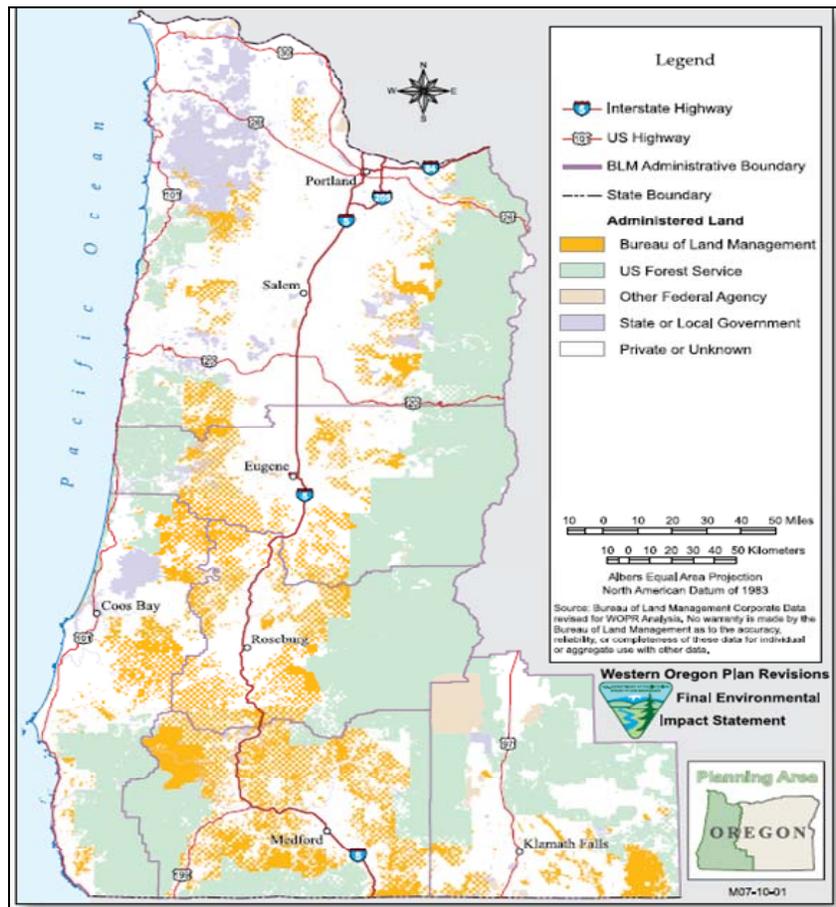


Figure 1 - Location of all BLM lands in Western Oregon

Results

The subject timberland for the purposes of this valuation consists of forested O&C acres with stand age of 110 years and younger, based on the BLM’s 2006 inventory. **Figure 1** shows the general location of the BLM lands in Western Oregon. The O&C lands are the majority of the BLM land shown in yellow. The subject timberland – the 1.2 million forested acres in stands 110 years and younger – account for somewhat less than half the BLM land shown in yellow.⁴

⁴ USDI Bureau of Land Management. 2005. *Western Oregon Plan Revision: Analysis of the Management Situation*, page 6.

Table 1 shows how the subject timberlands fit within the public land accounting commonly reported.⁵ The BLM manages over 2.5 million acres in Western Oregon. Of that about 486,000 acres are Public Domain lands, Coos Bay Wagon Road lands and acquired acres, none of which are included in this valuation. The remaining 2.1 million acres are the O&C lands, a portion of which become the subject timberland.

Table 1: Land Classification

	Acres
Land Administered by BLM in Western Oregon	
Total landbase included in WOPR	2,557,800
Public Domain, CBWR and Acquired	485,643
O&C Lands	2,072,157
O&C Lands (USFS & BLM)	
Total O&C Lands	2,564,556
Administered by USFS (mostly controverted acres)	492,399
Administered by BLM	2,072,157
Forested O&C Lands Administered by the BLM (net of roads)	
Total of forested acres	1,912,464
Forested acres older than 110 years	707,407
Forested acres 110 years and less	1,205,058
Forested riparian buffers (FPA rules)	96,405
Forested acres contributing to valuation (Subject Timberland)	1,108,653

All told, there are about 2.6 million acres of O&C lands, 2.1 million acres administered by the BLM and about 492,000 of mostly “controverted” O&C lands administered by the USFS. Only the 2.1 million acres of O&C lands administered by the BLM contribute to the subject timberland for valuation purposes.

Finally, **Table 1** shows that about 1.9 million acres of the O&C lands administered by the BLM are considered to be forested. The rest are in roads and other non-forest classifications. About 1.2 million acres of forested lands were 110 years and younger in the 2006 inventory – this constitutes the subject timberland for the purpose of this valuation.⁶ Based on recent work done at OSU, we estimate that about 96,000 acres of the subject timberland would be included in riparian buffers specified in Oregon’s Forest Practice Act and would not contribute to the cash flow. Our valuation is based on the commercial timber volume found on 1.1 million forested acres outside the riparian acres.

Table 2 shows how the subject timberland net of riparian acres is distributed across the BLM Districts. It also shows the distribution of all the forested O&C acres administered by the BLM.⁷ Table 2 indicates that the subject timberland is not evenly distributed between BLM Districts. About 80% of the O&C

⁵ Source: BLM Western Oregon Plan Revision; Bureau of Governmental Research and Service, *The O&C Lands*, University of Oregon, 1981.

⁶ In practice, the acres sold will be somewhat larger as they would include acres in road, non-forest, non-commercial forest, etc. For the purpose of valuation, we assign these acres a value of zero as they do not directly generate cash flow.

⁷ The inventory for the O&C acres administered by the US Forest Service was not available for this report.

lands administered by the BLM Eugene District is forested land with timber stands 110 years and younger and is part of the subject timberland. However, only 50% of the O&C lands administered by the BLM Medford District are included.

Table 2: Net BLM O&C forest acres outside of riparian zones and volume, 16-ft Scribner scale by district.

Acres and Volume by district	Acres <=110 years			All Acres		
	Acres	MMbf	Mbf/acre	Acres	MMbf	Mbf/acre
Coos Bay	158,452	2,991	18.9	209,271	6,611	31.6
Eugene	209,858	5,071	24.2	264,036	9,723	36.8
Lakeview	27,493	498	18.1	39,915	916	22.9
Medford	299,423	3,978	13.3	602,110	15,458	25.7
Roseburg	188,606	2,880	15.3	348,423	14,537	41.7
Salem	223,204	6,427	28.8	293,925	11,915	40.5
Total	1,107,036	21,845	19.7	1,757,680	59,160	33.7

Figure 2 shows the age class distribution of the O&C forested lands administered by the BLM, as of the 2006 inventory. The subject timberland is the 1.2 million acres 110 years of age and younger. Of that about half the acres are less than 50 years old. There are about 360,000 acres in the 120-150 age class and about 420,000 acres over 160 years old.

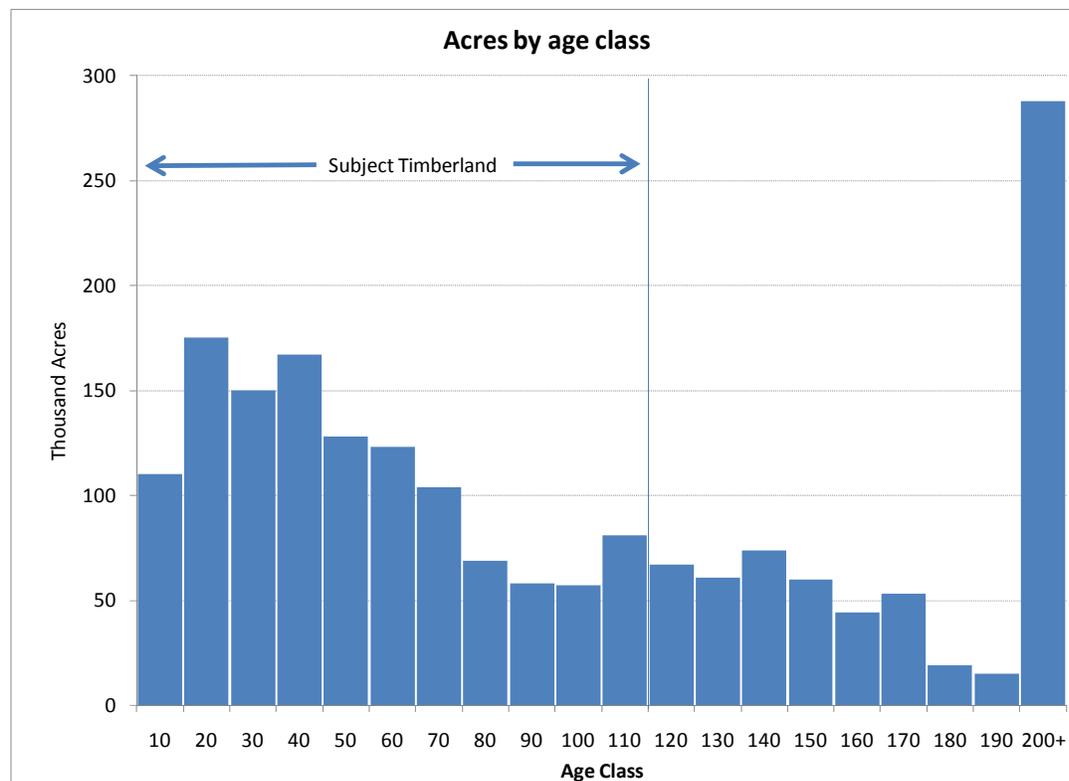


Figure 2: Age class distribution of forested O&C acres administered by the BLM

Discussion of the rate of harvest assumptions

The subject O&C timberlands are different from more typical Pacific Northwest timberland transactions and pose unique challenges to a valuation exercise. First, most of the value of the subject property is in mature timber which is past the financial rotation age.⁸ This is quite different from recent Pacific Northwest timberland sales which are heavier to younger age classes and as a result, purchasers must anticipate realizing a substantial portion of the revenue in the future. Second, the sheer size of the subject timberland presents special challenges to the valuation. Immediate harvest of the mature timber (i.e. the timber beyond financial rotation) would easily overwhelm current markets. Bidders will discount the mature timber while they meter it out at a rate that will maintain value. Finally, the ten year disposition schedule means that we must anticipate changes to the timberland markets over a long time period. We discuss each challenge in turn.

The bulk of the subject timber is no longer growing in volume and value as fast as the relevant discount rate (4.5-7%). Timberland purchasers will face the economic incentive to harvest the slower growing timber as quickly as possible, and regenerate the acres into younger, faster growing stands. Bids for the timberland, therefore, will be heavily influenced by bidders' projections about how quickly they could harvest the timber past the financial rotation age. The rate of conversion of the older timber, however, will depend greatly on the capacity of the market to absorb this extra timber – overwhelm the markets and the price will drop. But since the timber is only growing around 2% annually and bidders would like to enjoy a 6-7% return, holding the mature timber reduces its present net value and therefore the price anyone would be willing to pay for the mature timber.⁹

A key task for the valuation, therefore, is to estimate how fast bidders for the subject timberland would collectively project harvest of the older timber. This requires insight into how manufacturers would respond to an increased yet finite supply of timber from these lands. Relevant factors are discussed below.

- The WOPR analysis examined the potential price impact of selling more timber – WOPR Alternative 2 would have harvested upwards of 700 MMBf annually. Based on econometric modeling by the USFS and by OSU, the WOPR analysis estimated that selling an additional 700 Mbf of BLM timber would reduce log prices by 3% for the first ten year period, and that prices would subsequently recover as manufacturing capacity increased.¹⁰ Since the temporal resolution for WOPR was 10 year periods, there was no need for a finer estimate.
- The most recent Oregon mill study¹¹ indicates that mills in southwest Oregon consumed 2.090 Bbf of logs in 2003, and of that, 0.628 Bbf were imported from outside southwest Oregon -- 0.412 Bbf came from northwest Oregon, 0.156 Bbf from eastern Oregon, and 0.060 Bbf from

⁸ Financial rotation age is the age at which the growth rate in value falls below the discount rate. The specific age unique to each stand based on productivity of the site, stocking, species mix, log prices and logging cost factors, as well as the owner's discount rate.

⁹ Note that this is not unique to private purchasers. Under the even-flow harvest levels proposed in the WOPR, harvest of the mature timber is stretched out over an even longer period, with the result that the BLM would capture even less of the financial value of the mature timber.

¹⁰ MB&G participated in the WOPR economic analysis.

¹¹ Citation to 2003 mill study

other states. Mills in northwest Oregon used 1.667 Bbf and 0.251 Bbf of that came from other states.¹² This suggests that the southwest Oregon mills could take a substantial amount of new timber simply from BLM timberlands, if it became available. Such timber would have more favorable haul costs and would therefore be preferred to timber imported from other areas.

- Prior to the financial crisis, Pacific Northwest mills had been importing 0.300-0.500 Bbf of logs from Canada.¹³ Again, this suggests that additional timber from nearby BLM lands would be absorbed into current markets.
- There has been substantial investment in Washington sawmills over the last several years. Between 1996 and 2006, for example, Washington lumber production increased by 39% while the number of mills declined from 94 to 68. The average output per mill increased by 54% during the period.¹⁴ This investment was in response to increased timber supply, stemming from a softening of the Japanese log export market. This experience demonstrates that capacity is not fixed, and can increase substantially in a relatively short time frame, if timber supply can be secured.

For this valuation exercise, we built a DCF model for the entire 1.2 million acres of subject timberland and constrained it to convert the stands over rotation age over a 25 year period. We limited harvest levels during this period to levels that we think would allow the timber to be harvested without much price impact – about 1.1 Bbf in the first five year period, and 1.3-1.5 Bbf for the 20 years thereafter, as manufacturing capacity expands to absorb the extra timber. Once the mature timber has been captured, harvests would fall off after that to about 0.25 to 0.30 Bbf. Harvests would ultimately recover to a sustainable harvest of about 0.53Bbf, as shown in **Figure 3**. While our analysis did not explicitly evaluate the spatial feasibility of these harvest levels, they appear to be within the realm of reason, based on our experience with other properties.

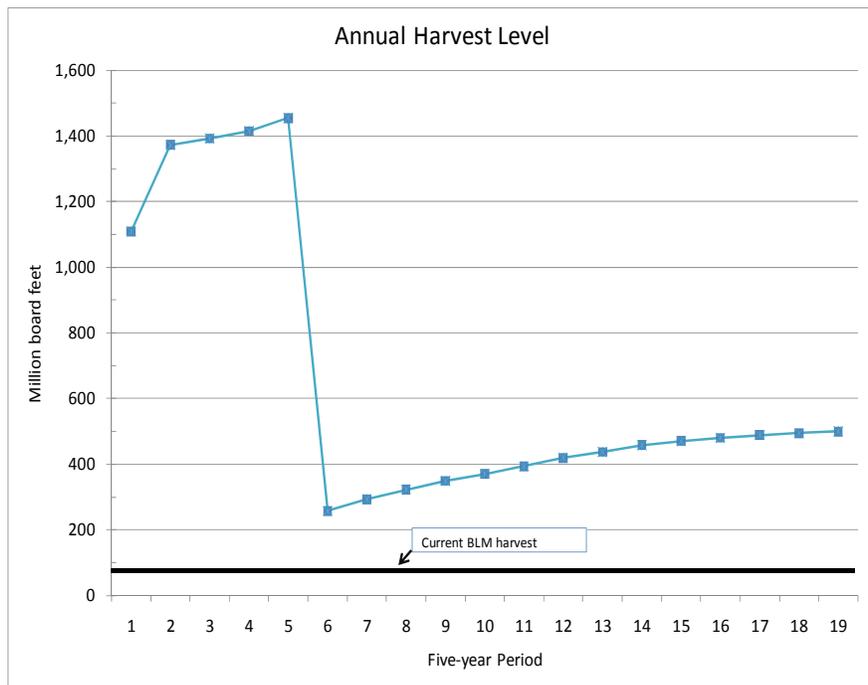


Figure 3: Harvest schedule for entire subject timberland

¹² Note that all of these figures are in 32' Scribner log scale. To convert the BLM volumes from 16' log scale to 32' log scale, multiply by 0.80.

¹³ This is in 32' log scale.

¹⁴ Campbell, Sally; Waddell, Karen, Gray, Andrew, tech.eds. 2010. Washington's forest resources, 2002-2006; five-year Forest Inventory and Analysis report. Gen. Tech. Rep. PNW-GTR-800. Portland OR; USDA Forest Service, PNW Research Station. 189 p.

Given the harvest schedule for the property as a whole, we then evaluated whether it could be used as a model for the valuation analysis that bidders would apply to each year’s timberland sale offerings. We concluded that timberland bidders would base their DCF analysis on harvest schedule with a similar pattern. We interviewed a few timberland purchasers and found agreement. While purchasers of the early offerings may not face immediate market limits, they will face a number of logistical problems that will limit their ability to sell more timber immediately – hiring staff, conducting owl surveys, ensuring access, etc.

From the Net Present Value (NPV) of the harvest schedule for the entire subject timberland, we derive an average per acre value and apply that to the half of the timberland that would be sold in the first five year period. This forms our estimate of the value of the timberland sold during the first five year period.

Timberland sold during the second five year period should sell for more as there will be more inventory due to growth during the first five year period. Based on the yield projections, we estimate that the timber inventory on the acres sold during the second period would on average be about 11% greater than the acres sold during the first period. Not all of that increment can be harvested right away however, and we estimate that the average per acre price for timberland sold in the second period will be about 7% more than price for the timberland sold in the first five year period, all other things being equal.

Given that the ten-year land sale schedule staggers the time that harvest starts on each year’s sale offering, actual harvest will rise and fall more gradually than shown in Figure 3. As a result, there will be a longer time for capacity to adjust to the increased harvest, and log price impacts should be minimized. Appendix A shows the actual harvest schedule projected from the staggered starting years.

Discussion of log price assumptions

Log price assumptions are a key factor affecting timberland valuation. Log prices have partially recovered from the recessionary lows, but are still below recent trends, as shown in **Figure 4**. However, it is the buyers’ view of future timber values that are key to timberland transaction prices, and that is focus of our valuation.

Our most recent survey of timberland market participants suggests a general agreement that log prices will return to “trend”

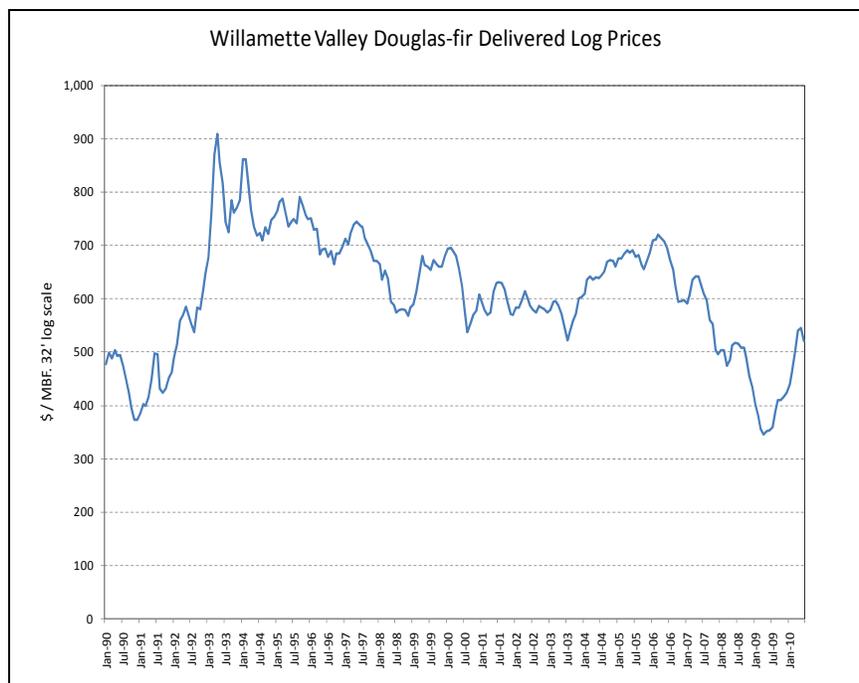


Figure 4: Delivered Log Price, Douglas Fir #2 Sawlog, Willamette Valley region

prices within two or three years. Trend prices were most often expressed as being somewhere around the 2007 markets. By 2007, housing markets were softening and lumber and panel prices were declining. Several survey respondents use #2 Douglas-fir sawlog prices in the Willamette Valley as the bellwether log price, and we follow that convention here; the 2007 log price is about \$600/Mbf.

Given the uncertainty imposed on the valuation by the size of the subject timberland and the ten year land sale period, we test the sensitivity of the valuation to different log price scenarios.

- **Scenario A** log prices are optimistic. They are about 5% higher for #2 sawlogs and an equivalent dollar amount increase for other grades. Prior to the recession, timberland buyers had a more optimistic view of future log prices, and Scenario A is used to estimate how much the valuation might increase if buyers again become optimistic. Those professing a more optimistic future point to increasing log demand from Asia, especially China. They also note that the pine beetle infestation in interior British Columbia could take as much wood off the market as did the spotted owl in the 1990s, thereby increasing demand for wood in other areas. They assume that housing will return to a more healthy level of 1.5-1.7 million starts, based on favorable demographics.
- **Scenario B** prices assumptions are the base case and reflect the currently held view that long term log prices will average somewhere close to the 2007 average log prices. Subscribers to this view generally see housing recovering to the 1.5-1.7 million housing start level. They acknowledge supply problems in other regions, but do not generally build that bet into their bids.
- **Scenario C** prices are lower than the base case Scenario B – about 5% lower for #2 sawlogs and an equivalent dollar amount for other grades. This scenario may reflect the views of bidders for the subject timber that adding a large volume of “new” timber to existing markets will permanently depress log prices, at least through the relevant conversion period.

For this valuation, we relied on log prices reported by Log Lines for the Willamette Valley. In Southern Oregon, we used log prices reported by ODF, as we have found them to be more appropriate in those areas. In both cases, we used the average 2007 prices by species and grade to define long term average log prices for Scenario B, the base case. **Appendix A** shows the log prices used for each scenario.

Finally, we note that some timberland buyers incorporate a real price increase into their calculations. Using a lower discount rate yields a similar effect and since we calculate the value under a range of discount rates, the impact of a real price trend assumption can be deduced from **Table 3**.

Discussion of discount rates used for the valuation

Timberland bidders use a discount rate to discount future revenues to the present. It is customary to discuss discount rates in real terms (net of inflation) and we follow that convention here.

Discount rates used by bidders are typically considered proprietary and not disclosed. Appraisers and market observers typically derive discount rates by working backwards from the transaction price. Expected rates of return, or the discount rate used in a DCF analysis of US western timberland, has fallen from about 8-10% to 4.5-6% . **Figure 5** shows an estimate of discount rate and timberland price for combined US west and south timberland transactions.¹⁵ While these are annual averages of transactions with many different characteristics and should not be relied on for valuation, the figure does show the fundamental relationship – as expected returns fall, the price paid rises.

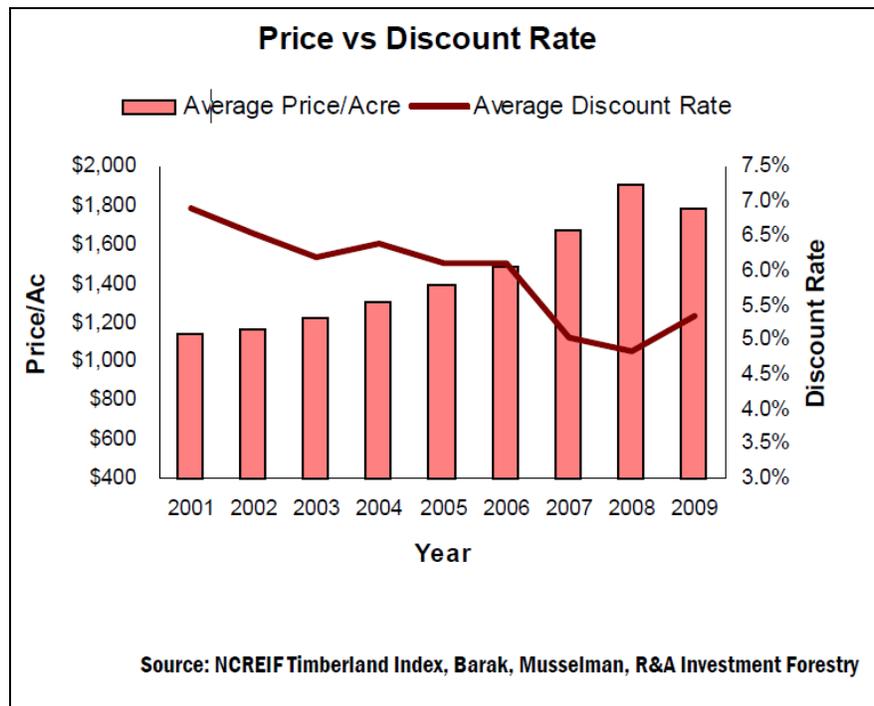


Figure 5: Estimated discount rate and timberland price, US west and south

There have been few transactions since the financial crisis (**Figure 6**), and it is not yet clear where things will settle out – buyers looking for bargains are using higher discount rates, but sellers are unwilling to accept those lower prices. For more recent appraisals, we have been using rates closer to 6%, based on our survey of market participants. Rinehart and others, however, suggest that rates will have to be in the 6.0-7.5% range to get potential buyers to commit. Given the uncertainty, we calculate the value under a range of discount rates ranging from 4.5% to 7.0%. We applied these rates to the standard harvest schedules that were solved with a 5% discount rate. Most of the timber is growing less than the 4.5% rate which means that the rate of harvest would not change based on the discount rate.

Discussion of the market for timberland

Is there enough demand for timberland to expect that 1.2 million acres of BLM timberland could be sold over a ten year period? Since the mid-1980s, the forest industry has sold over 43 million acres to institutional investors for about \$37.8 billion. The global portfolio is more than \$50.0 billion.

Some properties have been sold more than once. RISI reports 475 major US timberland transactions between 1995 and 2009, totaling 53.3 million acres and \$52 million. **Figure 6** summarizes the US timberland market over the past ten years.¹⁶

¹⁵ Rinehart, Jim, 2010. *U.S. Timberland post-recession. Is it the same asset?* R&A Investment Forestry, April 2010.

¹⁶ RISI Timberland Markets Report, August 2010.

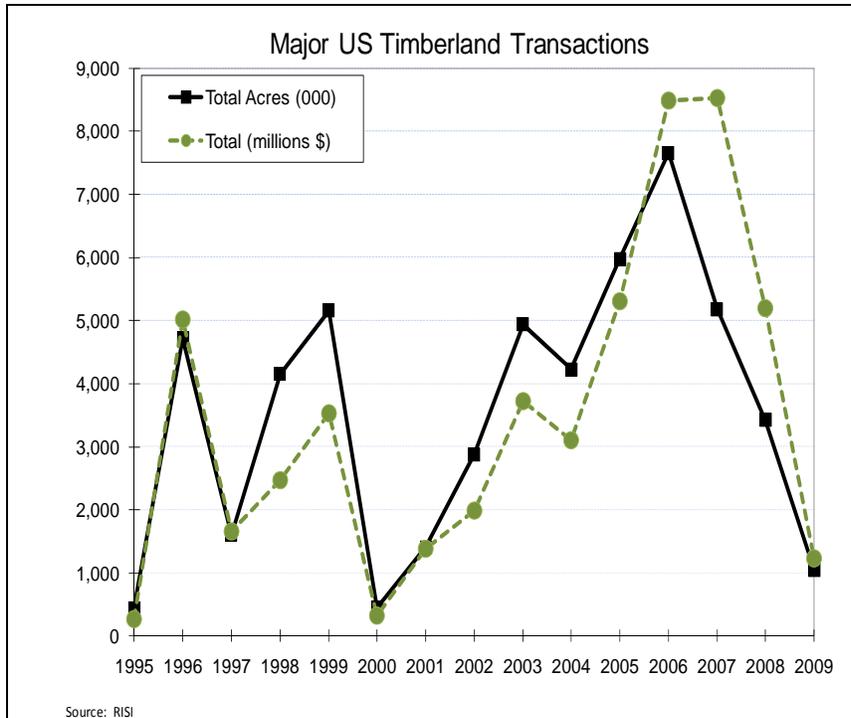


Figure 6: Summary of major US timberland transactions

Prior to the financial crisis of 2008, timberland sales drew keen interest from a wide variety of investors. Investment managers find that timberland has three key portfolio attributes: (1) high risk adjusted return; (2) low correlation with other financial assets; and (3) good inflation hedge. They typically target somewhere around 2% of their funding for timberland. Much of the investment has come through TIMOs and REITs and they

have developed expertise in gathering funding, pooling investors, finding investment opportunities and managing timberland.¹⁷

While the financial crisis has dampened transactions, the TIMOs and REITs appear to be weathering the storm – there have not yet been any major distress sales. Most would be investors are reportedly on the sidelines waiting for more favorable prices, most would be sellers are holding back, hoping that a financial recovery will restore value. **Figure 7** shows that average timberland prices have lost a little ground since the financial crisis. For the most part, however, the

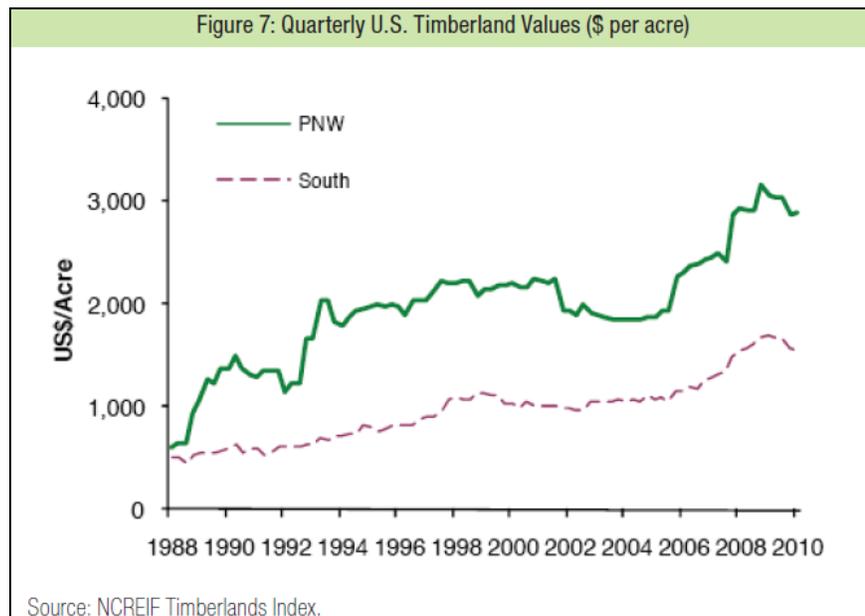


Figure 7: NCREIF Timberlands Index

¹⁷ TIMO – timberland investment management organization. REIT – real estate investment trust. Both are kinds of firms buy and manage timberland as part of an investment, often for institutional investors.

NCREIF Timberlands Index is based on appraised values, not transaction values, so caution is warranted.¹⁸

Figure 6 suggest that over the last decade, annual timberland transactions have averaged somewhere around \$3 billion. We expect that a steady stream of offerings totaling about 120,000 acres per year with a price tag of about \$600 million annually could easily be absorbed into the market for US timberland.

Summary of valuation

Table 3 shows the market valuation calculated under three price scenarios and six different discount rates. In our view, timberland purchasers will become more optimistic about pricing and willing to accept lower returns as the economy recovers. Our DCF calculations, furthermore, may be conservative as we did not consider any higher and better use values, carbon sequestration credits, or potential non-timber revenue.

We think it is likely that when all is said and done, the O&C land sale program will have generated somewhere close to \$6 billion for the 1.2 million forested acres with timber stands 110 years old and younger.

Table 3: Value of subject timberland at under various log pricing scenarios and discount rates, billion dollars.

	Discount Rate					
	4.5%	5.0%	5.5%	6.0%	6.5%	7.0%
Scenario A	7.05	6.56	6.13	5.76	5.42	5.12
Scenario B	6.38	5.94	5.55	5.20	4.90	4.62
Scenario C	5.84	5.42	5.06	4.75	4.46	4.21

¹⁸ Brookfield Timberlands Management LP, *First Quarter 2010 Global Timberlands Research Report*, 1Q 2010. NCREIF – National Council of Real Estate Investment Fiduciaries

Appendix A

Projected Harvest Levels

The purpose of the valuation is to estimate how much the subject timberlands would fetch in the marketplace. The O&C Counties are also interested in the economic impacts that more aggressive timber management would bring to local economies. To support that analysis, we have been asked to estimate the flow of timber from these acres, consistent with our valuation.

We assume that the timberland will be sold in roughly equal portions over a ten year period – about 120,000 acres per year. We expect that each year’s sale offering will be broken into smaller parcels targeting specific markets.

In the past, the timberland purchaser often hires the timberland seller’s employees to manage the timberland, at least during a transition period. This strategy allows the buyer to maintain or increase operations right away. This will not be the case with sales of the BLM land. The BLM currently does not have enough employees with the skills needed to immediately begin harvesting substantially more timber.¹⁹ BLM employees, furthermore, are federal employees and will not switch over to private companies so easily. We believe that it will take on average about two years for a purchaser to build the organization to begin harvesting at desired levels. Purchasers buying subject timberland in the first couple of years of the program, furthermore, will have difficulty harvesting timber if owl surveys have not already been completed. We assume that the BLM will begin surveying as the program develops so that later purchasers don’t face that problem. Given the ramp up period, the ten-year disposition period, and a starting date in 2011, we offer **Figure 8** as the basis for evaluating employment and income effects from the O&C Counties proposal.

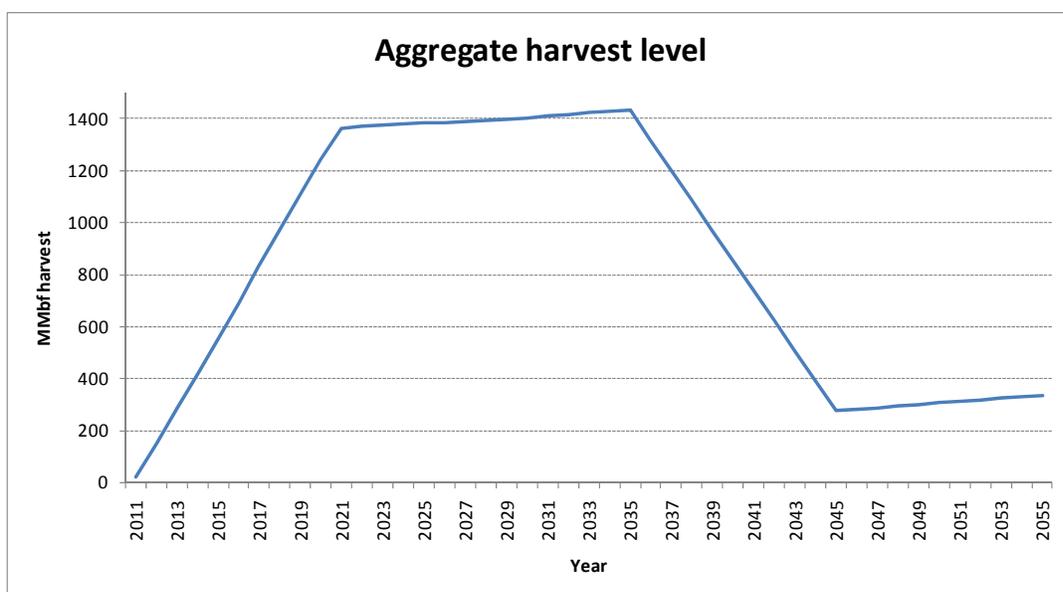


Figure 8: Projected aggregate harvest level

¹⁹ The WOPR assumes that it would take about three years for the BLM to ramp up its workforce to increase harvests.

Appendix B

DCF Model Specifications

Our intent in this valuation was to rely on the BLM WOPR data to the greatest extent possible. For the purpose of valuation, however, we needed more detailed data than did the BLM for its strategic planning effort. Below we briefly describe some of the key processes and assumptions supporting the discounted cash flow model.

- **Land base**

Stand descriptors and gross acreage calculations are based on inventory provided to Dr. Sessions by the BLM as part of the WOPR analysis. We included in our analysis of value only acres identified as O&C lands. Age class information is based on stand age in 2006.

Based on a recent OSU study of riparian buffers on private land in Western Oregon, we assumed that 8% of the gross acres would fall in riparian buffers as defined by the Oregon Forest Practices Act. We therefore reduced acres available for harvest by 8% in every stand. A more detailed analysis, of course, would show that riparian acres are not evenly spread across all stands.

The BLM data included separate “stand” polygons for roads and we of course did not schedule harvest from these polygons. Since some roads fall within riparian buffers, however, we are very likely overstating the riparian reduction. In essence, this makes our valuation conservative.

- **Timber Volumes**

We relied on stand level timber yield tables prepared by the BLM as part of the WOPR analysis. We understand how these were derived and after analysis of the harvest scheduling runs, believe that the yield tables a reasonable starting point for this valuation. We note, however, that the Salem District and Klamath Resource Area have higher defect assumptions (15% compared to 8-10% in the other districts for older stands). We also note that the BLM did not incorporate genetic gain into the yield tables for regenerated stands.

Based on our experience, we expect that some timberland bidders might make more aggressive growth projections using more intensive management. This makes our estimate somewhat conservative.

- **Species mix**

Log prices vary by species. The BLM timber yield data, however, showed total volume, without a species distribution. We obtained additional species data from the BLM, and checked it against the data from the Forest Inventory Analysis reports. We developed a species mix for each BLM district and assumed that every stand has that species mix.

- **Log grade**

Log prices vary by grade. The BLM timber yield data, however, shows only total volume without a grade distribution. The BLM provided data about grade from past timber sales. We also relied on other sources to build a table showing log grade by age class by BLM district. We applied the grade distribution to each timber stand, based on that assumption.

- **Log prices**

As described in our report, we developed a base price scenario (Scenario B) and tested the sensitivity of the valuation to different pricing assumptions.

Our most recent survey of timberland market participants suggests a general view that log prices will return to trend within two or three years, and that the 2007 prices offer a reasonable approximation of trend prices. We used the 2007 average price as the base price scenario for this Scenario B.

For Scenario A, we increased the price of #2 sawlogs by 5% and increased other grades by roughly the same dollar amount.

For Scenario C, we decreased the price of #2 sawlogs by 5% and decreased other grades by roughly the same dollar amount.

For the Eugene and Salem Districts, we relied on log prices published by Log Lines for the Willamette Valley region. We used a weighted average of the “average” and “high” published prices. In our experience, this gives a good approximation of actual log sale realizations.

For the other BLM districts, we relied on log prices published quarterly by the Oregon Department of Forestry. In our experience, these prices more closely reflect actual log price realizations than does Log Lines in these regions.

- **Logging methods**

The BLM data did not include the appropriate logging method (ground, cable, helicopter) for each stand. For the WOPR, the BLM did take a close look at the sales scheduled in the first 10 year period and developed a distribution by district, but that was not sufficient as we needed to schedule all of the acres.

From publically available elevation data, we developed a slope map and calculated the percentage of each district that could be harvested using ground based systems and cable systems. We used the district averages to calculate average logging costs by district, and applied those averages to each stand.

- **Logging costs**

Based on previous work, we developed a schedule of logging costs as a function of volume removed per acre, logging method and harvest type (clearcut or partial cut). We applied the appropriate logging cost to each stand based on district, volume removed and harvest type.

- **Road costs**

Road maintenance and road construction cost assumptions are based on our appraisal experience with other Western Oregon properties. We increased both costs over more typical properties, however, due to the fact that the O&C lands are typically on alternating sections, suggesting the need for more roads.

- **Haul costs**

Haul cost assumptions are based on current fuel rates. We adjusted our standard rates to reflect the fact that logs and loads will be somewhat larger over the first 20-25 years of the harvest schedule. Haul costs vary by District and assume that most of the timber harvested will be hauled to local mills.

- **Administration costs**

Purchasers of the subject timberland will need to hire local managers, as well as support corporate overhead. We used a typical cost per thousand board feet for the variable costs of timber sale preparation, harvest administration and contract administration. We also used typical costs for post-harvest planting and silviculture. We incorporated fixed management and overhead costs as a per acre charge.

- **Management regimes**

The valuation anticipates that most bidders for the subject timberland would value the timber under even-aged harvest regimes. For a relatively few acres, the BLM data provided did not include clearcut regimes, so we relied there on the available partial cutting regimes.

The BLM data did not include regimes utilizing fertilization or genetically improved seedlings. Both are favored by industrial landowners. Both increase yields and provide a very favorable return. By not incorporating either, our valuation is conservative. Since most of the value on this property comes from harvesting over mature timber during the first 25 years, however, the extra bump from more intensive management will be minimal.

- **Spatial analysis**

Our valuation assignment is to provide an estimate of the value of the timber stands 110 years and younger for the purpose of evaluating a policy proposal. We did not incorporate any spatial analysis into this valuation. Specific sale parcels were not delineated, we did not analyze transportation systems, nor schedule harvests under the green up rules imposed by the Oregon Forest Practices Act. Nor did we evaluate the potential impact of existing spotted owl or marbled murrelet sites on short or long term harvests. We have not attempted to show how the timberland sales could be laid out to meet the program objectives. The proposal tasks a citizen advisory board with that effort.

The valuation assumes that timberland purchasers would harvest the mature timber over a 25 year period. Based on previous experience, we believe that this assumption provides the foresters setting up the timber

sales with enough flexibility to lay out the sales without significant fall down from the green up rules.²⁰ which specify maximum clearcut size and how soon stands adjacent to a clearcut can be harvested. This extended time period, furthermore, should provide sufficient time to deal with any ESA issues.

²⁰ The green up rules in the Oregon Forest Practices Act specify the maximum clearcut size and the time period between adjacent clearcuts.