Appendix M

Data and Assumptions Used in the Socioeconomics Analysis

The potential impact of the marbled murrelet long-term conservation strategy alternatives on revenue from timber sales on state trust lands depends on the harvest schedule anticipated under each alternative. The alternatives do not include a harvest schedule[1], so a direct comparison of harvest levels cannot be made. However, the alternatives could be compared using two different methods, bare land value[2] and the change in estimated annual timber harvest revenue. Both methods required making assumptions about timber production and operability.

A key assumption used in this analysis was the relative weighting of lands in different land classes. Land classes were used to describe management constraints on different lands. Descriptions of the land classes are below:

- Deferred, which includes lands unavailable for harvest.

- Riparian, which includes riparian and wetland buffers.

- Uplands with general management objectives, which includes lands that are managed in accordance with the *State Trust Lands Habitat Conservation Plan* (1997 HCP) and all other

---

[1] The long-term conservation strategy will have implications for DNR's sustainable harvest level. In a separate action, DNR is completing the sustainable harvest calculation, with a separate process for environmental review that analyzes potential harvest levels associated with long-term conservation strategy alternatives. Refer to discussion in Chapter 1 of the FEIS, page 1-6.

[2] Bare land value (BLV) provides an estimate of the value of managing forest land for timber production using specific management assumptions. Specifically, BLV assesses the present net worth of an infinite number of successive, identical timber harvest rotations. As calculated here, the resulting value does not include any indication of the value of non-timber or non-market values. Revenue sources other than timber harvests could be included in the calculation, if applicable. BLV is calculated as: $BLV = \frac{NFW}{(1+i)^n - 1}$, where net future worth (NFW) is calculated as the sum of the future revenue and costs of one rotation, with both revenue and costs compounded until the end of the rotation, i is the annual discount rate, and n is the number of years in a rotation. Note that this calculation assumes that the cost, revenue, and rotation length do not change over time. The infinite time horizon used in the calculation of BLV allows for comparisons of BLV values from different forest management regimes.

applicable law and polices, but not subject to particular conservation strategies that limit harvest location or type.

- Uplands with special management objectives, which includes lands that are managed under all the same rules as uplands with general objectives, plus additional constraints for the northern spotted owl, marbled murrelet, or riparian conservation[3] strategies (refer to Table M-1 for acre deferred).

Table M-1. Acres Deferred From Harvest and Acres Available for Harvest in Each Land Class for Each Alternative

Land Class	Alt. A (acres)	Alt. B (acres)	Alt. C (acres)	Alt. D (acres)	Alt. E (acres)	Alt. F (acres)	Alt. G (acres)	Alt. H (acres)
Deferred	455,268	425,181	477,028	480,417	482,648	509,610	506,056	461,834
Uplands with general objectives	433,570	445,540	429,689	426,372	427,736	408,971	422,430	435,085
Uplands with special objectives	323,463	337,378	310,950	312,650	307,929	306,612	293,551	317,014
Riparian	168,300	172,501	162,933	161,160	162,287	155,407	158,563	166,667
Total	1,380,600	1,380,600	1,380,600	1,380,600	1,380,600	1,380,600	1,380,600	1,380,600

■ Estimating Bare Land Value Change

The first step in estimating bare land value change was to compare the number of acres deferred from harvest and acres available for harvest in each land class to Alternative A (Table M-2).

Table M-2. Change in Acres Deferred From Harvest and Acres Available for Harvest in Each Land Class Under Alternative A and B

Land Class	Alternative A (acres)	Alternative B (acres)	Difference between Alt A and Alt B (acres)
Deferred	455,268	425,181	-30,087
Uplands with general objectives	433,570	445,540	11,970
Uplands with special objectives	323,463	337,378	13,915
Riparian	168,300	172,501	4,202
Total	1,380,600	1,380,600	0

---

[3] The hydrologic maturity component of the riparian conservation strategy.

Determining the bare land value of an acre of uplands with general objectives required several assumptions:

- Costs incurred in management equal $300 per acre harvested, the cost of regeneration[4].

- The discount rate on all costs and revenue equals 4 percent per year.

- Harvest occurs at age 50 and yields 32 thousand board feet (MBF) per acre, a consistent yield on DNR-managed lands with site index class II land that have not been commercially thinned, and

- Stumpage is $350 per MBF[5].

As described in the introduction and shown in Table M-1, DNR-managed lands are organized into four land classes: deferred, uplands with general management objectives, uplands with special management objectives, and riparian. The volume produced from each land class differs due to different management objectives. To account for the harvest volume difference, each land class was weighted based on the volume produced per acre of each land class in western Washington from 2005 through 2016. Uplands with special management objectives produced 55 percent the volume per acre of uplands with general objectives. Riparian areas produced 2 percent the volume per acre of uplands with general objectives. No harvest occurs on deferred lands, so these areas are weighted as 0.

Based on these assumptions, the bare land value of one acre of upland with general objectives in the analysis area is $1,485. Lands in the other land classes have lower bare land values consistent with their different management objectives. Multiplying the bare land value of uplands with general objectives by the land class weighting and the number of acres difference between Alternative A and an action alternative (B) results in the bare land value change (Table M-3). These estimates were developed for use in this FEIS only. Actual bare land value may be different due to site-specific factors.

Table M-3. Change in Bare Land Value (BLV) Between Alternative A and Alternative B

Land Class	Difference between Alt A and Alt B (acres)	BLV per acre of uplands with general objectives	Weighting[6]	Change in BLV (rounded to nearest 1000)
Deferred	-30,087	$1,485	0	0
Uplands with general objectives	11,970	$1,485	100%	$17,776,000.00

---

[4] The $300 per acre regeneration cost includes planting and initial vegetation management. This cost represents a common forest management objective that DNR foresters use when conducting their financial analysis on silvicultural treatments.

[5] $350 per MBF is conservative estimate for the stumpage of higher quality Douglas fir sawlogs on DNR-managed lands.

[6] The weighting values in tables M-3 and M-4 have been rounded to the nearest percent.

Land Class	Difference between Alt A and Alt B (acres)	BLV per acre of uplands with general objectives	Weighting[6]	Change in BLV (rounded to nearest 1000)
Uplands with special objectives	13,915	$1,485	55%	$11,365,000.00
Riparian	4,202	$1,485	2%	$125,000.00
Total	0	NA	NA	$29,266,000.00

■ Estimating the Change in Annual Timber Sales Revenue

To estimate the change in annual timber sale revenue, the change in acres available for harvest in each land class (Table M-2) was calculated. Each land class was weighted using the same assumptions as the BLV methodology to find the change in operable acres available in each land class (Table M-4). It was assumed that stands in the areas that change land class are equally distributed across ages 1 to 50 years old, such that one fiftieth of the acres would be harvested per year. It also was assumed that:

- Harvests yield 32 MBF per acre, which is a consistent yield on DNR-managed lands with site index Class II that have not been commercially thinned.

- Stumpage is $350 per MBF.

Multiplying the annual change in acres of harvest (weighted by operability) by the yield and stumpage results in the estimated annual revenue change (refer to Text Box 1). The actual change in timber sale value would depend on the timing of harvest, harvest volume, timber quality, and stumpage price.

Text Box 1. Estimated Change in Annual Timber Sale Revenue Under Alternative B

19,708/50 x 32 MBF x $350 per MBF = $4,414,000

Table M-4. Change in Operable Acres Between Alternative A and Alternative B

Land Class	Difference between Alt A and Alt B (acres)	Weighting	Change in operable acres
Deferred	-30,087	0	0
Uplands with general objectives	11,970	100%	11,970
Uplands with special objectives	13,915	55%	7,653
Riparian	4,202	2%	84
Total	0	NA	19,708