Appendix P

Sustainable Harvest Draft Financial Analysis

The full title of this document is *Financial Analysis of Alternatives for Establishment of a Sustainable Harvest Level for Forested State Trust Lands in Western Washington* (the financial analysis). This financial analysis includes fiscal year 2015 through 2024 projections of harvest volumes and 10-decade net present values for 38 scenarios. The scenarios include 36 combinations of marbled murrelet long-term conservation strategy alternatives presented in the *Marbled Murrelet Long-term Conservation Strategy Revised Draft Environmental Impact Statement* (RDEIS) (DNR 2018) and the arrearage harvest and riparian thinning options presented in *Alternatives for Establishment of a Sustainable Harvest Level Draft Environmental Impact Statement* (DEIS) (DNR 2016). The other two scenarios represent alternatives G and H from the marbled murrelet RDEIS, combined with the Board of Natural Resources' preferred alternatives for arrearage harvest and riparian thinning.

This financial analysis is in the process of being updated for the sustainable harvest final EIS (FEIS), expected in October 2019. Therefore, an update is not available for publication with the marbled murrelet FEIS, to which this document is an appendix.

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Financial Analysis

of

Alternatives for Establishment of a Sustainable Harvest Level for Forested State Trust Lands in Western Washington

October 2018

WASHINGTON STATE DEPARTMENT OF
NATURAL RESOURCES

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October 2018

Prepared by
Washington State Department
of Natural Resources

Forest Resources Division

WASHINGTON STATE DEPARTMENT OF
NATURAL RESOURCES

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Acronyms

DNR	Washington State Department of Natural Resources
DEIS	Draft Environmental Impact Statement
FY	Fiscal Year
HCP	State Trust Lands Habitat Conservation Plan
MMBF	Million Board Feet
NAP	Natural Area Preserve
NRCA	Natural Resources Conservation Area
OESF	Olympic Experimental State Forest
RCW	Revised Code of Washington

Preface

This financial analysis is meant to update the *Financial Analysis of Alternatives for Establishment of a Sustainable Harvest Level for Forested State Trust Lands in Western Washington* (released July 2017; DNR 2017). Changes include the addition of new marbled murrelet long-term conservation strategy alternatives, a new option for arrearage harvest volume, a new riparian thinning level, and updated data. This analysis also uses a different discount rate than the previous analysis.

Conducting this financial analysis is part of being a prudent trust lands manager.

Acknowledgements

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Introduction

The Washington State Department of Natural Resources (DNR) is establishing a sustainable harvest level for the fiscal year 2015 to 2024 planning decade for over 1.4 million acres of forested state trust lands in western Washington (refer to Text Box 1). The sustainable harvest level is defined in Revised Code of Washington (RCW) 79.10.300(5) as "the volume of timber scheduled for sale from state-owned lands during a planning decade as calculated by DNR and approved by the board." Setting a level is required by both DNR policy (DNR 2006) and state law (RCW 79.10.320).

Selection of a sustainable harvest level for the planning decade requires three key decisions by the Board of Natural Resources (board):

- Selection of an alternative for the long-term marbled murrelet conservation strategy (marbled murrelet strategy),

- Selection of an option for harvesting the arrearage from the 2005 through 2014 planning decade, and

- Selection of an option for thinning in riparian areas.

For this analysis, DNR modeled 38 possible combinations[1] of these alternatives and options, each of which will be referred to as a "scenario" in this financial analysis (the model will be discussed later in this analysis). **The purpose of this analysis is to provide financial projections to help the board understand how each scenario affects DNR's**

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[1] There are 96 possible scenarios, but DNR modeled only 38. This report contains updated results for the 36 scenarios presented in the financial analysis published in July 2017. Two new scenarios are added. These scenarios show are marbled murrelet conservation strategy alternatives G and H paired with the board's preferred alternatives for the arrearage harvest and riparian thinning options. Only two scenarios were added so that the analysis could focus on the effects of the preferred alternative compared to the original 36 scenarios.

ability to meet its trust management obligations. This analysis addresses these obligations as follows:

- **The generation of revenue for trust beneficiaries**

  The fiduciary aspect of trust management requires DNR to manage state trust lands to produce perpetual income for the beneficiaries (DNR 2006). To assess revenue generation, DNR provides projections for net present value for each scenario. Net present value is a financial term referring to the sum of both current and future cash flows. It is the cash inflow (revenue from timber sales) minus cash outflow (costs of forest management). Future revenues and expenses are expressed in terms of their equivalent in today's dollars. All future revenues and expenses are discounted by 3 percent per year back to the present date. The 10-decade net present value allows the scenarios to be compared for their long-term revenue production potential.

- **Ability to generate revenue in perpetuity**

  A percentage of revenue from each timber sale is placed in a management account. In this analysis, the funds placed into this account are referred to as "management funds." Management funds are used to cover the expenditures incurred in managing state trust lands.

  A rise or drop in the harvest level will cause a corresponding rise or drop in management funds, which would in turn affect DNR's management. This analysis includes a qualitative analysis of DNR's ability to continue managing state trust lands under each scenario, given the scenario's harvest level and likely total management funds.

- **Impartiality with respect to current and future beneficiaries**

  As a trust lands manager, DNR must comply with the common law duties of a trustee. One of those duties is to ensure intergenerational equity, meaning DNR cannot favor either present or future beneficiaries over each other (DNR 2006). To assess this obligation, DNR reports harvest volumes by decade under each scenario.

- **Maintaining the corpus of the trust**

  The corpus of the trust, or trust assets that are kept or used for the benefit of the beneficiaries, include all state trust lands plus the funds in certain dedicated accounts and permanent funds associated with the trusts (DNR 2006). Maintaining the corpus of the trust is part of prudent trust land management.

  In the analysis area (discussed later in this analysis), the corpus of the trust includes forested state trust lands that are available for both thinning and harvest, lands restricted to thinning only, and lands that are not available for harvest or thinning. Lands that are available for both thinning and harvest generate the most revenue for the trusts. Therefore, a change in the number of those acres may affect the corpus of the trust. In this analysis, DNR considers the number of acres available for thinning and harvest under each marbled murrelet strategy alternative.

Key Decisions

Following is a description of the three key decisions now facing the board: the marbled murrelet strategy alternatives, arrearage harvest options, and riparian thinning options.

Marbled Murrelet Strategy Alternatives

All eight marbled murrelet strategy alternatives are described in detail in the *Revised Draft Environmental Impact Statement on a* Long-*Term Conservation Strategy for the Marbled Murrelet* (marbled murrelet RDEIS, DNR 2018) and are included in this analysis. Table 1 lists each alternative and the conservation acres (collectively referred to as long-term forest cover[2]) proposed under each.

Table 1. Summary of Conservation Acres Proposed Under Each Alternative (alt.)

	Alt. A (no action)	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G	Alt. H
Acres of existing conservation that may provide benefits to marbled murrelets depending on forest condition	567,000	567,000	567,000	567,000	567,000	567,000	567,000	567,000
Acres of additional, marbled murrelet-specific conservation[3]	33,000	9,000	50,000	51,000	55,000	176,000	76,000	43,000
Total approximate acres of long-term conservation (long-term forest cover)	600,000	576,000	617,000	618,000	622,000	743,000	643,000	610,000

Arrearage Harvest Options

Arrearage occurs when the actual harvest volume is less than the sustainable harvest level set by the board for a planning decade (refer to Chapter 2.1 of the *Draft Environmental Impact Statement on Alternatives for Establishment of a Sustainable Harvest Level for Forested State Trust Lands in Western Washington* [sustainable harvest DEIS, DNR 2016a] for more detail).

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[2] Lands managed to maintain forest cover (relatively closed canopy structure) for conservation. Long-term forest cover may have current marbled murrelet habitat or have the capability to develop into the types of structurally complex forest needed for marbled murrelet nesting. Refer to Appendix G of the marbled murrelet RDEIS (DNR 2018) for more information.
[3] Acres reported here are those that do not overlap other existing conservation lands.

The options for arrearage harvest in this analysis come from recommendations from a board subcommittee created to review arrearage from the fiscal year 2005 through 2014 planning decade, and board direction on a sustainable harvest level preferred alternative selected at the November 2017 board meeting. Four of the options were analyzed in the sustainable harvest DEIS. The board selected the preferred alternative, which was not analyzed in the sustainable harvest DEIS, based on analysis in the sustainable harvest DEIS, comments received on the DEIS, and stakeholder comments received at board meetings. For each option, DNR specifies a harvest volume for each sustainable harvest unit; however, DNR does *not* specify the specific areas in the unit from which the arrearage should be harvested. For example, DNR did not require arrearage volume to come from riparian areas, even though thinning in riparian areas was well below the volume projected for the fiscal year 2005 through 2014 planning decade.

The arrearage options are to:

- Harvest 702 MMBF proportionally from those sustainable harvest units with deficits over 5 years (analyzed in sustainable harvest DEIS).

- Harvest 462 MMBF proportionally from those sustainable harvest units with deficits over 10 years (analyzed in sustainable harvest DEIS).

- Harvest 462 MMBF proportionally from sustainable harvest units with deficits in 1 year, and then harvest the remaining sustainable harvest level volume for the decade over the next 9 years. Under this option, harvest would occur only in units with deficits in one year of the decade (analyzed in sustainable harvest DEIS).

- Set harvest levels without specifying arrearage quantity (analyzed in sustainable harvest DEIS).

- Harvest 382 MMBF proportionally from those sustainable harvest units with deficits over 10 years (preferred alternative).

The 702 MMBF arrearage volume is the total arrearage from all sustainable harvest units with deficits from the fiscal year 2005 through 2014 planning decade. The 462 MMBF arrearage volume is the total arrearage minus overages (harvested volume that exceeded the sustainable harvest level for a given planning unit). The 382 MMBF arrearage volume is the total arrearage from all sustainable harvest unit with deficits minus volume transacted through the Trust Land Transfer Program or reconveyed to a county (Appendix A). For more information on the arrearage options with 702 or 462 MMBF of arrearage volume, refer to the sustainable harvest DEIS.

Riparian Thinning Options

The board provided direction as to riparian thinning levels to be analyzed in the sustainable harvest DEIS. These thinning levels apply to the five west-side Habitat Conservation Plan[4] (HCP) planning units, excluding the Olympic Experimental State Forest (OESF; Figure 1). These riparian harvest options are

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[4] *State Trust Lands Habitat Conservation Plan (HCP)*, available at http://www.dnr.wa.gov/programs-and-services/forest-resources/habitat-conservation-state-trust-lands.

expressed as maximums levels rather than requirements. The model used for this analysis (refer to "Analysis Methods" later in this document) calculates the riparian volume that best meets DNR's management objectives for riparian areas.

At the November 2017 board meeting, the board selected a preferred alternative for riparian thinning. Unlike the alternatives analyzed in the sustainable harvest DEIS, the preferred alternative does not set a specific level of thinning. Instead, the preferred alternative does not count riparian thinning in the forest estate model toward the projections of the sustainable harvest level. During implementation, riparian thinning can occur consistent with the 1997 HCP. Volume thinning in riparian areas will count toward the implementation of the sustainable harvest level.

Under any riparian thinning option, any activities in riparian areas would be assessed at the operational level for environmental and economic feasibility.

The riparian thinning options are:

- **Thin up to 10 percent of the total riparian area**. Riparian areas in the five west-side planning units cover 346,000 acres and are composed of stream, wetland, and wetland buffers. Buffers range from 100 to over 190 feet wide, depending on stream type or wetland size. This option would limit thinning in riparian thinning areas to a maximum of 34,600 acres for the decade (analyzed in sustainable harvest DEIS).

- **Thin an area less than or equal to 1 percent of the acres thinned or harvested in non-riparian areas.** For example, if DNR expected to harvest or thin 100,000 acres outside of riparian areas in the five west-side planning units, a maximum of 1,000 riparian acres could be thinned during the decade (analyzed in sustainable harvest DEIS).

- **Riparian volume not included when setting the sustainable harvest level.**

No change in management of riparian areas is proposed for the OESF HCP planning unit. Thinning and limited harvest can occur in riparian areas in the OESF under the *OESF HCP Planning Unit Forest Land Plan* (DNR 2016b). For more information on the riparian thinning options, refer to the sustainable harvest DEIS.

Understanding This Analysis

Analysis Area

The analysis area is all DNR-managed forestlands in western Washington. Western Washington is defined in this analysis as lands in the Columbia, North Puget, OESF, South Coast, South Puget, and Straights HCP planning units. This area includes approximately 1.4 million acres of DNR-managed lands, which include state trust lands as well as natural area preserves (NAP) and natural resources conservation areas (NRCA).

The marbled murrelet conservation strategy will apply only to a subset of this area: all DNR-managed lands within 55 miles of all marine waters in western Washington (refer to Figure 1).

Analysis Scope

Although there are other sources of revenue on forested state trust lands in western Washington, this analysis looks at the financial impacts that may occur to the trusts from projected timber harvest *only*.

DNR collects revenue from leases for communication sites, non-timber forest

Figure 1. Analysis Area for the Sustainable Harvest Level and Marbled Murrelet Strategy

products such as salal, and other uses. In addition, some trusts include lands in eastern Washington, where agricultural leases generate substantial revenue. DNR did not include these sources of revenue in this analysis because they would be constant across all 38 scenarios. DNR also did not include other possible sources of revenue, such as revenues from carbon sequestration, because they are outside the scope of the sustainable harvest need and purpose (refer to Chapter 1.1 of the sustainable harvest DEIS), do not yet have a market, or are speculative.

Setting a sustainable harvest level does not foreclose other revenue-generating activities. Decisions on revenue from other sources, as well as decisions on when and where to harvest, are—and will continue to be—made at the operational level, after considering what is in the best interests of the trusts and following appropriate environmental review.

Analysis Methods

This analysis uses data from a forest estate model. A forest estate model is a powerful, computer-based tool that enables DNR to consider the entire land base at once to find efficient and effective ways to achieve multiple objectives (refer to Appendix F of the sustainable harvest DEIS for more detail).

The forest estate model (model) used for this analysis was programmed to calculate the sustainable harvest level associated with each scenario.[5] The model results provide harvest levels for a 10-decade period. The first decade in this period corresponds to fiscal years 2015 through 2024, also called the planning decade, for which the board will set the sustainable harvest level. The model reports harvest volume per decade, which for this analysis is broken out by sustainable harvest unit, trust, and individual counties for the State Forest Transfer Trust.

The model was programmed to maximize the long-term value of timber harvest from state trust lands while meeting all other management objectives. Specifically, the model maximized the 10-decade net present value (refer to the sustainable harvest DEIS, Appendix F) of timber harvest. Maximizing net present value is different from maximizing timber harvest volume. Maximizing volume produces a lower net present value because the costs of harvesting the extra volume exceed the additional revenue from that volume.[6]

The net present value numbers presented in this analysis take into account the economic assumptions described in Appendix F of the sustainable harvest DEIS. These assumptions are based on average prices and expenditures. Another assumption is that the management funds—which are used to cover expenditures—are 25 percent of revenue from timber sales from State Forest Transfer lands and 31 percent of revenue from all other trusts. Although average prices, expenditures, and management funds could vary in the future, DNR held them constant across all 10 decades in the model. Any change would affect each scenario proportionately and would therefore not affect the relative differences between scenarios.

Updates Since July 2017 Financial Analysis

In response to public comments received during the sustainable harvest and marbled murrelet long-term conservation strategy planning processes to date, and analysis by DNR staff, DNR has updated the data and assumptions within the forest estate model used for the 2016 DEIS analysis. The following is a list and short description of the updates:

- **Forest inventory data** – updated to account for land transactions, recent and historic harvest activities, and changes in areas identified as deferred in a local knowledge database (refer to marbled murrelet long-term conservation strategy RDEIS Appendix O for more information).

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[5] The July 2017 financial analysis included two changes to the model from the version used in for the sustainable harvest DEIS. These changes were to the arrearage formulation and assumptions for northern spotted owl habitat. These changes are described in Appendix A. Additional changes between the July 2017 analysis and the current analysis can be found starting on this page.

[6] An example of this was provided in the October 17, 2016 special board meeting. Meeting presentation available at http://file.dnr.wa.gov/publications/em_bc_bnr_shc_october2016special_presentation.pdf

- **Cover type changes** – Cover types were revised such that three cover types covering relatively small areas were incorporated in to larger cover types. The result is there are now three cover types instead of six.

- **Timber price data** – updated to include prices from fiscal years 2011-2018. Prices are updated for the three cover types used in the current model. Prices are no longer defined for "saw" logs and "chip and saw" logs. Instead, all grades are considered collectively in developing a single price for each cover type for each region.

- **Management cost data** – updated to include management costs from fiscal years 2012-2018

- **Timber yields** – updated timber yields to better match actual growth patterns and current forest inventory data. The revised yields generally show lower volumes in confer stands under 70 years old and higher volumes in stands over 70 years old than the yields used in the July 2017 financial analysis. Stands in the red alder cover type have generally lower yields in the revised yields.

- **Discount rate –** the discount rate for future costs and revenue was updated from 2 percent to 3 percent following analysis of return rates of the Common School Permanent Fund

- **Northern spotted owl habitat management** – modeling constrains on spotted owl habitat were updated to better reflect the 1997 HCP northern spotted owl conservation strategy. Specifically, harvest of spotted owl habitat is allowed in the first two decades of the modeling, if conditions set forth in the northern spotted owl conservation strategy are met.

- **Olympic Experimental State Forest management** – due to improved forest inventory and changes to the modeling of northern spotted owl habitat management, a set of requirements defining the maximum harvest and thinning areas in the Olympic Experimental State Forest were removed as they no longer affected harvest levels.

These model changes result in changes to projected planning decade harvest levels and 10-decade net present values. Table 2 summarizes the direction of change expected due to these changes.

Table 2. Effects of changes in model data and assumptions on planning decade volume and 10-decade net present value

Change	Effect on planning decade volume	Effect on 10-decade net present value
Forest inventory data	Updates to the forest inventory resulted in an increase in the acres available for harvest. This increased the planning decade harvest volume.	Updates to the forest inventory resulted in an increase in the acres available for harvest. This increased the 10-decade net present value.
Timber price data	Updates to the prices can shift volume projections up or down depending on species composition of stands within each sustainable harvest unit and the region the stands are in.	Updates to the prices resulted in lower 10-decade net present values as the more accurate price calculations that resulted from removing the "saw" and "chip and saw" categories resulted in slightly lower average prices

Management cost data	Updated management costs differ only slightly from costs previously used, resulting in little change in harvest volume.	Updated management costs differ only slightly from costs previously used. Resulting in little change in 10-decade net present value.
Timber yields	Updated yields result in increased planning decade harvest volume.	Updated yields result in increased 10-decade net present value.
Discount rate	The updated discount rate increased planning decade volumes and lowered volumes in future decades.	The updated discount rate reduced 10-decade net present value.
Northern Spotted Owl habitat management	Updated spotted owl management modeling constrains increase first decade volume and removes the peak in harvest volume previously expected in the third decade.	Updated spotted owl management modeling constrains increase 10-decade net present value by shifting volume earlier in the 10-decade period.
Olympic Experimental State Forest management	The removal of the Olympic Experimental State Forest management constraints have no effect on harvest volume. The changes removed constraints that were no longer affecting harvest volumes.	The removal of the Olympic Experimental State Forest management constraints have no effect on 10-decade net present value since thee change did not affect harvest volume.

Key Understandings

Arrearage

As stated previously, there are two arrearage options for harvesting 462 MMBF:

- Harvest 462 MMBF proportionally from those sustainable harvest units with deficits over 10 years.

- Harvest 462 MMBF proportionally from sustainable harvest units with deficits in 1 year, and then harvest the remaining sustainable harvest level volume for the decade over the next 9 years.

The model reports harvest volume in decades, not years. Therefore, the model's output data for both of these options would be the same. In the majority of this analysis, DNR therefore provided results for the first option only (harvesting 462 MMBF over 10 years). However, DNR did consider the qualitative differences between these two options. These differences are discussed in the results section.

This analysis assumes arrearage volumes will be available for harvest in the planning decade. However, they may not be. For example, although not required, part of the arrearage may come from thinning in riparian areas. Yet any thinning that occurs in riparian areas in the planning decade would be assessed at the operational level for environmental and economic feasibility and may or may not occur. Note that riparian thinning during the fiscal year 2005 through 2014 planning decade was less than projected (Table 2).

Table 3. Actual Harvest in the Fiscal Year 2005 Through 2014 Planning Decade by Location and Harvest Activity Type

	Harvest		Thinning		Total	
	MMBF	% of projected volume	**MMBF**	% of projected volume	**MMBF**	% of projected volume
Riparian lands	0	N/A	48	20%	48	12%
Non-riparian lands	4,604	108%	386	45%	4,991	98%
Total	**4,604**	**(104%)**	**434**	**(40%)**	**5,038**	**92%**

Refer to Appendix C of the sustainable harvest DEIS for a more detailed discussion on the reasons for the current arrearage.

Recent Timber Revenue and Volumes

DNR tracks both the timber volume sold and the timber volume harvested. Sales contracts typically require timber harvest to occur within two years of sale. As a result, timber is frequently harvested in a different fiscal year than when it was sold. Most revenue is generated when timber is harvested.[7]

This being the case, this analysis uses the harvest volume from fiscal years 2011 through 2018 to represent baseline conditions for comparison of model results for each scenario. This period best represents current conditions because it was a time of financial stability, and because harvest volumes were not affected by the following:

- The ramp-up in volume associated with the last sustainable harvest calculation,[8]

- Adjustments following the 2007 recalculation of the sustainable harvest level, or

- The 2008 windstorm that affected southwest Washington.

In addition, by fiscal year 2011, department staffing levels had recovered from losses due to the economic downturn in 2009.

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[7] A portion of the total revenue from a sale is collected as a deposit prior to harvest.
[8] The ramp-up period occurred in 2005 and 2006. This was the adjustment in volume from the prior decade's harvest level to the level set in 2004. This level was subsequently adjusted in 2007.

For fiscal years 2011 through 2018, harvest volume averaged 454.5 MMBF per year.[9] Converting this annual figure into a decadal level requires multiplying by ten. Therefore, harvesting an average 456 MMBF per year equates to 4,545 MMBF per decade. Appendix B contains the actual harvest volumes from fiscal year 2011 through 2018 for each sustainable harvest unit, each trust, and the State Forest Transfer Trust for each county. In the appendix, volumes are converted into volume per decade for comparison with model results, along with revenue generated for each trust from harvest of this timber.

How Data are Presented

Since there are eight marbled murrelet strategy alternatives, four arrearage harvest options (excluding the one year option, refer to "Arrearage" under "Key Understandings" earlier in this document), and three riparian thinning options, there are 96 possible scenarios. DNR modeled 38 of these scenarios the cover the range of possible results. Results for the 38 scenarios are shown together in tables in this document. For 36 scenarios the marbled murrelet strategy alternatives in the left-hand column and the arrearage harvest and riparian thinning options in right-hand columns (Figure 3). Scenarios including marbled murrelet conservation strategy alternative G and H are in separate rows below the other 36 scenarios.

Tables are color coded to show the results for each scenario clearly. Cells with the lowest value are shown in shades of orange and those with the highest values are shown in shades of blue. Cells with the same value have the same color. When appropriate, some tables have an additional column on the far right showing the recent harvest level for comparison. That column is shown in green.

Volume data are presented in millions of board feet (MMBF) per decade unless otherwise noted.

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[9] In this same period, sales volume was 468 MMBF per year.

Figure 3. Example of a Table Showing Results for all 38 Scenarios Plus Comparison to Recent Harvest Level

The cell with the red border is marbled murrelet strategy Alternative B with arrearage harvest of 702 MMBF and thinning of up to 10 percent of the riparian area. Since it is dark blue, it had a higher value than cells show in lighter shades of blue or shades of orange.

Marbled murrelet strategy alternative	Arrearage harvest						Decadal rate based on FY 2011-2015 performance
	702 MMBF		462 MMBF		No specific level		
	Riparian thinning						
	10%	1%	10%	1%	10%	1%	Amount
Alt. A	Amount	Amount	Amount	Amount	Amount	Amount	
Alt. B	Amount	Amount	Amount	Amount	Amount	Amount	
Alt. C	Amount	Amount	Amount	Amount	Amount	Amount	
Alt. D	Amount	Amount	Amount	Amount	Amount	Amount	
Alt. E	Amount	Amount	Amount	Amount	Amount	Amount	
Alt. F	Amount	Amount	Amount	Amount	Amount	Amount	
Alt. G – 382 MMBF arrearage volume – Riparian not included						Amount	
Alt. H – 382 MMBF arrearage volume – Riparian not included						Amount	

Results

Net Present Value

In Western Washington

Under the different scenarios, the 10-decade net present value of timber harvest from state trust lands in Western Washington ranged from $3.09 billion to $3.89 billion (Table 4).[10]

Table 4. 10-decade Net Present Value of Each Scenario ($ billions)

Marbled murrelet strategy alternative	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	3.74	3.64	3.74	3.64	3.74	3.64
Alt. B	3.89	3.79	3.89	3.79	3.89	3.79
Alt. C	3.69	3.60	3.69	3.60	3.69	3.59
Alt. D	3.69	3.59	3.69	3.59	3.69	3.59
Alt. E	3.67	3.57	3.67	3.57	3.67	3.57
Alt. F	3.18	3.09	3.18	3.09	3.18	3.09
Alt. G – 382 MMBF arrearage volume – Riparian not included						3.43
Alt. H – 382 MMBF arrearage volume – Riparian not included						3.59

[10] The net present value numbers in this financial analysis are lower than those reported in the July 2017 financial analysis due to a change in the discount rate used in calculating these values. In this analysis, the discount rate is 3 percent per year, up from 2 percent in the earlier analysis. The present value of future revenue is reduced under a 3 percent discount rate compared to the 2 percent discount rate.

EFFECTS OF MARBLED MURRELET STRATEGY ALTERNATIVES ON NET PRESENT VALUE

The marbled murrelet strategy alternatives have a larger impact on 10-decade net present value than either arrearage harvest or riparian thinning options.

Marbled murrelet strategy Alternative B produces the highest 10-decade net present value. Alternatives A, and C through F have lower values in the follow order from highest to lowest value A, C, D, E, and, finally, F. The 10-decade net present value of Alternative B is approximately $700 million (or roughly 18 percent) higher than Alternative F, with each paring of arrearage harvest and riparian thinning option.

Alternatives G and H are modeled under a scenario that that does not include riparian thinning in the harvest level, resulting in lower 10-decade net present value. However, isolating the effect of the murrelet long-term conservation strategy shows that Alternative H has a 10-decade net present value between alternatives A and C, while Alternative G is between alternatives E and F.

The extent to which a trust or county may be impacted by the marbled murrelet strategy corresponds mostly to the number of acres of long-term forest cover in each trust or county. Figure 3 shows that as the number of acres of long-term forest cover increases, net present value decreases. Appendix C shows the net present value for each trust and, for the State Forest Transfer Trust, for each county. Appendix D shows the results by sustainable harvest unit.

Figure 3. 10-decade Net Present Value by Long-term Forest Cover area

From left to right, the columns of blue dots correspond to marbled murrelet strategy alternatives B, A, D, C, E, G, and F. The red dots represent the alternatives analyzed in the sustainable harvest DEIS for potential environmental impacts (excluding the No Action alternative). The orange dot is the Board of Natural Resources preferred alternative.
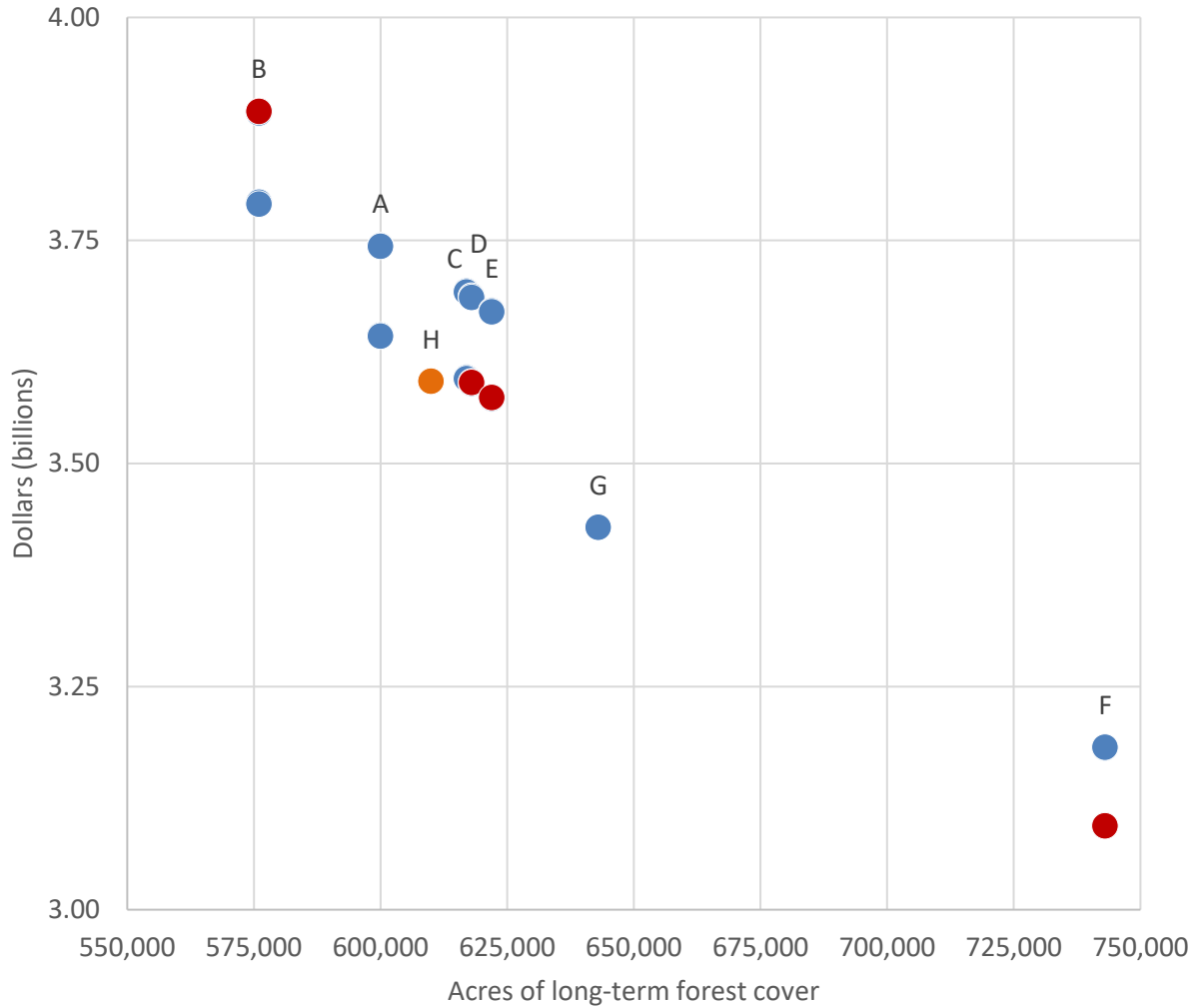
EFFECTS OF ARREARAGE HARVEST OPTIONS ON NET PRESENT VALUE

Arrearage harvest has a much smaller effect on 10-decade net present value than the marbled murrelet strategy. Arrearage harvest of 382 MMBF, 462 MMBF, and 702 MMBF of timber are both equivalent to the volume typically harvested by DNR over approximately 10 months, 1, and 1.5 years respectively, while 10-decade net present value spans 100 years of harvest.

All else being equal, net present value is up to $2 million higher for scenarios that include 702 MMBF of arrearage harvest than for those without a specific arrearage harvest volume. This difference ($2 million) is less than 0.1 percent of 10-decade net present value.

EFFECTS OF RIPARIAN THINNING OPTIONS ON NET PRESENT VALUE

The effect of the riparian thinning level on 10-decade net present value is up to $101 million, or about 3 percent of the 10-decade net present value.

Scenarios that include the 10 percent riparian thinning option generate higher 10-decade net present values and higher first decade volumes than scenarios that include the 1 percent thinning option.

The scenarios with alternatives G and H do not include any riparian volume the harvest level or the 10-decade net present value. The result of this is lower 10-decade net present values than if riparian thinning was included in the scenario.

By Trust and County

EFFECTS OF MARBLED MURRELET STRATEGY ALTERNATIVES ON NET PRESENT VALUE

The marbled murrelet strategy alternatives affect 10-decade net present values differently in the different trusts and counties. For example:

- For several trusts and counties, the 10-decade net present value is similar for alternatives A through E but substantially lower for Alternative F. For example, for the Scientific School Trust, the 10-decade net present value is at least 22 percent lower under Alternative F than the other alternatives (Table 5).[11]

- For State Forest Transfer Trust lands in Wahkiakum County, the 10-decade net present value is up to 54 percent lower under Alternative F than under Alternative B (Table 6; refer to Appendix C for 10-decade net present value and planning decade volumes for all trusts and counties).[12]

- For other trusts, such as State Forest Transfer Trust lands in Jefferson County, the marbled murrelet strategy alternatives have relatively little effect on 10-decade net present value (Table 6).[13]

Table 5. Effect of the Scenarios on 10-decade Net Present Value for Each Trust

Trust	Maximum 10-decade net present value ($ millions)	Magnitude of change in 10-decade net present value as a percent of maximum 10-decade net present value		
		Due to marbled murrelet conservation	Due to arrearage harvest	Due to riparian thinning
Agriculture School Grant	84	18%	0%	4%
Capitol Building Grant	244	25%	0%	2%
CEP&RI	91	22%	0%	3%

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[11] A similar pattern occurs on the Common School and Indemnity Trust and the State Forest Transfer Trust in King, Lewis, Mason, Pierce, Skagit, Snohomish, and Whatcom counties.

[12] A similar pattern occurs on the Capitol Grant, CEPRI and CEPR Transferred, Normal School, Scientific School, State Forest Purchase, and University trusts, and in the State Forest Transfer Trust in Clallam and Pacific counties.

[13] A similar patter occurs on the Community College Forest Reserve and Water Pollution Control Division trusts, and State Forest Transfer Trust in Clark, Cowlitz, Grays Harbor, Jefferson, Kitsap, Skamania, and Thurston counties.

Trust	Maximum 10-decade net present value ($ millions)	Magnitude of change in 10-decade net present value as a percent of maximum 10-decade net present value		
		Due to marbled murrelet conservation	Due to arrearage harvest	Due to riparian thinning
Common School and Indemnity	1,321	22%	0%	3%
Community College Forest Reserve	16	2%	0%	5%
Normal school	87	18%	0%	3%
Other	0	0%	0%	0%
Scientific School	172	22%	0%	4%
State Forest Purchase	289	7%	0%	3%
State Forest Transfer	1,474	14%	0%	2%
University Grant	98	44%	0%	2%
Water Pollution Control Division	18	3%	0%	0%

Table 6. Effect of the Scenarios on 10-decade Net Present Value for Each County with State Forest Transfer Trust Land

Note: total differs from State Forest Transfer maximum 10-decade net present value in Table 5 due to rounding.

State Forest Transfer Trust		Magnitude of change in 10-decade net present value as a percent of maximum 10-decade net present value		
County	Maximum 10-decade net present value ($ millions)	Due to marbled murrelet conservation	Due to arrearage harvest	Due to riparian thinning
Clallam	239	14%	0%	1%
Clark	50	0%	0%	3%
Cowlitz	25	1%	0%	4%
Grays Harbor	9	15%	1%	4%
Jefferson	48	5%	0%	2%
King	54	20%	0%	0%
Kitsap	15	1%	0%	2%
Lewis	144	17%	0%	3%
Mason	72	1%	0%	1%
Pacific	43	27%	0%	7%
Pierce	35	58%	0%	1%
Skagit	273	17%	0%	2%
Skamania	70	0%	0%	2%
Snohomish	200	11%	0%	2%
Thurston	80	4%	1%	4%
Wahkiakum	45	54%	1%	3%
Whatcom	74	29%	0%	1%

EFFECTS OF ARREARAGE HARVEST OPTIONS ON NET PRESENT VALUE

Similar to the results at the scale of western Washington, the effect of the arrearage harvest options is small at the scale of individual trusts and counties. An example is the 10-decade net present value for Skamania State Forest Transfer Trust lands. For the Skamania State Forest Transfer Trust lands, the difference in 10-decade net present value under the 702 MMBF arrearage harvest option and the no specific arrearage option is about than 0.2 percent (Table 7). Alternatives G and H have lower 10-decade net present values than the other alternatives shown in Table 7 due to the riparian thinning option, not due to the arrearage option.

Some counties do not have arrearage from the fiscal year 2005 through 2014 planning decade. In these counties, the arrearage option has no effect on 10-decade net present value.

Table 7. 10-decade Net Present Value for State Forest Transfer Trust lands in Skamania County ($ millions)

Marbled murrelet strategy alternative	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	70	69	70	69	70	69
Alt. B	70	69	70	69	70	69
Alt. C	70	69	70	69	70	69
Alt. D	70	69	70	69	70	69
Alt. E	70	69	70	69	70	69
Alt. F	70	69	70	69	70	69
Alt. G – 382 MMBF arrearage volume – Riparian not included						65
Alt. H – 382 MMBF arrearage volume – Riparian not included						65

EFFECTS OF RIPARIAN THINNING OPTIONS ON NET PRESENT VALUE

Similar to the results at the scale of western Washington, the effect of riparian thinning options on 10-decade net present value for the trusts and counties is larger than the effect of arrearage but much smaller than the effect of the marbled murrelet conservation strategy alternatives. For example, for Common

School and Indemnity Trust lands the difference in 10-decade net present value is about 3 percent between the riparian thinning options. This difference is similar in other trusts and counties (Table 8).

Table 8. 10-decade Net Present Value for Common School and Indemnity Trust Lands ($ millions)

Marbled murrelet strategy alternative	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	1,273	1,235	1,273	1,236	1,273	1,236
Alt. B	1,320	1,282	1,320	1,282	1,321	1,282
Alt. C	1,255	1,219	1,254	1,219	1,255	1,219
Alt. D	1,248	1,213	1,248	1,213	1,249	1,213
Alt. E	1,246	1,211	1,246	1,211	1,246	1,211
Alt. F	1,029	997	1,030	998	1,030	998
Alt. G – 382 MMBF arrearage volume – Riparian not included						1,135
Alt. H – 382 MMBF arrearage volume – Riparian not included						1,206

Harvest Volume

In Western Washington

In western Washington, the planning decade timber harvest volume under the scenarios ranges from 3,868 MMBF to 5,430 MMBF (Table 9). The *annual* harvest level for each scenario varies depending on the arrearage option (refer to "Effects of Arrearage Harvest Options on Harvest Volume").

Over 10 decades, the decadal harvest level follows a general pattern of decreasing decadal harvest volumes though decade 5 followed by increasing volumes (Figure 4).

Table 9. Planning-decade Timber Harvest Volume of Each Scenario (MMBF/decade)

Marbled murrelet strategy alternative	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	5,048	4,879	5,010	4,849	4,925	4,760
Alt. B	5,430	5,247	5,391	5,219	5,276	5,044
Alt. C	5,029	4,866	4,987	4,814	4,902	4,729
Alt. D	5,067	4,900	5,037	4,863	4,922	4,734
Alt. E	4,986	4,822	4,937	4,770	4,862	4,689
Alt. F	4,198	4,077	4,118	4,002	3,990	3,868
Alt. G – 382 MMBF arrearage volume – Riparian not included						4,499
Alt. H – 382 MMBF arrearage volume – Riparian not included						4,794

Figure 4. 10-decade Harvest Levels Under Each Scenario

Scenarios with the maximum, median, and minimum 10-decade net present values* are shown in blue, red, and green, respectively; other scenarios are in gray.
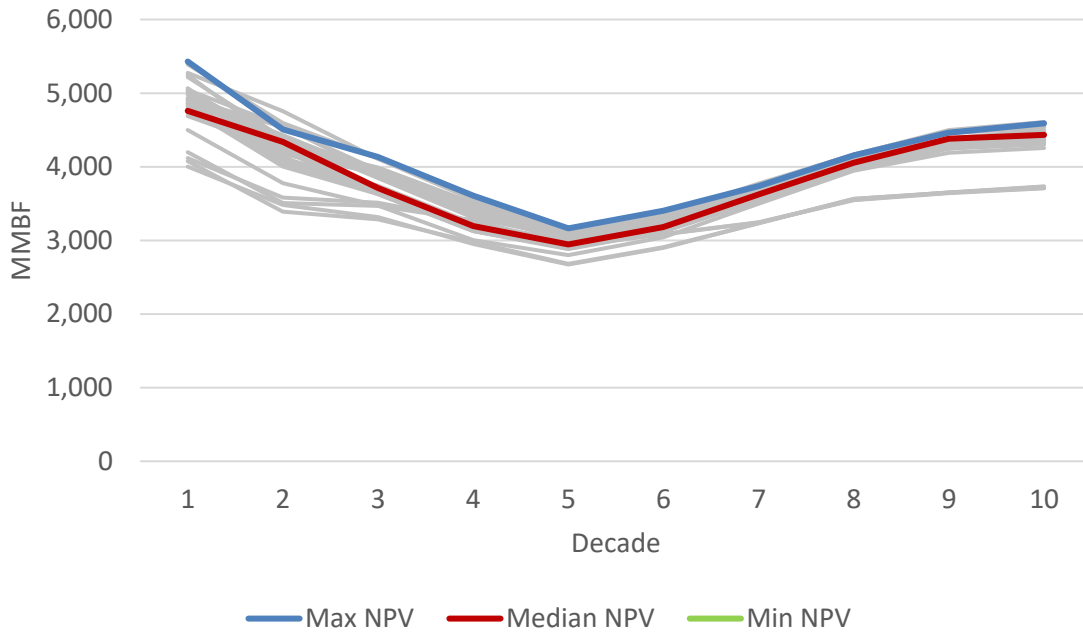
* The scenario with the maximum net present value is the combination of marbled murrelet strategy Alternative B, the 702 MMBF of arrearage harvest option, and the 10 percent riparian thinning option. The scenario with the median net present value (18th highest of 36 scenarios) is the combination of marbled murrelet strategy Alternative A, the 462 MMBF of arrearage harvest option, and the 1 percent riparian thinning option. The scenario with the minimum net present value is the combination of marbled murrelet strategy Alternative F, the no specific arrearage harvest option, and the 1 percent riparian thinning option.

EFFECTS OF MARBLED MURRELET STRATEGY ALTERNATIVES ON HARVEST VOLUME

Results for harvest volume are similar to those for net present value. Alternative B produces the highest planning decade harvest volume, followed by alternatives A, C, D, E, and, finally, F. Alternative B produces 1,200 MMBF (about 23 percent) more harvest volume in the planning decade than Alternative F, regardless of arrearage harvest or riparian thinning option (Figure 5). The maximum effect of marbled murrelet strategy alternatives on harvest volume moderate over time, but exceed 480 MMBF per decade.

Alternatives G and H are modeled under a scenario that that does not include riparian thinning in the harvest level, resulting in planning decade harvest volumes. However, isolating the effect of the murrelet long-term conservation strategy shows that Alternative H has a planning decade volume similar to alternatives A, while Alternative G is between alternatives E and F.

As with 10-decade net present value, the effect of the marbled murrelet strategy alternatives on planning decade harvest volumes differs by trust and county (Tables 10 and 11).

Figure 5. Planning decade Harvest Volume by Area of Long-term Forest Cover

From left to right, the columns of blue dots correspond to marbled murrelet strategy alternatives B, A, D, C, E, G and F. From left to right, the columns of blue dots correspond to marbled murrelet strategy alternatives B, A, D, C, E, G, and F. The red dots represent the alternatives analyzed in the sustainable harvest DEIS for potential environmental impacts (excluding the No Action alternative). The orange dot is the Board of Natural Resources preferred alternative.
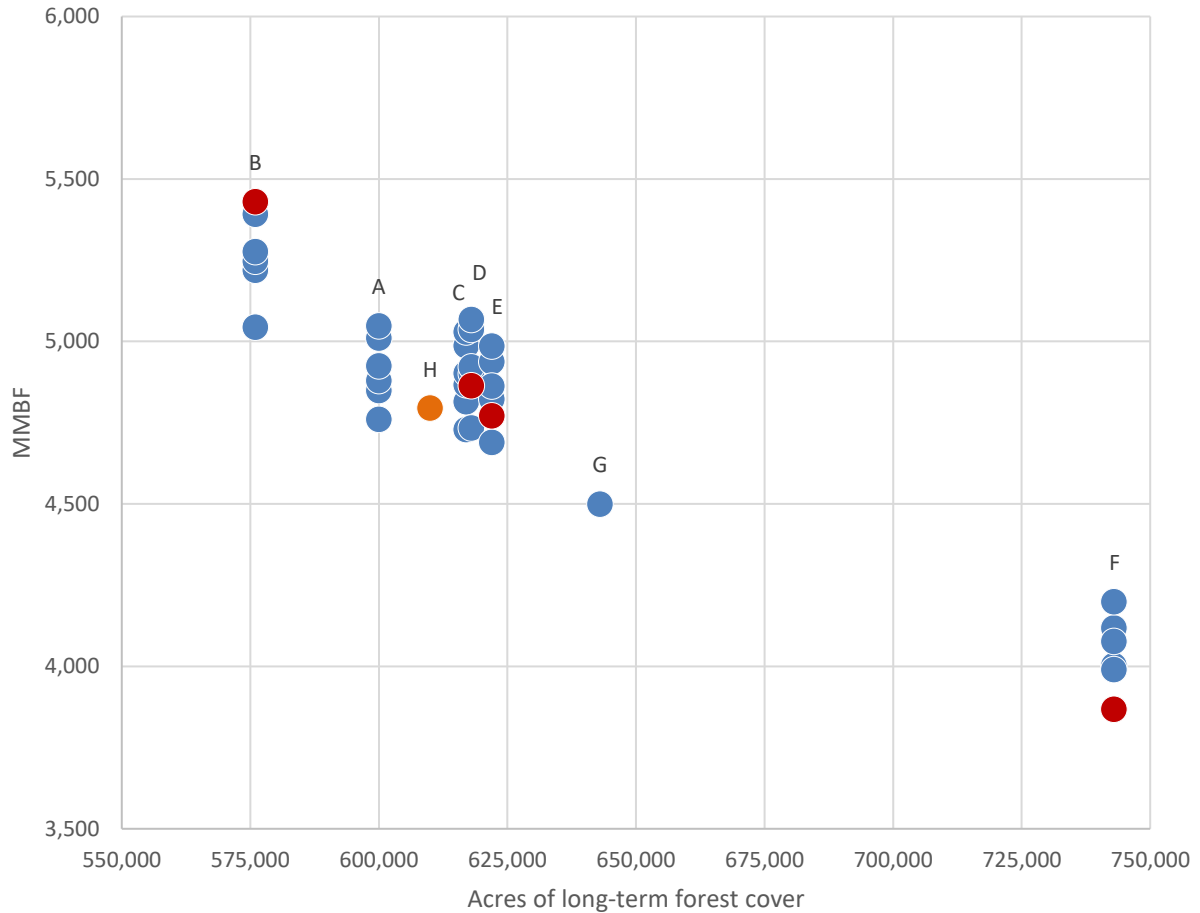
Table 10. Effect of the Scenarios on Planning Decade Harvest Volume for Each Trust

| Trust | Maximum planning decade harvest volume (MMBF) | Magnitude of change in planning decade harvest volume as a percent of maximum planning decade harvest volume | | |
		Due to marbled murrelet conservation	Due to arrearage harvest	Due to riparian thinning
Agriculture School Grant	136	26%	2%	8%
Capitol Building Grant	490	26%	2%	3%
CEP&RI	137	34%	2%	8%
Common School and Indemnity	1,722	28%	2%	3%
Community College Forest Reserve	13	58%	0%	0%
Normal school	105	25%	3%	2%
Other	0	0%	0%	0%
Scientific School	274	30%	1%	6%
State Forest Purchase	430	7%	5%	8%
State Forest Transfer	1,987	17%	3%	4%
University Grant	134	58%	5%	2%
Water Pollution Control Division	6	6%	0%	1%

Table 11. Effect of the Scenarios on Planning Decade Harvest Volume for Each County with State Forest Transfer Trust Land

Note: The sum of maximum planning decade harvest volumes in Table 10 is different than the maximum planning decade harvest volume shown in Table 9 for State Forest Transfer trust land. The reason, is that no single scenario produces the maximum planning decade harvest volume in every county at once.

| State Forest Transfer Trust | | Magnitude of change in planning decade harvest volume as a percent of maximum planning decade harvest volume | | |
County	Maximum planning decade harvest volume (MMBF)	Due to marbled murrelet conservation	Due to arrearage harvest	Due to riparian thinning
Clallam	426	16%	6%	1%
Clark	42	0%	0%	15%
Cowlitz	22	5%	0%	11%
Grays Harbor	9	20%	1%	6%
Jefferson	77	6%	0%	6%
King	80	19%	12%	2%
Kitsap	11	1%	0%	3%
Lewis	182	19%	0%	4%
Mason	87	1%	0%	0%
Pacific	53	35%	3%	9%
Pierce	44	59%	0%	1%
Skagit	322	22%	0%	3%
Skamania	120	6%	11%	11%

State Forest Transfer Trust		Magnitude of change in planning decade harvest volume as a percent of maximum planning decade harvest volume		
County	Maximum planning decade harvest volume (MMBF)	Due to marbled murrelet conservation	Due to arrearage harvest	Due to riparian thinning
Snohomish	228	20%	2%	1%
Thurston	131	23%	8%	24%
Wahkiakum	73	59%	15%	4%
Whatcom	85	28%	10%	1%

EFFECTS OF ARREARAGE HARVEST OPTIONS ON HARVEST VOLUME

Scenarios that include 702 MMBF and 462 MMBF in arrearage harvest result in a slightly higher harvest volume in the planning decade than scenarios with no specific arrearage options. Harvest levels for scenarios with 702 MMBF of arrearage harvest are no more than 210 MMBF higher than scenarios with the no specific arrearage option, when paired with the 10 percent thinning option. When paired with the 1 percent riparian thinning option, the difference is even smaller: 191 MMBF.

Arrearage would be straightforward if the volume that was not harvested during a previous decade was available for harvest now. However, areas that were unavailable for harvest during the fiscal year 2005 through 2014 planning decade (for example, areas transferred out of trust status, and areas where DNR restricted harvest to avoid foreclosing future options for marbled murrelet conservation) continue to be unavailable for harvest during the 2015 through 2024 planning decade. For that reason, the model must make up the arrearage by bringing harvests forward from decade 2. That, in turn, reduces harvest volumes in decade 2. Figure 6 shows a slightly higher harvest level in the planning decade and a small reduction in the harvest level in the second decade under the 702 and 462 MMBF arrearage harvest options. Over the first three decades, scenarios that include 702 or 462 MMBF of arrearage harvest result in slightly less total harvest volume than scenarios with no specific arrearage volume.

Alternatives G and H are paired only with 382 MMBF of arrearage volume. The effect of this arrearage harvest volume on harvest levels is similar to the 462 MMBF arrearage option.

Figure 6. Sustainable Harvest Level (solid bars) and Arrearage Harvest (hollow bars) in Western Washington Under Three Arrearage Options Combined with Marbled Murrelet Strategy Alternative A and the 10 Percent Riparian Thinning Option
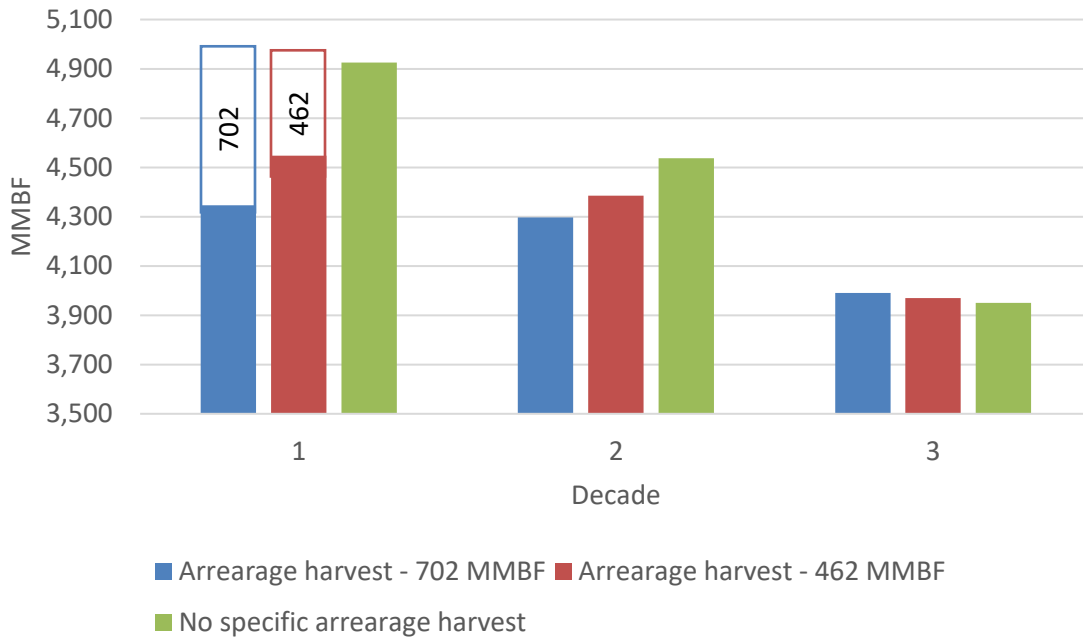
Scenarios that include arrearage harvest of 702 MMBF or 462 MMBF result in a greater change in harvest levels between the first and second decades than scenarios with no specific arrearage volume (Figure 6). Larger changes in harvest levels will require DNR to make larger changes in staffing levels. After the second decade, harvest levels are similar for scenarios that differ only by arrearage harvest level (Figure 7).

Figure 7. Harvest Levels Under the Three Arrearage Options Combined With Marbled Murrelet Strategy Alternative A and the 10 Percent Riparian Thinning Option

The line for 462 MMBF of arrearage harvest nearly completely overlaps the line for 702 MMBF of arrearage harvest.
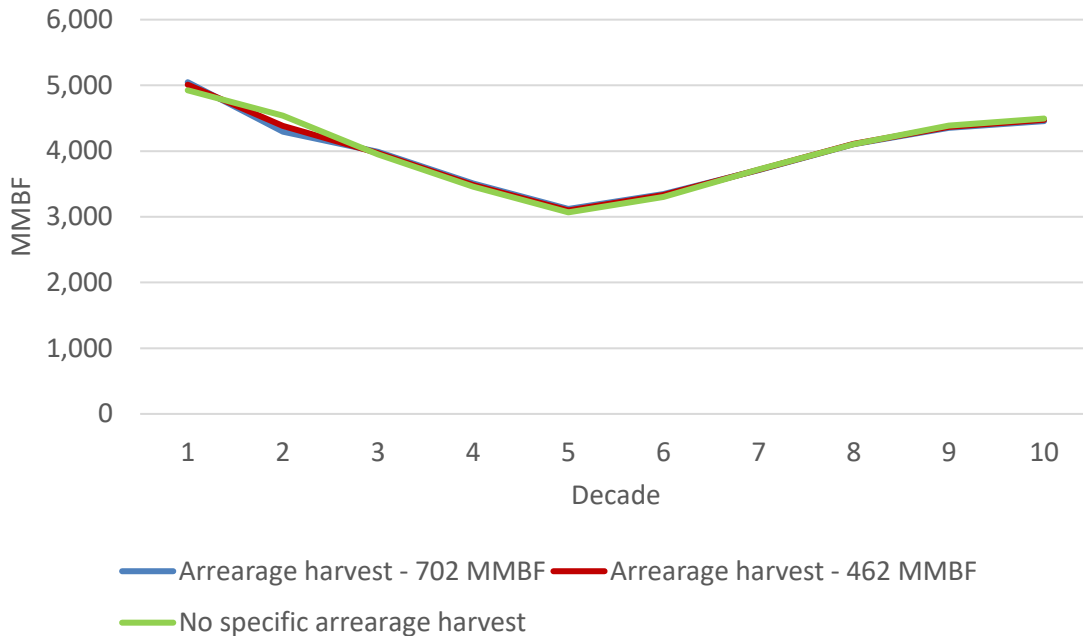
Timing of Arrearage and Within-decade Variability

The arrearage harvest options differ in the timing of harvest of arrearage volume (Text Box 2). However, under all options, DNR would harvest the specified arrearage volume by the end of the planning decade, 2024. As it is currently fiscal year 2019, and only five full fiscal years remain in the planning decade, the options that specify the harvest of arrearage in five or ten years have the same effect on harvest levels in the remaining years of the planning decade.

The option that specifies the harvest of arrearage volume in 1 year, however, would have a different result. Under this option, harvest occurs only in sustainable harvest units with arrearage. As a result, for one year no revenue would be generated on State Forest Transfer Trust lands that benefit Clark, Cowlitz, Jefferson, Lewis, Mason, Pierce, Skagit, or Snohomish counties. This option would result in large swings in harvest levels around the state, which may increase management expenditures, as explained previously. For example, harvest volumes in the OESF would be about twice as high during that one year than in the other years of the decade. Significant additional staff would be needed to set up and do compliance on these additional sales. Staff would then need to be shifted to other regions to meet their subsequent harvest levels. Also, additional costs would be incurred from temporarily high demand for seedlings, staff, and contractors for planting.

The spike in volume offered for sale in one year also may depress revenue per volume sold: excess timber supply on the market may suppress prices, and increased demand for logging crews may increase logging costs for purchasers

EFFECTS OF RIPARIAN THINNING OPTIONS ON HARVEST VOLUME

Scenarios that include the 10-percent riparian thinning option result in between 121 and 232 MMBF more harvest volume in the planning decade than the 1-percent thinning option, depending on marbled murrelet strategy and arrearage option. Harvest levels over a 10-decade period are also highest under the 10-percent riparian thinning option (Figure 8).

Alternative G and H are paired only with an option not to include riparian thinning volume in the calculation of the harvest level. The result of this is a lower harvest volume for the planning decade and over a 10-decade period. During implementation, thinning in riparian areas is expected to continue at a level consistent with recent practice under the Riparian Forest Restoration Strategy and Olympic Experimental State Forest HCP Unit Forest Land Plan. Volume from these activities will be counted towards attainment of the sustainable harvest level.

Figure 8. Harvest Levels Under the Two Riparian Thinning Levels Combined With Marbled Murrelet Strategy Alternative A and no Specific Level Arrearage Harvest Option
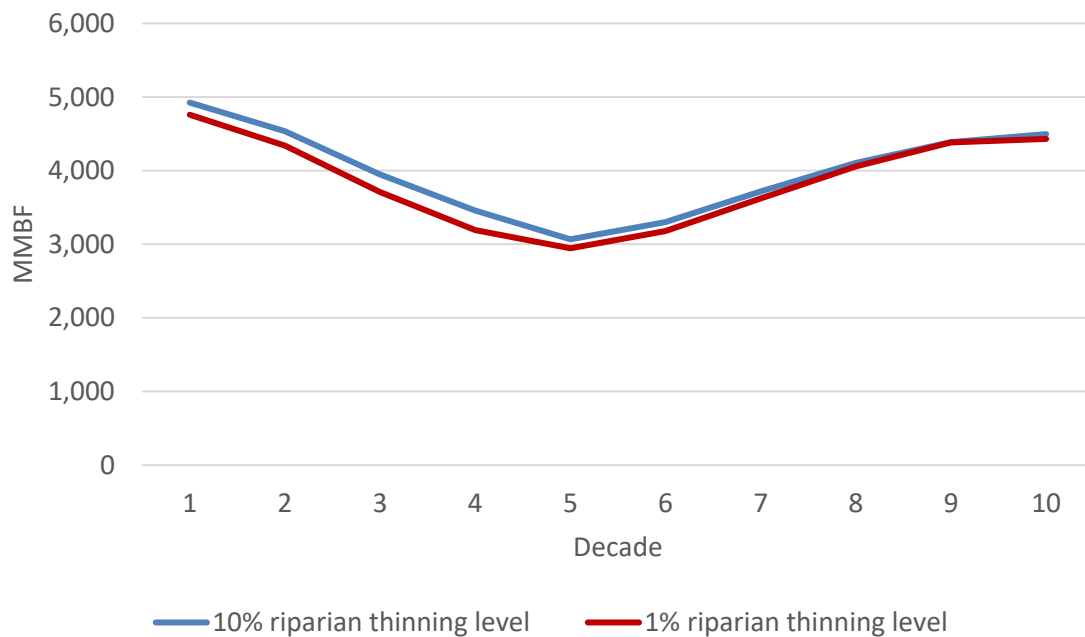
By Trust and County

EFFECTS OF MARBLED MURRELET STRATEGY ALTERNATIVES ON HARVEST VOLUME

Similar to 10-decade net present value, the effects of the scenarios on the planning decade harvest level differ at the scale of the individual trusts, or counties for the State Forest Transfer Trust.

The marbled murrelet strategy alternatives affect the harvest level differently in the different trusts and counties. For example, for State Forest Transfer Trust lands in Wahkiakum County, the harvest level under marbled murrelet strategy Alternative F is 40 percent of the level under Alternative B, and half to

two thirds recent harvest levels (Table 13). Alternative H produces harvest volumes that approach Alternative B levels.

The other patterns in the 10-decade net present value results appear in the first decade results. Some trusts or counties are mainly affected by alternative F and G (Table 14), while other are largely unaffected (Table 15).

Table 12. Planning Decade Harvest Level for State Forest Transfer Trust lands in Wahkiakum County (MMBF/decade)

Marbled murrelet strategy alternative	Arrearage harvest						Decadal rate based on FY 2011-2018 performance
	702 MMBF		462 MMBF		No specific level		
	Riparian thinning						
	10%	1%	10%	1%	10%	1%	
Alt. A	42	41	39	39	36	36	50
Alt. B	73	70	69	66	62	59	
Alt. C	40	39	40	39	35	33	
Alt. D	42	41	39	38	34	32	
Alt. E	40	39	40	39	35	33	
Alt. F	30	29	30	28	24	23	
Alt. G – 382 MMBF arrearage volume – Riparian not included						31	
Alt. H – 382 MMBF arrearage volume – Riparian not included						59	

Table 13. Planning Decade Harvest Level for Scientific School Trust Lands (MMBF/decade)

Marbled murrelet strategy alternative	Arrearage harvest						Decadal rate based on FY 2011-2018 performance
	702 MMBF		462 MMBF		No specific level		
	Riparian thinning						
	10%	1%	10%	1%	10%	1%	
Alt. A	260	246	261	244	257	243	257
Alt. B	274	258	273	259	270	249	
Alt. C	263	246	260	247	260	246	
Alt. D	261	247	266	248	262	249	
Alt. E	260	247	260	244	260	247	
Alt. F	192	178	192	176	189	178	
Alt. G – 382 MMBF arrearage volume – Riparian not included					205		
Alt. H – 382 MMBF arrearage volume – Riparian not included					241		

Table 14. Planning Decade Harvest Level for State Forest Transfer Trust Lands in Jefferson County (MMBF/decade)

Marbled murrelet strategy alternative	Arrearage harvest						Decadal rate based on FY 2011-2018 performance
	702 MMBF		462 MMBF		No specific level		
	Riparian thinning						
	10%	1%	10%	1%	10%	1%	
Alt. A	72	69	73	69	73	69	62
Alt. B	77	73	77	73	77	73	
Alt. C	77	73	77	73	77	73	
Alt. D	77	73	77	73	77	73	
Alt. E	77	73	77	73	77	73	
Alt. F	76	73	76	73	76	73	
Alt. G – 382 MMBF arrearage volume – Riparian not included						73	
Alt. H – 382 MMBF arrearage volume – Riparian not included						73	

EFFECTS OF ARREARAGE HARVEST OPTIONS ON HARVEST VOLUME

The effect of the arrearage harvest options on the planning decade harvest level is small but apparent between the arrearage options, as exemplified by the harvest level for State Forest Transfer Trust lands in Skamania County (Table 15). Alternatives G and H have lower planning decade harvest levels than the other alternatives shown in Table 15 due to the riparian thinning option, not due to the arrearage option.

Table 15. Planning Decade Harvest Level for State Forest Transfer Trust Lands in Skamania County (MMBF/decade)

Marbled murrelet strategy alternative	Arrearage harvest						Decadal rate based on FY 2011-2018 performance
	702 MMBF		462 MMBF		No specific level		
	Riparian thinning						
	10%	1%	10%	1%	10%	1%	
Alt. A	116	107	116	107	107	103	54
Alt. B	120	107	118	107	107	103	
Alt. C	120	107	118	107	107	103	
Alt. D	120	107	118	107	107	103	
Alt. E	120	107	117	107	107	103	
Alt. F	113	107	107	107	103	103	
Alt. G – 382 MMBF arrearage volume – Riparian not included						100	
Alt. H – 382 MMBF arrearage volume – Riparian not included						101	

EFFECTS OF RIPARIAN THINNING OPTIONS ON HARVEST VOLUME

The effect of the riparian harvest options is relatively small in most cases on the planning decade harvest level at the trust and county level (Table 16). However, for State Forest Transfer Trust lands in Clark, Cowlitz, Skamania, and Thurston counties the maximum change to planning decade harvest volumes due to the riparian thinning option exceeds 10 percent of the decadal harvest level.

Table 16. Planning Decade Harvest Level for Common School and Indemnity Trust Lands (MMBF/decade)

Marbled murrelet strategy alternative	Arrearage harvest						Decadal rate based on FY 2011-2018 performance
	702 MMBF		462 MMBF		No specific level		
	Riparian thinning						
	10%	1%	10%	1%	10%	1%	
Alt. A	1,586	1,530	1,579	1,531	1,571	1,510	1,193
Alt. B	1,722	1,672	1,714	1,669	1,689	1,593	
Alt. C	1,576	1,534	1,582	1,530	1,562	1,519	
Alt. D	1,591	1,540	1,585	1,538	1,560	1,493	
Alt. E	1,562	1,521	1,564	1,521	1,555	1,507	
Alt. F	1,241	1,184	1,199	1,156	1,154	1,113	
Alt. G – 382 MMBF arrearage volume – Riparian not included						1,368	
Alt. H – 382 MMBF arrearage volume – Riparian not included						1,484	

Land Base Available for Production

The area available for harvest varies by marbled murrelet strategy alternative. Lands managed to maintain long-term forest cover include areas where thinning can occur, and areas where thinning cannot occur, such as northern spotted owl nest patches, marbled murrelet occupied sites, NRCAs, and NAPs. Additional information about changes in land area available for production in each trust and county is available in the marbled murrelet RDEIS in Chapters 3.11 and 4.11. Table 17 provides the number of acres available for harvest under each alternative, since DNR generates the most revenue from these acres.

Table 17. Area Available for Harvest Activities in Western Washington

Marbled murrelet strategy alternative	Lands where only thinning may occur or that are deferred from activity (acres)	Lands where thinning and harvest may occur (acres)	Total (acres)[14]
Alt. A	686,000	779,000	1,465,000
Alt. B	678,000	787,000	1,465,000
Alt. C	706,000	759,000	1,465,000
Alt. D	709,000	756,000	1,465,000
Alt. E	710,000	755,000	1,465,000
Alt. F	819,000	646,000	1,465,000
Alt. G	725,000	740,000	1,465,000
Alt. H	701,000	764,000	1,465,000

Management Funds

As explained in the introduction to this analysis, management funds are used to cover expenditures incurred in managing state trust lands. Expenditures can be broken into three categories: direct expenditures associated with timber production such as timber sale setup, compliance, and marketing; silvicultural expenditures such as site preparation, planting, vegetation management, pre-commercial thinning, and surveys; and indirect expenditures of land management such as planning, inventory, right-of-way management, legal support, and research.[15]

During the planning decade, management funds available to DNR under each scenario range from $40 million to $56 million per year (Table 18). The marbled murrelet strategy alternatives have the greatest impact on management funds. Under Alternative F, funds are about $12 million per year less than under Alternative B and $8 million to $11 million less than they were in the fiscal years 2011 through 2018 period.

As described in Appendix F of the sustainable harvest DEIS, indirect expenditures are likely to remain constant over a range of harvest levels. Under marbled murrelet strategy Alternative F, indirect

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[14] Acres reported here are from the forest estate model. Acres differ from the total number of DNR-managed forested acres in western Washington by about 1 percent due to data limits of the forest estate model. Refer to sustainable harvest DEIS Appendix F for more information about these data limits.

[15] For more information on indirect costs, refer to slide 25 of the May 2015 Board of Natural Resources presentation available at http://file.dnr.wa.gov/publications/em_bc_bnr_shc_may2016_presentation.pdf.

expenditures will either account for a much larger proportion of the total cost of harvesting timber than under other alternatives, *or* these activities will be curtailed.

Table 18. Management Funds in the Planning Decade ($ millions/year)

Marbled murrelet strategy alternative	Arrearage harvest						Decadal rate based on FY 2011-2018 performance
	702 MMBF		462 MMBF		Rolled in		
	Riparian thinning						
	10%	1%	10%	1%	10%	1%	
Alt. A	53	51	52	50	52	50	51
Alt. B	56	54	56	54	55	52	
Alt. C	52	50	52	50	51	49	
Alt. D	52	51	52	50	51	49	
Alt. E	52	50	51	49	51	49	
Alt. F	43	42	42	41	41	40	
Alt. G – 382 MMBF arrearage volume – Riparian not included						47	
Alt. H – 382 MMBF arrearage volume – Riparian not included						50	

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Appendix A. Model Updates – Sustainable harvest DEIS to July 2017 financial analysis

Arrearage

Table A-1 presents the portion of first decade harvest volumes for each sustainable harvest unit that is specifically due to arrearage from the fiscal year 2005 through 2014 planning decade. The table includes volumes for each arrearage harvest option with 702 MMBF or 462 MMBF. The table shows volumes only for the sustainable harvest units in which arrearage occurred during the past decade. In sustainable harvest units not listed, actual harvest met or exceeded the planned harvest level.

Table A-1. Projected Arrearage Harvest Volume for Each Sustainable Harvest Unit in Arrears in the Fiscal Year 2005 through 2014 Planning Decade Under Each Arrearage Option

Sustainable harvest unit	Arrearage harvest volume under 702 MMBF option	Arrearage harvest volume under 462 MMBF option*	Arrearage harvest volume under 382 MMBF option
Capitol	56	37	56
Clallam	25	16	25
Federal	347	229	45
King	16	10	16
OESF	200	132	200
Pacific	4	3	4
Skamania	19	13	19
Wahkiakum	17	11	17
Whatcom	18	12	0

* Values sum to 463 due to rounding

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Appendix B. Fiscal Year 2011 Through 2018 Harvest Levels and Revenue

This appendix reports net revenue distributed to the trusts in fiscal years 2011 through 2018. Data came from DNR's revenue tracking database, NaturE. Revenue numbers were adjusted to 2018 dollars using the consumer price index (U.S. Bureau of Labor Statistics 2018).

Table B-1. Revenue by Sustainable Harvest Unit

Sustainable harvest unit	Harvest volume FY 2011–2018 (MMBF)	Annual average (MMBF)	Annual harvest converted into a decadal harvest level (MMBF)
Capitol	327	41	409
Clallam	123	15	154
Clark	171	21	214
Cowlitz	53	7	66
Federal	1,482	185	1,853
Grays Harbor	2	0	3
Jefferson	50	6	62
King	45	6	56
Kitsap	16	2	19
Lewis	174	22	218
Mason	79	10	99
OESF	315	39	394
Pacific	46	6	58
Pierce	12	2	15
Skagit	262	33	328
Skamania	43	5	54
Snohomish	260	33	325
Thurston	42	5	53
Wahkiakum	40	5	50
Whatcom	93	12	116
Total	3,636	454	4,545

Table B-2. Revenue by Trust

Sustainable harvest unit	Trust(s)	Harvest volume FY 2011–2015 (MMBF)	Annual average (MMBF)	Annual harvest converted into a decadal harvest level (MMBF)	Annual net revenue FY 2011–2018 (2018 dollars in million)
State Lands	Agricultural School Grant	91	11	114	$4
	Capitol Building Grant	235	29	294	$7
	CEP&RI (including CEP&RI Transferred) Grant	103	13	128	$4
	Common School and Indemnity	954	119	1,193	$28
	Normal School	64	8	80	$2
	Scientific School	206	26	257	$6
	University Grant (original and transferred)	55	7	69	$1
State Forest Lands	State Forest Purchase Trust*	254	32	318	$6
	State Forest Transfer Trust	1,656	207	2,070	$59
Other lands	Community College Forest Reserve	10	1	13	$0.4
	Water Pollution Control Division	6	1	8	$0.2
	Other	<0.1	<0.1	<0.1	$<0.1
Total		3,636	454	4,545	$118

* Includes timber trust lands for University repayment and Forest Board repayment.

Table B-3. Revenue by county for State Forest Transfer Trust lands

County	Harvest volume FY 2011–2018 (MMBF)	Annual average (MMBF)	Annual harvest converted into a decadal harvest level (MMBF)	Annual net revenue FY 2011–2018 (2018 dollars in million)
Clallam	222	28	278	$6
Clark	171	21	214	$6
Cowlitz	53	7	66	$2
Grays Harbor	11	1	13	$0.4
Jefferson	50	6	62	$2

County	Harvest volume FY 2011–2018 (MMBF)	Annual average (MMBF)	Annual harvest converted into a decadal harvest level (MMBF)	Annual net revenue FY 2011–2018 (2018 dollars in million)
King	45	6	56	$2
Kitsap	16	2	19	$0.6
Lewis	174	22	218	$6
Mason	79	10	99	$4
Pacific	46	6	58	$1
Pierce	12	2	15	$0.4
Skagit	262	33	328	$10
Skamania	43	5	54	$1
Snohomish	260	33	325	$9
Thurston	79	10	99	$3
Wahkiakum	40	5	50	$1
Whatcom	93	12	116	$3
Total	1,656	207	2,070	$59

References

U.S. Bureau of Labor Statistics. 2018. Consumer price index for all urban consumers: all items less food and energy. Available at: https://research.stlouisfed.org. Accessed August 2, 2018.

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Appendix C. Trust and County Level Results

This appendix reports the fiscal year 2015 through 2024 planning decade projected volume and 10-decade net present value under each scenario for each trust, and for the State Forest Transfer trust, for each county. Planning decade volume is compared to the actual harvest volume from the fiscal year 2011 through 2018 planning period.

By Trust

Agricultural School Grant

Table C-1. Planning Decade Volume, Agricultural School Grant (MMBF/decade)

Marbled murrelet strategy alternative	Arrearage harvest						Decadal rate based on FY 2011-2018 performance
	702 MMBF		462 MMBF		No specific level		
	Riparian thinning						
	10%	1%	10%	1%	10%	1%	
Alt. A	131	121	131	120	125	118	114
Alt. B	136	125	136	125	134	122	
Alt. C	133	122	132	122	131	120	
Alt. D	132	121	131	120	129	117	
Alt. E	132	121	131	121	129	118	
Alt. F	101	95	101	93	101	92	
Alt. G – 382 MMBF arrearage volume – Riparian not included						114	
Alt. H – 382 MMBF arrearage volume – Riparian not included						117	

Table C-2. 10-decade Net Present Value, Agricultural School Grant ($ millions)

Marbled murrelet strategy alternative	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	83	79	83	79	83	79
Alt. B	84	81	84	81	84	81
Alt. C	83	79	83	79	83	79
Alt. D	82	79	82	79	82	79
Alt. E	82	79	82	79	82	79
Alt. F	69	65	69	65	69	65
Alt. G – 382 MMBF arrearage volume – Riparian not included						76
Alt. H – 382 MMBF arrearage volume – Riparian not included						77

Capitol Building Grant

Table C-3. Planning Decade Volume, Capitol Building Grant (MMBF/decade)

Marbled murrelet strategy alternative	Arrearage harvest						Decadal rate based on FY 2011-2018 performance
	702 MMBF		462 MMBF		No specific level		
	Riparian thinning						
	10%	1%	10%	1%	10%	1%	
Alt. A	453	439	453	438	450	429	294
Alt. B	490	476	490	479	481	465	
Alt. C	448	435	449	434	442	429	
Alt. D	455	439	455	442	446	431	
Alt. E	444	431	444	431	441	429	
Alt. F	362	358	359	345	341	331	
Alt. G – 382 MMBF arrearage volume – Riparian not included						372	
Alt. H – 382 MMBF arrearage volume – Riparian not included						413	

Table C-4. 10-decade Net Present Value, Capitol Building Grant ($ millions)

Marbled murrelet strategy alternative	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	232	227	232	228	232	228
Alt. B	243	238	243	239	244	239
Alt. C	225	221	226	221	226	221
Alt. D	226	222	226	222	226	222
Alt. E	225	220	225	220	225	220
Alt. F	183	178	183	179	183	179
Alt. G – 382 MMBF arrearage volume – Riparian not included					206	
Alt. H – 382 MMBF arrearage volume – Riparian not included					221	

CEP&RI[16] (including CEP&RI transferred)

Table C-5. Planning Decade Volume, CEP&RI (MMBF/decade)

Marbled murrelet strategy alternative	Arrearage harvest						Decadal rate based on FY 2011-2018 performance
	702 MMBF		462 MMBF		No specific level		
	Riparian thinning						
	10%	1%	10%	1%	10%	1%	
Alt. A	114	107	115	108	114	107	128
Alt. B	137	129	137	126	133	127	
Alt. C	109	104	110	104	110	104	
Alt. D	114	107	114	108	114	107	
Alt. E	110	103	110	103	111	103	
Alt. F	92	84	91	84	91	83	
Alt. G – 382 MMBF arrearage volume – Riparian not included					100		
Alt. H – 382 MMBF arrearage volume – Riparian not included					117		

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[16] Charitable, Educational, Penal, and Reformatory Institutions Grant

Table C-6. 10-decade Net Present Value, CEP&RI ($ millions)

Marbled murrelet strategy alternative	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	85	82	85	82	85	82
Alt. B	91	88	91	88	91	88
Alt. C	82	79	82	79	82	79
Alt. D	81	78	81	78	81	78
Alt. E	82	79	82	79	82	79
Alt. F	71	68	71	68	71	68
Alt. G – 382 MMBF arrearage volume – Riparian not included						78
Alt. H – 382 MMBF arrearage volume – Riparian not included						84

Common School and Indemnity

Table C-7. Planning Decade Volume, Common School and Indemnity (MMBF/decade)

Marbled murrelet strategy alternative	Arrearage harvest						Decadal rate based on FY 2011-2018 performance
	702 MMBF		462 MMBF		No specific level		
	Riparian thinning						
	10%	1%	10%	1%	10%	1%	
Alt. A	1,586	1,530	1,579	1,531	1,571	1,510	1,193
Alt. B	1,722	1,672	1,714	1,669	1,689	1,593	
Alt. C	1,576	1,534	1,582	1,530	1,562	1,519	
Alt. D	1,591	1,540	1,585	1,538	1,560	1,493	
Alt. E	1,562	1,521	1,564	1,521	1,555	1,507	
Alt. F	1,241	1,184	1,199	1,156	1,154	1,113	
Alt. G – 382 MMBF arrearage volume – Riparian not included						1,368	
Alt. H – 382 MMBF arrearage volume – Riparian not included						1,484	

Table C-8. 10-decade Net Present Value, Common School and Indemnity ($ millions)

Marbled murrelet strategy alternative	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	1,273	1,235	1,273	1,236	1,273	1,236
Alt. B	1,320	1,282	1,320	1,282	1,321	1,282
Alt. C	1,255	1,219	1,254	1,219	1,255	1,219
Alt. D	1,248	1,213	1,248	1,213	1,249	1,213
Alt. E	1,246	1,211	1,246	1,211	1,246	1,211
Alt. F	1,029	997	1,030	998	1,030	998
Alt. G – 382 MMBF arrearage volume – Riparian not included					1,135	
Alt. H – 382 MMBF arrearage volume – Riparian not included					1,206	

Community College Forest Reserve

Table C-9. Planning Decade Volume, Community College Forest Reserve (MMBF/decade)

Marbled murrelet strategy alternative	Arrearage harvest						Decadal rate based on FY 2011-2018 performance
	702 MMBF		462 MMBF		No specific level		
	Riparian thinning						
	10%	1%	10%	1%	10%	1%	
Alt. A	13	13	13	13	13	13	13
Alt. B	13	13	13	13	13	13	
Alt. C	13	13	13	13	13	12	
Alt. D	13	13	13	13	13	12	
Alt. E	13	13	13	13	13	12	
Alt. F	5	12	5	12	5	13	
Alt. G – 382 MMBF arrearage volume – Riparian not included					12		
Alt. H – 382 MMBF arrearage volume – Riparian not included					12		

Table C-10. 10-decade Net Present Value, Community College Forest Reserve ($ millions)

Marbled murrelet strategy alternative	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	16	15	16	15	16	15
Alt. B	16	15	16	15	16	15
Alt. C	16	15	16	15	16	15
Alt. D	16	15	16	15	16	15
Alt. E	16	15	16	15	16	15
Alt. F	16	15	16	15	16	15
Alt. G – 382 MMBF arrearage volume – Riparian not included						15
Alt. H – 382 MMBF arrearage volume – Riparian not included						15

Normal School

Table C-11. Planning Decade Volume, Normal School (MMBF/decade)

Marbled murrelet strategy alternative	Arrearage harvest						Decadal rate based on FY 2011-2018 performance
	702 MMBF		462 MMBF		No specific level		
	Riparian thinning						
	10%	1%	10%	1%	10%	1%	
Alt. A	95	97	95	94	96	98	80
Alt. B	105	100	105	103	102	101	
Alt. C	92	90	88	90	93	88	
Alt. D	93	95	93	92	93	92	
Alt. E	89	84	91	85	89	86	
Alt. F	87	83	79	82	81	77	
Alt. G – 382 MMBF arrearage volume – Riparian not included						89	
Alt. H – 382 MMBF arrearage volume – Riparian not included						89	

Table C-12. 10-decade Net Present Value, Normal School ($ millions)

Marbled murrelet strategy alternative	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	84	81	84	81	84	81
Alt. B	87	84	87	84	87	84
Alt. C	80	77	80	77	80	77
Alt. D	81	79	81	79	81	79
Alt. E	80	77	80	77	80	77
Alt. F	71	69	72	69	72	69
Alt. G – 382 MMBF arrearage volume – Riparian not included					75	
Alt. H – 382 MMBF arrearage volume – Riparian not included					76	

Scientific School

Table C-13. Planning Decade Volume, Scientific School (MMBF/decade)

Marbled murrelet strategy alternative	Arrearage harvest						Decadal rate based on FY 2011-2018 performance
	702 MMBF		462 MMBF		No specific level		
	Riparian thinning						
	10%	1%	10%	1%	10%	1%	
Alt. A	260	246	261	244	257	243	257
Alt. B	274	258	273	259	270	249	
Alt. C	263	246	260	247	260	246	
Alt. D	261	247	266	248	262	249	
Alt. E	260	247	260	244	260	247	
Alt. F	192	178	192	176	189	178	
Alt. G – 382 MMBF arrearage volume – Riparian not included					205		
Alt. H – 382 MMBF arrearage volume – Riparian not included					241		

Table C-14. 10-decade Net Present Value, Scientific School ($ millions)

Marbled murrelet strategy alternative	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	168	161	168	161	168	161
Alt. B	172	166	172	166	172	166
Alt. C	167	161	167	161	167	161
Alt. D	167	161	167	161	167	161
Alt. E	167	161	167	161	167	161
Alt. F	135	130	135	130	135	130
Alt. G – 382 MMBF arrearage volume – Riparian not included					148	
Alt. H – 382 MMBF arrearage volume – Riparian not included					160	

State Forest Purchase

Table C-15. Planning Decade Volume, State Forest Purchase (MMBF/decade)

Marbled murrelet strategy alternative	Arrearage harvest						Decadal rate based on FY 2011-2018 performance
	702 MMBF		462 MMBF		No specific level		
	Riparian thinning						
	10%	1%	10%	1%	10%	1%	
Alt. A	430	395	414	388	407	390	318
Alt. B	428	421	428	410	398	399	
Alt. C	409	396	414	394	387	356	
Alt. D	407	400	404	396	387	368	
Alt. E	407	387	413	395	394	364	
Alt. F	401	376	388	364	358	357	
Alt. G – 382 MMBF arrearage volume – Riparian not included					380		
Alt. H – 382 MMBF arrearage volume – Riparian not included					383		

Table C-16. 10-decade Net Present Value, State Forest Purchase ($ millions)

Marbled murrelet strategy alternative	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	284	274	283	273	283	274
Alt. B	289	280	289	279	288	279
Alt. C	280	271	280	271	279	270
Alt. D	278	269	278	269	277	268
Alt. E	280	271	280	271	280	270
Alt. F	269	260	269	259	268	259
Alt. G – 382 MMBF arrearage volume – Riparian not included					265	
Alt. H – 382 MMBF arrearage volume – Riparian not included					266	

State Forest Transfer

Table C-17. Planning Decade Volume, State Forest Transfer (MMBF/decade)

Marbled murrelet strategy alternative	Arrearage harvest						Decadal rate based on FY 2011-2018 performance
	702 MMBF		462 MMBF		No specific level		
	Riparian thinning						
	10%	1%	10%	1%	10%	1%	
Alt. A	1,834	1,807	1,823	1,789	1,768	1,731	2,070
Alt. B	1,987	1,916	1,957	1,900	1,922	1,842	
Alt. C	1,870	1,812	1,821	1,767	1,790	1,744	
Alt. D	1,895	1,833	1,869	1,805	1,824	1,763	
Alt. E	1,866	1,817	1,809	1,758	1,769	1,724	
Alt. F	1,655	1,647	1,640	1,629	1,612	1,568	
Alt. G – 382 MMBF arrearage volume – Riparian not included					1,758		
Alt. H – 382 MMBF arrearage volume – Riparian not included					1,830		

Table C-18. 10-decade Net Present Value, State Forest Transfer ($ millions)

Marbled murrelet strategy alternative	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	1,410	1,381	1,410	1,381	1,410	1,380
Alt. B	1,474	1,444	1,474	1,444	1,473	1,442
Alt. C	1,408	1,378	1,408	1,378	1,407	1,378
Alt. D	1,415	1,386	1,415	1,386	1,414	1,385
Alt. E	1,401	1,372	1,401	1,372	1,401	1,372
Alt. F	1,265	1,240	1,266	1,240	1,266	1,239
Alt. G – 382 MMBF arrearage volume – Riparian not included					1,343	
Alt. H – 382 MMBF arrearage volume – Riparian not included					1,391	

University Grant (original and transferred)

Table C-19. Planning Decade Volume, University Grant (MMBF/decade)

Marbled murrelet strategy alternative	Arrearage harvest						Decadal rate based on FY 2011-2018 performance
	702 MMBF		462 MMBF		No specific level		
	Riparian thinning						
	10%	1%	10%	1%	10%	1%	
Alt. A	123	119	120	119	118	115	69
Alt. B	134	131	133	130	128	127	
Alt. C	110	108	110	107	108	106	
Alt. D	100	97	100	96	87	96	
Alt. E	96	93	96	93	96	93	
Alt. F	56	55	58	55	52	50	
Alt. G – 382 MMBF arrearage volume – Riparian not included					94		
Alt. H – 382 MMBF arrearage volume – Riparian not included					102		

Table C-20. 10-decade Net Present Value, University Grant ($ millions)

Marbled murrelet strategy alternative	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	91	89	91	89	91	89
Alt. B	98	96	98	96	98	96
Alt. C	80	78	80	78	80	78
Alt. D	74	72	74	72	74	72
Alt. E	75	73	75	72	75	72
Alt. F	55	53	55	54	55	54
Alt. G – 382 MMBF arrearage volume – Riparian not included					71	
Alt. H – 382 MMBF arrearage volume – Riparian not included					78	

Water Pollution Control Division

Table C-21. Planning Decade Volume, Water Pollution Control Division (MMBF/decade)

Marbled murrelet strategy alternative	Arrearage harvest						Decadal rate based on FY 2011-2018 performance
	702 MMBF		462 MMBF		No specific level		
	Riparian thinning						
	10%	1%	10%	1%	10%	1%	
Alt. A	6	6	6	6	6	6	8
Alt. B	6	6	6	6	6	6	
Alt. C	6	6	6	6	6	6	
Alt. D	6	6	6	6	6	6	
Alt. E	6	6	6	6	6	6	
Alt. F	6	6	6	6	6	6	
Alt. G – 382 MMBF arrearage volume – Riparian not included					6		
Alt. H – 382 MMBF arrearage volume – Riparian not included					6		

Table C-22. 10-decade Net Present Value, Water Pollution Control Division ($ millions)

Marbled murrelet strategy alternative	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	18	18	18	18	18	18
Alt. B	18	18	18	18	18	18
Alt. C	17	17	17	17	17	17
Alt. D	18	18	18	18	18	18
Alt. E	17	17	17	17	17	17
Alt. F	18	18	18	18	18	17
Alt. G – 382 MMBF arrearage volume – Riparian not included					17	
Alt. H – 382 MMBF arrearage volume – Riparian not included					18	

Other[17]

Table C-23. Planning Decade Volume, Other (MMBF/decade)

Marbled murrelet strategy alternative	Arrearage harvest						Decadal rate based on FY 2011-2018 performance
	702 MMBF		462 MMBF		No specific level		
	Riparian thinning						
	10%	1%	10%	1%	10%	1%	
Alt. A	0	0	0	0	0	0	0.1
Alt. B	0	0	0	0	0	0	
Alt. C	0	0	0	0	0	0	
Alt. D	0	0	0	0	0	0	
Alt. E	0	0	0	0	0	0	
Alt. F	0	0	0	0	0	0	
Alt. G – 382 MMBF arrearage volume – Riparian not included					0		
Alt. H – 382 MMBF arrearage volume – Riparian not included					0		

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[17] Includes transacted lands where DNR holds timber rights.

Table C-24. 10-decade Net Present Value, Other ($ millions)

Marbled murrelet strategy alternative	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	0	0	0	0	0	0
Alt. B	0	0	0	0	0	0
Alt. C	0	0	0	0	0	0
Alt. D	0	0	0	0	0	0
Alt. E	0	0	0	0	0	0
Alt. F	0	0	0	0	0	0
Alt. G – 382 MMBF arrearage volume – Riparian not included						0
Alt. H – 382 MMBF arrearage volume – Riparian not included						0

State Forest Transfer Trust by County

Clallam County

Table C-25. Planning Decade Volume, Clallam County (MMBF/decade)

Marbled murrelet strategy alternative	Arrearage harvest						Decadal rate based on FY 2011-2018 performance
	702 MMBF		462 MMBF		No specific level		
	Riparian thinning						
	10%	1%	10%	1%	10%	1%	
Alt. A	357	357	348	349	330	331	278
Alt. B	426	423	418	417	399	397	
Alt. C	386	387	360	356	345	339	
Alt. D	394	397	386	384	368	361	
Alt. E	383	383	351	348	334	328	
Alt. F	403	396	398	385	382	363	
Alt. G – 382 MMBF arrearage volume – Riparian not included						366	
Alt. H – 382 MMBF arrearage volume – Riparian not included						376	

Table C-26. 10-decade Net Present Value, Clallam County ($ millions)

Marbled murrelet strategy alternative	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	204	202	204	202	205	202
Alt. B	239	237	239	237	238	237
Alt. C	217	216	218	216	217	216
Alt. D	220	218	220	218	220	218
Alt. E	212	210	212	210	212	210
Alt. F	214	213	214	213	214	213
Alt. G – 382 MMBF arrearage volume – Riparian not included					203	
Alt. H – 382 MMBF arrearage volume – Riparian not included					213	

Clark County

Table C-27. Planning Decade Volume, Clark County (MMBF/decade)

Marbled murrelet strategy alternative	Arrearage harvest						Decadal rate based on FY 2011-2018 performance
	702 MMBF		462 MMBF		No specific level		
	Riparian thinning						
	10%	1%	10%	1%	10%	1%	
Alt. A	42	36	42	36	42	36	214
Alt. B	42	36	42	36	42	36	
Alt. C	42	36	42	36	42	36	
Alt. D	42	36	42	36	42	36	
Alt. E	42	36	42	36	42	36	
Alt. F	42	36	42	36	42	36	
Alt. G – 382 MMBF arrearage volume – Riparian not included					36		
Alt. H – 382 MMBF arrearage volume – Riparian not included					36		

Table C-28. 10-decade Net Present Value, Clark County ($ millions)

Marbled murrelet strategy alternative	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	50	49	50	49	50	49
Alt. B	50	49	50	49	50	49
Alt. C	50	49	50	49	50	49
Alt. D	50	49	50	49	50	49
Alt. E	50	49	50	49	50	49
Alt. F	50	49	50	49	50	49
Alt. G – 382 MMBF arrearage volume – Riparian not included						48
Alt. H – 382 MMBF arrearage volume – Riparian not included						48

Cowlitz County

Table C-29. Planning Decade Volume, Cowlitz County (MMBF/decade)

Marbled murrelet strategy alternative	Arrearage harvest						Decadal rate based on FY 2011-2018 performance
	702 MMBF		462 MMBF		No specific level		
	Riparian thinning						
	10%	1%	10%	1%	10%	1%	
Alt. A	22	19	22	19	22	19	66
Alt. B	22	19	22	19	22	19	
Alt. C	22	19	22	19	22	19	
Alt. D	22	19	22	19	22	19	
Alt. E	22	19	22	19	22	19	
Alt. F	21	19	21	19	21	19	
Alt. G – 382 MMBF arrearage volume – Riparian not included						19	
Alt. H – 382 MMBF arrearage volume – Riparian not included						19	

Table C-30. 10-decade Net Present Value, Cowlitz County ($ millions)

Marbled murrelet strategy alternative	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	25	24	25	24	25	24
Alt. B	25	24	25	24	25	24
Alt. C	25	24	25	24	25	24
Alt. D	25	24	25	24	25	24
Alt. E	25	24	25	24	25	24
Alt. F	25	24	25	24	25	24
Alt. G – 382 MMBF arrearage volume – Riparian not included						24
Alt. H – 382 MMBF arrearage volume – Riparian not included						24

Grays Harbor County

Table C-31. Planning Decade Volume, Grays Harbor County (MMBF/decade)

Marbled murrelet strategy alternative	Arrearage harvest						Decadal rate based on FY 2011-2018 performance
	702 MMBF		462 MMBF		No specific level		
	Riparian thinning						
	10%	1%	10%	1%	10%	1%	
Alt. A	7	6	7	6	7	7	13
Alt. B	9	8	8	8	9	8	
Alt. C	9	8	9	8	9	8	
Alt. D	9	8	9	8	9	8	
Alt. E	8	8	9	8	9	8	
Alt. F	7	7	7	7	7	7	
Alt. G – 382 MMBF arrearage volume – Riparian not included						8	
Alt. H – 382 MMBF arrearage volume – Riparian not included						8	

Table C-32. 10-decade Net Present Value, Grays Harbor County ($ millions)

Marbled murrelet strategy alternative	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	8	7	8	7	8	7
Alt. B	8	8	8	8	8	8
Alt. C	8	8	8	8	8	8
Alt. D	8	8	9	8	8	8
Alt. E	8	8	8	8	9	8
Alt. F	7	7	7	7	7	7
Alt. G – 382 MMBF arrearage volume – Riparian not included						8
Alt. H – 382 MMBF arrearage volume – Riparian not included						8

Jefferson County

Table C-33. Planning Decade Volume, Jefferson County (MMBF/decade)

Marbled murrelet strategy alternative	Arrearage harvest						Decadal rate based on FY 2011-2018 performance
	702 MMBF		462 MMBF		No specific level		
	Riparian thinning						
	10%	1%	10%	1%	10%	1%	
Alt. A	72	69	73	69	73	69	62
Alt. B	77	73	77	73	77	73	
Alt. C	77	73	77	73	77	73	
Alt. D	77	73	77	73	77	73	
Alt. E	77	73	77	73	77	73	
Alt. F	76	73	76	73	76	73	
Alt. G – 382 MMBF arrearage volume – Riparian not included						73	
Alt. H – 382 MMBF arrearage volume – Riparian not included						73	

Table C-34. 10-decade Net Present Value, Jefferson County ($ millions)

Marbled murrelet strategy alternative	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	46	45	46	45	46	45
Alt. B	48	47	48	47	48	47
Alt. C	48	47	48	47	48	47
Alt. D	48	47	48	47	48	47
Alt. E	48	47	48	47	48	47
Alt. F	48	47	48	47	48	47
Alt. G – 382 MMBF arrearage volume – Riparian not included						47
Alt. H – 382 MMBF arrearage volume – Riparian not included						47

King County

Table C-35. Planning Decade Volume, King County (MMBF/decade)

Marbled murrelet strategy alternative	Arrearage harvest						Decadal rate based on FY 2011-2018 performance
	702 MMBF		462 MMBF		No specific level		
	Riparian thinning						
	10%	1%	10%	1%	10%	1%	
Alt. A	78	80	75	76	69	71	56
Alt. B	79	80	75	77	70	71	
Alt. C	78	79	74	76	68	70	
Alt. D	79	80	75	77	70	71	
Alt. E	78	79	74	76	68	70	
Alt. F	61	65	59	62	55	56	
Alt. G – 382 MMBF arrearage volume – Riparian not included						79	
Alt. H – 382 MMBF arrearage volume – Riparian not included						80	

Table C-36. 10-decade Net Present Value, King County ($ millions)

Marbled murrelet strategy alternative	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	54	53	54	53	53	53
Alt. B	54	54	54	54	54	53
Alt. C	53	53	53	53	53	53
Alt. D	54	54	54	54	54	53
Alt. E	53	53	53	53	53	53
Alt. F	43	43	43	43	43	43
Alt. G – 382 MMBF arrearage volume – Riparian not included					53	
Alt. H – 382 MMBF arrearage volume – Riparian not included					53	

Kitsap County

Table C-37. Planning Decade Volume, Kitsap County (MMBF/decade)

Marbled murrelet strategy alternative	Arrearage harvest						Decadal rate based on FY 2011-2018 performance
	702 MMBF		462 MMBF		No specific level		
	Riparian thinning						
	10%	1%	10%	1%	10%	1%	
Alt. A	11	11	11	11	11	11	19
Alt. B	11	11	11	11	11	11	
Alt. C	11	11	11	11	11	11	
Alt. D	11	11	11	11	11	11	
Alt. E	11	11	11	11	11	11	
Alt. F	11	11	11	11	11	11	
Alt. G – 382 MMBF arrearage volume – Riparian not included					11		
Alt. H – 382 MMBF arrearage volume – Riparian not included					11		

Table C-38. 10-decade Net Present Value, Kitsap County ($ millions)

Marbled murrelet strategy alternative	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	14	14	14	14	14	14
Alt. B	15	14	15	14	15	14
Alt. C	15	14	15	14	15	14
Alt. D	15	14	15	14	15	14
Alt. E	15	14	15	14	15	14
Alt. F	15	14	15	14	15	14
Alt. G – 382 MMBF arrearage volume – Riparian not included						14
Alt. H – 382 MMBF arrearage volume – Riparian not included						14

Lewis County

Table C-39. Planning Decade Volume, Lewis County (MMBF/decade)

Marbled murrelet strategy alternative	Arrearage harvest						Decadal rate based on FY 2011-2018 performance
	702 MMBF		462 MMBF		No specific level		
	Riparian thinning						
	10%	1%	10%	1%	10%	1%	
Alt. A	181	173	181	173	181	173	218
Alt. B	182	174	182	174	182	174	
Alt. C	181	173	181	173	181	173	
Alt. D	182	174	182	174	182	174	
Alt. E	181	173	181	173	181	173	
Alt. F	147	144	147	144	147	144	
Alt. G – 382 MMBF arrearage volume – Riparian not included						172	
Alt. H – 382 MMBF arrearage volume – Riparian not included						172	

Table C-40. 10-decade Net Present Value, Lewis County ($ millions)

Marbled murrelet strategy alternative	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	143	138	143	138	143	138
Alt. B	144	139	144	139	144	139
Alt. C	143	138	143	138	143	138
Alt. D	144	139	144	139	144	139
Alt. E	143	138	143	138	143	138
Alt. F	120	115	120	115	120	115
Alt. G – 382 MMBF arrearage volume – Riparian not included						137
Alt. H – 382 MMBF arrearage volume – Riparian not included						138

Mason County

Table C-41. Planning Decade Volume, Mason County (MMBF/decade)

Marbled murrelet strategy alternative	Arrearage harvest						Decadal rate based on FY 2011-2018 performance
	702 MMBF		462 MMBF		No specific level		
	Riparian thinning						
	10%	1%	10%	1%	10%	1%	
Alt. A	86	87	86	87	86	87	99
Alt. B	87	87	87	87	87	87	
Alt. C	86	87	86	87	86	87	
Alt. D	87	87	87	87	87	87	
Alt. E	86	87	86	87	86	87	
Alt. F	86	87	86	87	86	87	
Alt. G – 382 MMBF arrearage volume – Riparian not included						87	
Alt. H – 382 MMBF arrearage volume – Riparian not included						87	

Table C-42. 10-decade Net Present Value, Mason County ($ millions)

Marbled murrelet strategy alternative	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	71	70	71	70	71	70
Alt. B	72	71	72	71	72	71
Alt. C	71	71	71	71	71	71
Alt. D	71	71	71	71	71	71
Alt. E	71	71	71	71	71	71
Alt. F	71	71	71	71	71	71
Alt. G – 382 MMBF arrearage volume – Riparian not included					71	
Alt. H – 382 MMBF arrearage volume – Riparian not included					71	

Pacific County

Table C-43. Planning Decade Volume, Pacific County (MMBF/decade)

Marbled murrelet strategy alternative	Arrearage harvest						Decadal rate based on FY 2011-2018 performance
	702 MMBF		462 MMBF		No specific level		
	Riparian thinning						
	10%	1%	10%	1%	10%	1%	
Alt. A	40	37	40	36	40	35	58
Alt. B	53	48	53	47	52	46	
Alt. C	40	35	40	35	39	34	
Alt. D	39	34	39	34	37	33	
Alt. E	40	35	40	35	39	34	
Alt. F	35	31	35	31	34	30	
Alt. G – 382 MMBF arrearage volume – Riparian not included					34		
Alt. H – 382 MMBF arrearage volume – Riparian not included					36		

Table C-44. 10-decade Net Present Value, Pacific County ($ millions)

Marbled murrelet strategy alternative	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	36	33	36	33	36	33
Alt. B	43	40	43	40	43	40
Alt. C	35	32	35	32	35	32
Alt. D	33	31	33	31	33	31
Alt. E	35	32	35	32	35	32
Alt. F	31	29	31	29	31	29
Alt. G – 382 MMBF arrearage volume – Riparian not included						31
Alt. H – 382 MMBF arrearage volume – Riparian not included						32

Pierce County

Table C-45. Planning Decade Volume, Pierce County (MMBF/decade)

Marbled murrelet strategy alternative	Arrearage harvest						Decadal rate based on FY 2011-2018 performance
	702 MMBF		462 MMBF		Rolled in		
	Riparian thinning						
	10%	1%	10%	1%	10%	1%	
Alt. A	44	44	44	44	44	44	15
Alt. B	44	44	44	44	44	44	
Alt. C	44	43	44	43	44	43	
Alt. D	44	44	44	44	44	44	
Alt. E	44	43	44	43	44	43	
Alt. F	18	18	18	18	18	18	
Alt. G – 382 MMBF arrearage volume – Riparian not included						43	
Alt. H – 382 MMBF arrearage volume – Riparian not included						43	

Table C-46. 10-decade Net Present Value, Pierce County ($ millions)

Marbled murrelet strategy alternative	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	35	35	35	35	35	35
Alt. B	35	35	35	35	35	35
Alt. C	35	35	35	35	35	35
Alt. D	35	35	35	35	35	35
Alt. E	35	35	35	35	35	35
Alt. F	15	15	15	15	15	15
Alt. G – 382 MMBF arrearage volume – Riparian not included					35	
Alt. H – 382 MMBF arrearage volume – Riparian not included					35	

Skagit County

Table C-47. Planning Decade Volume, Skagit County (MMBF/decade)

Marbled murrelet strategy alternative	Arrearage harvest						Decadal rate based on FY 2011-2018 performance
	702 MMBF		462 MMBF		No specific level		
	Riparian thinning						
	10%	1%	10%	1%	10%	1%	
Alt. A	320	311	320	311	320	311	328
Alt. B	322	312	322	312	322	312	
Alt. C	315	305	315	305	315	305	
Alt. D	319	309	319	309	319	309	
Alt. E	315	305	315	305	315	305	
Alt. F	251	254	251	253	250	254	
Alt. G – 382 MMBF arrearage volume – Riparian not included					301		
Alt. H – 382 MMBF arrearage volume – Riparian not included					308		

Table C-48. 10-decade Net Present Value, Skagit County ($ millions)

Marbled murrelet strategy alternative	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	272	267	272	267	272	267
Alt. B	273	268	273	268	273	268
Alt. C	268	263	268	263	268	263
Alt. D	271	265	271	265	271	265
Alt. E	268	263	268	263	268	263
Alt. F	227	222	227	222	227	222
Alt. G – 382 MMBF arrearage volume – Riparian not included					259	
Alt. H – 382 MMBF arrearage volume – Riparian not included					265	

Skamania County

Table C-49. Planning Decade Volume, Skamania County (MMBF/decade)

Marbled murrelet strategy alternative	Arrearage harvest						Decadal rate based on FY 2011-2018 performance
	702 MMBF		462 MMBF		No specific level		
	Riparian thinning						
	10%	1%	10%	1%	10%	1%	
Alt. A	116	107	116	107	107	103	54
Alt. B	120	107	118	107	107	103	
Alt. C	120	107	118	107	107	103	
Alt. D	120	107	118	107	107	103	
Alt. E	120	107	117	107	107	103	
Alt. F	113	107	107	107	103	103	
Alt. G – 382 MMBF arrearage volume – Riparian not included					100		
Alt. H – 382 MMBF arrearage volume – Riparian not included					101		

Table C-50. 10-decade Net Present Value, Skamania County ($ millions)

Marbled murrelet strategy alternative	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	70	69	70	69	70	69
Alt. B	70	69	70	69	70	69
Alt. C	70	69	70	69	70	69
Alt. D	70	69	70	69	70	69
Alt. E	70	69	70	69	70	69
Alt. F	70	69	70	69	70	69
Alt. G – 382 MMBF arrearage volume – Riparian not included					65	
Alt. H – 382 MMBF arrearage volume – Riparian not included					65	

Snohomish County

Table C-51. Planning Decade Volume, Snohomish County (MMBF/decade)

Marbled murrelet strategy alternative	Arrearage harvest						Decadal rate based on FY 2011-2018 performance
	702 MMBF		462 MMBF		No specific level		
	Riparian thinning						
	10%	1%	10%	1%	10%	1%	
Alt. A	221	226	222	226	223	226	325
Alt. B	224	226	225	226	228	225	
Alt. C	216	217	217	217	218	217	
Alt. D	218	219	219	219	221	218	
Alt. E	216	218	217	217	218	217	
Alt. F	182	193	182	193	183	193	
Alt. G – 382 MMBF arrearage volume – Riparian not included					210		
Alt. H – 382 MMBF arrearage volume – Riparian not included					223		

Table C-52. 10-decade Net Present Value, Snohomish County ($ millions)

Marbled murrelet strategy alternative	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	200	196	200	196	200	196
Alt. B	200	196	200	196	200	196
Alt. C	194	190	194	190	194	190
Alt. D	194	190	194	190	194	190
Alt. E	194	190	194	190	194	190
Alt. F	178	175	178	175	178	175
Alt. G – 382 MMBF arrearage volume – Riparian not included						183
Alt. H – 382 MMBF arrearage volume – Riparian not included						193

Thurston County

Table C-53. Planning Decade Volume, Thurston County (MMBF/decade)

Marbled murrelet strategy alternative	Arrearage harvest						Decadal rate based on FY 2011-2018 performance
	702 MMBF		462 MMBF		No specific level		
	Riparian thinning						
	10%	1%	10%	1%	10%	1%	
Alt. A	112	119	116	119	101	96	99
Alt. B	130	112	121	113	131	99	
Alt. C	129	116	113	108	123	124	
Alt. D	129	112	122	107	123	112	
Alt. E	130	125	113	108	114	116	
Alt. F	112	116	113	116	121	99	
Alt. G – 382 MMBF arrearage volume – Riparian not included						124	
Alt. H – 382 MMBF arrearage volume – Riparian not included						124	

Table C-54. 10-decade Net Present Value, Thurston County ($ millions)

Marbled murrelet strategy alternative	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	77	75	77	75	77	74
Alt. B	79	77	79	77	80	76
Alt. C	79	77	79	76	79	77
Alt. D	80	77	79	77	79	77
Alt. E	79	77	79	76	79	77
Alt. F	79	77	79	77	79	76
Alt. G – 382 MMBF arrearage volume – Riparian not included						77
Alt. H – 382 MMBF arrearage volume – Riparian not included						77

Wahkiakum County

Table C-55. Planning Decade Volume, Wahkiakum County (MMBF/decade)

Marbled murrelet strategy alternative	Arrearage harvest						Decadal rate based on FY 2011-2018 performance
	702 MMBF		462 MMBF		No specific level		
	Riparian thinning						
	10%	1%	10%	1%	10%	1%	
Alt. A	42	41	39	39	36	36	50
Alt. B	73	70	69	66	62	59	
Alt. C	40	39	40	39	35	33	
Alt. D	42	41	39	38	34	32	
Alt. E	40	39	40	39	35	33	
Alt. F	30	29	30	28	24	23	
Alt. G – 382 MMBF arrearage volume – Riparian not included						31	
Alt. H – 382 MMBF arrearage volume – Riparian not included						59	

Table C-56. 10-decade Net Present Value, Wahkiakum County ($ millions)

Marbled murrelet strategy alternative	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	31	30	31	30	31	30
Alt. B	45	44	45	44	45	43
Alt. C	27	26	27	26	27	26
Alt. D	26	26	26	26	26	25
Alt. E	27	26	27	26	27	26
Alt. F	21	20	21	20	21	20
Alt. G – 382 MMBF arrearage volume – Riparian not included					22	
Alt. H – 382 MMBF arrearage volume – Riparian not included					36	

Whatcom County

Table C-57. Planning Decade Volume, Whatcom County (MMBF/decade)

Marbled murrelet strategy alternative	Arrearage harvest						Decadal rate based on FY 2011-2018 performance
	702 MMBF		462 MMBF		No specific level		
	Riparian thinning						
	10%	1%	10%	1%	10%	1%	
Alt. A	83	85	80	81	75	75	116
Alt. B	84	85	82	83	76	77	
Alt. C	73	76	71	74	67	67	
Alt. D	79	82	78	78	71	72	
Alt. E	72	75	70	73	66	66	
Alt. F	59	61	57	59	52	52	
Alt. G – 382 MMBF arrearage volume – Riparian not included					65		
Alt. H – 382 MMBF arrearage volume – Riparian not included					75		

Table C-58. 10-decade Net Present Value, Whatcom County ($ millions)

Marbled murrelet strategy alternative	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	73	72	73	72	73	72
Alt. B	74	73	74	73	74	73
Alt. C	68	67	67	67	67	67
Alt. D	70	70	70	70	70	69
Alt. E	67	66	67	66	67	66
Alt. F	52	52	52	52	52	52
Alt. G – 382 MMBF arrearage volume – Riparian not included						64
Alt. H – 382 MMBF arrearage volume – Riparian not included						71

Appendix D. Sustainable Harvest Unit Level Results

This appendix reports the planning decade volume and 10-decade net present value under each scenario for each sustainable harvest unit (Figure D.1). Planning decade volume is compared to the actual harvest volume from the fiscal year 2011 through 2018 period.

Figure D.1. Western Washington State Trust Lands Sustainable Harvest Units

(Individual units for State Forest Transfer Lands in each county are not shown separately).
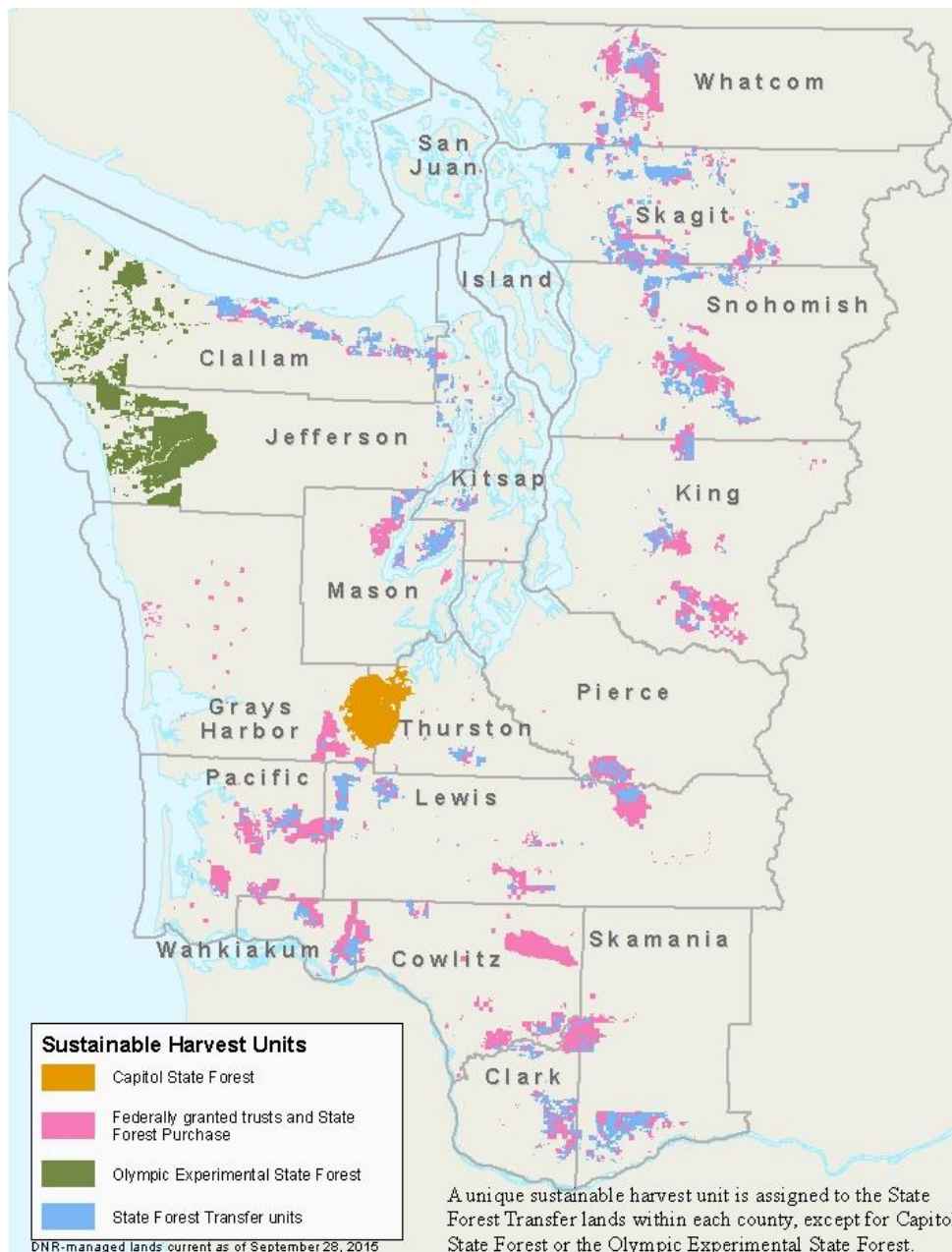
Federal

Table D-1. Planning Decade Volume, Federal Sustainable Harvest Unit (MMBF/decade)

Marbled murrelet strategy alternative	Arrearage harvest						Decadal rate based on FY 2011-2018 performance
	702 MMBF		462 MMBF		No specific level		
	Riparian thinning						
	10%	1%	10%	1%	10%	1%	
Alt. A	2,113	2,010	2,114	2,012	2,115	2,016	1,853
Alt. B	2,294	2,195	2,296	2,197	2,283	2,132	
Alt. C	2,075	1,985	2,079	1,986	2,083	1,986	
Alt. D	2,092	1,998	2,093	2,000	2,093	1,984	
Alt. E	2,058	1,968	2,063	1,969	2,069	1,971	
Alt. F	1,600	1,509	1,586	1,496	1,587	1,501	
Alt. G – 382 MMBF arrearage volume – Riparian not included						1,776	
Alt. H – 382 MMBF arrearage volume – Riparian not included						1,952	

Table D-2. 10-decade Net Present Value, Federal Sustainable Harvest Unit ($ millions)

Marbled murrelet strategy alternative	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	1,660	1,602	1,660	1,602	1,660	1,602
Alt. B	1,716	1,657	1,716	1,657	1,716	1,657
Alt. C	1,615	1,561	1,615	1,561	1,616	1,561
Alt. D	1,608	1,553	1,608	1,553	1,608	1,553
Alt. E	1,607	1,553	1,608	1,553	1,608	1,553
Alt. F	1,337	1,288	1,337	1,288	1,337	1,288
Alt. G – 382 MMBF arrearage volume – Riparian not included						1,462
Alt. H – 382 MMBF arrearage volume – Riparian not included						1,555

OESF

Table D-3. Planning Decade Volume, OESF Sustainable Harvest Unit (MMBF/decade)

Marbled murrelet strategy alternative	Arrearage harvest						Decadal rate based on FY 2011-2018 performance
	702 MMBF		462 MMBF		No specific level		
	Riparian thinning						
	10%	1%	10%	1%	10%	1%	
Alt. A	829	832	814	826	782	784	394
Alt. B	896	897	884	895	841	842	
Alt. C	812	820	790	791	758	760	
Alt. D	828	836	822	824	766	768	
Alt. E	799	805	770	776	745	747	
Alt. F	664	676	627	638	549	555	
Alt. G – 382 MMBF arrearage volume – Riparian not included					717		
Alt. H – 382 MMBF arrearage volume – Riparian not included					771		

Table D-4. 10-decade Net Present Value, OESF Sustainable Harvest Unit ($ millions)

Marbled murrelet strategy alternative	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	432	432	432	432	433	432
Alt. B	460	460	460	460	461	460
Alt. C	417	417	417	417	418	417
Alt. D	419	419	419	419	420	419
Alt. E	409	409	410	409	410	409
Alt. F	318	318	319	319	321	320
Alt. G – 382 MMBF arrearage volume – Riparian not included					377	
Alt. H – 382 MMBF arrearage volume – Riparian not included					407	

Capitol State Forest

Table D-5. Planning Decade Volume, Capitol State Forest Sustainable Harvest Unit (MMBF/decade)

Marbled murrelet strategy alternative	Arrearage harvest						Decadal rate based on FY 2011-2018 performance
	702 MMBF		462 MMBF		No specific level		
	Riparian thinning						
	10%	1%	10%	1%	10%	1%	
Alt. A	515	481	503	470	479	448	409
Alt. B	526	493	514	482	491	459	
Alt. C	526	493	514	482	491	459	
Alt. D	526	493	514	482	491	459	
Alt. E	526	493	514	482	491	459	
Alt. F	526	492	513	481	491	457	
Alt. G – 382 MMBF arrearage volume – Riparian not included						492	
Alt. H – 382 MMBF arrearage volume – Riparian not included						492	

Table D-6. 10-decade Net Present Value, Capitol State Forest Sustainable Harvest Unit ($ millions)

Marbled murrelet strategy alternative	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	384	370	384	369	383	369
Alt. B	392	377	391	377	390	376
Alt. C	392	377	391	377	390	376
Alt. D	392	377	391	377	390	376
Alt. E	392	377	391	377	390	376
Alt. F	391	377	391	377	390	376
Alt. G – 382 MMBF arrearage volume – Riparian not included						377
Alt. H – 382 MMBF arrearage volume – Riparian not included						377

Clallam

Table D-7. Planning Decade Volume, Clallam Sustainable Harvest Unit (MMBF/decade)

Marbled murrelet strategy alternative	Arrearage harvest						Decadal rate based on FY 2011-2018 performance
	702 MMBF		462 MMBF		No specific level		
	Riparian thinning						
	10%	1%	10%	1%	10%	1%	
Alt. A	208	205	203	200	194	191	154
Alt. B	266	262	261	257	251	248	
Alt. C	244	241	239	235	229	225	
Alt. D	234	230	229	225	219	215	
Alt. E	233	229	227	224	218	214	
Alt. F	251	247	246	242	237	232	
Alt. G – 382 MMBF arrearage volume – Riparian not included						228	
Alt. H – 382 MMBF arrearage volume – Riparian not included						232	

Table D-8. 10-decade Net Present Value, Clallam Sustainable Harvest Unit ($ millions)

Marbled murrelet strategy alternative	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	124	122	124	122	123	122
Alt. B	155	154	155	154	155	153
Alt. C	143	142	143	141	142	141
Alt. D	138	137	138	137	138	136
Alt. E	137	136	137	136	137	136
Alt. F	146	145	146	145	146	145
Alt. G – 382 MMBF arrearage volume – Riparian not included						136
Alt. H – 382 MMBF arrearage volume – Riparian not included						138

Clark

Table D-9. Planning Decade Volume, Clark Sustainable Harvest Unit (MMBF/decade)

Marbled murrelet strategy alternative	Arrearage harvest						Decadal rate based on FY 2011-2018 performance
	702 MMBF		462 MMBF		No specific level		
	Riparian thinning						
	10%	1%	10%	1%	10%	1%	
Alt. A	42	36	42	36	42	36	214
Alt. B	42	36	42	36	42	36	
Alt. C	42	36	42	36	42	36	
Alt. D	42	36	42	36	42	36	
Alt. E	42	36	42	36	42	36	
Alt. F	42	36	42	36	42	36	
Alt. G – 382 MMBF arrearage volume – Riparian not included					36		
Alt. H – 382 MMBF arrearage volume – Riparian not included					36		

Table D-10. 10-decade Net Present Value, Clark Sustainable Harvest Unit ($ millions)

Marbled murrelet strategy alternative	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	50	49	50	49	50	49
Alt. B	50	49	50	49	50	49
Alt. C	50	49	50	49	50	49
Alt. D	50	49	50	49	50	49
Alt. E	50	49	50	49	50	49
Alt. F	50	49	50	49	50	49
Alt. G – 382 MMBF arrearage volume – Riparian not included						48
Alt. H – 382 MMBF arrearage volume – Riparian not included						48

Cowlitz

Table D-11. Planning Decade Volume, Cowlitz Sustainable Harvest Unit (MMBF/decade)

Marbled murrelet strategy alternative	Arrearage harvest						Decadal rate based on FY 2011-2018 performance
	702 MMBF		462 MMBF		No specific level		
	Riparian thinning						
	10%	1%	10%	1%	10%	1%	
Alt. A	22	19	22	19	22	19	66
Alt. B	22	19	22	19	22	19	
Alt. C	22	19	22	19	22	19	
Alt. D	22	19	22	19	22	19	
Alt. E	22	19	22	19	22	19	
Alt. F	21	19	21	19	21	19	
Alt. G – 382 MMBF arrearage volume – Riparian not included						19	
Alt. H – 382 MMBF arrearage volume – Riparian not included						19	

Table D-12. 10-decade Net Present Value, Cowlitz Sustainable Harvest Unit ($ millions)

Marbled murrelet strategy alternative	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	25	24	25	24	25	24
Alt. B	25	24	25	24	25	24
Alt. C	25	24	25	24	25	24
Alt. D	25	24	25	24	25	24
Alt. E	25	24	25	24	25	24
Alt. F	25	24	25	24	25	24
Alt. G – 382 MMBF arrearage volume – Riparian not included						24
Alt. H – 382 MMBF arrearage volume – Riparian not included						24

Grays Harbor

Table D-13. Planning Decade Volume, Grays Harbor Sustainable Harvest Unit (MMBF/decade)

Marbled murrelet strategy alternative	Arrearage harvest						Decadal rate based on FY 2011-2018 performance
	702 MMBF		462 MMBF		No specific level		
	Riparian thinning						
	10%	1%	10%	1%	10%	1%	
Alt. A	3	3	3	3	3	3	3
Alt. B	4	4	4	4	4	4	
Alt. C	4	4	4	4	4	4	
Alt. D	4	4	4	4	4	4	
Alt. E	4	4	4	4	4	4	
Alt. F	3	3	3	3	3	3	
Alt. G – 382 MMBF arrearage volume – Riparian not included					4		
Alt. H – 382 MMBF arrearage volume – Riparian not included					4		

Table D-14. 10-decade Net Present Value, Grays Harbor Sustainable Harvest Unit ($ millions)

Marbled murrelet strategy alternative	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	3	3	3	3	3	3
Alt. B	3	3	3	3	3	3
Alt. C	3	3	3	3	3	3
Alt. D	3	3	3	3	3	3
Alt. E	3	3	3	3	3	3
Alt. F	2	2	2	2	2	2
Alt. G – 382 MMBF arrearage volume – Riparian not included						3
Alt. H – 382 MMBF arrearage volume – Riparian not included						3

Jefferson

Table D-15. Planning Decade Volume, Jefferson Sustainable Harvest Unit (MMBF/decade)

Marbled murrelet strategy alternative	Arrearage harvest						Decadal rate based on FY 2011-2018 performance
	702 MMBF		462 MMBF		No specific level		
	Riparian thinning						
	10%	1%	10%	1%	10%	1%	
Alt. A	72	69	73	69	73	69	62
Alt. B	77	73	77	73	77	73	
Alt. C	77	73	77	73	77	73	
Alt. D	77	73	77	73	77	73	
Alt. E	77	73	77	73	77	73	
Alt. F	76	73	76	73	76	73	
Alt. G – 382 MMBF arrearage volume – Riparian not included					73		
Alt. H – 382 MMBF arrearage volume – Riparian not included					73		

Table D-16. 10-decade Net Present Value, Jefferson Sustainable Harvest Unit ($ millions)

Marbled murrelet strategy alternative	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	46	45	46	45	46	45
Alt. B	48	47	48	47	48	47
Alt. C	48	47	48	47	48	47
Alt. D	48	47	48	47	48	47
Alt. E	48	47	48	47	48	47
Alt. F	48	47	48	47	48	47
Alt. G – 382 MMBF arrearage volume – Riparian not included						47
Alt. H – 382 MMBF arrearage volume – Riparian not included						47

King

Table D-17. Planning Decade Volume, King Sustainable Harvest Unit (MMBF/decade)

Marbled murrelet strategy alternative	Arrearage harvest						Decadal rate based on FY 2011-2018 performance
	702 MMBF		462 MMBF		No specific level		
	Riparian thinning						
	10%	1%	10%	1%	10%	1%	
Alt. A	78	80	75	76	69	71	56
Alt. B	79	80	75	77	70	71	
Alt. C	78	79	74	76	68	70	
Alt. D	79	80	75	77	70	71	
Alt. E	78	79	74	76	68	70	
Alt. F	61	65	59	62	55	56	
Alt. G – 382 MMBF arrearage volume – Riparian not included					79		
Alt. H – 382 MMBF arrearage volume – Riparian not included					80		

Table D-18. 10-decade Net Present Value, King Sustainable Harvest Unit ($ millions)

Marbled murrelet strategy alternative	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	54	53	54	53	53	53
Alt. B	54	54	54	54	54	53
Alt. C	53	53	53	53	53	53
Alt. D	54	54	54	54	54	53
Alt. E	53	53	53	53	53	53
Alt. F	43	43	43	43	43	43
Alt. G – 382 MMBF arrearage volume – Riparian not included					53	
Alt. H – 382 MMBF arrearage volume – Riparian not included					53	

Kitsap

Table D-19. Planning Decade Volume, Kitsap Sustainable Harvest Unit (MMBF/decade)

Marbled murrelet strategy alternative	Arrearage harvest						Decadal rate based on FY 2011-2018 performance
	702 MMBF		462 MMBF		No specific level		
	Riparian thinning						
	10%	1%	10%	1%	10%	1%	
Alt. A	11	11	11	11	11	11	19
Alt. B	11	11	11	11	11	11	
Alt. C	11	11	11	11	11	11	
Alt. D	11	11	11	11	11	11	
Alt. E	11	11	11	11	11	11	
Alt. F	11	11	11	11	11	11	
Alt. G – 382 MMBF arrearage volume – Riparian not included						11	
Alt. H – 382 MMBF arrearage volume – Riparian not included						11	

Table D-20. 10-decade Net Present Value, Kitsap Sustainable Harvest Unit ($ millions)

Marbled murrelet strategy alternative	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	14	14	14	14	14	14
Alt. B	15	14	15	14	15	14
Alt. C	15	14	15	14	15	14
Alt. D	15	14	15	14	15	14
Alt. E	15	14	15	14	15	14
Alt. F	15	14	15	14	15	14
Alt. G – 382 MMBF arrearage volume – Riparian not included						14
Alt. H – 382 MMBF arrearage volume – Riparian not included						14

Lewis

Table D-21. Planning Decade Volume, Lewis Sustainable Harvest Unit (MMBF/decade)

Marbled murrelet strategy alternative	Arrearage harvest						Decadal rate based on FY 2011-2018 performance
	702 MMBF		462 MMBF		No specific level		
	Riparian thinning						
	10%	1%	10%	1%	10%	1%	
Alt. A	181	173	181	173	181	173	218
Alt. B	182	174	182	174	182	174	
Alt. C	181	173	181	173	181	173	
Alt. D	182	174	182	174	182	174	
Alt. E	181	173	181	173	181	173	
Alt. F	147	144	147	144	147	144	
Alt. G – 382 MMBF arrearage volume – Riparian not included					172		
Alt. H – 382 MMBF arrearage volume – Riparian not included					172		

Table D-22. 10-decade Net Present Value, Lewis Sustainable Harvest Unit ($ millions)

Marbled murrelet strategy alternative	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	143	138	143	138	143	138
Alt. B	144	139	144	139	144	139
Alt. C	143	138	143	138	143	138
Alt. D	144	139	144	139	144	139
Alt. E	143	138	143	138	143	138
Alt. F	120	115	120	115	120	115
Alt. G – 382 MMBF arrearage volume – Riparian not included					137	
Alt. H – 382 MMBF arrearage volume – Riparian not included					138	

Mason

Table D-23. Planning Decade Volume, Mason Sustainable Harvest Unit (MMBF/decade)

Marbled murrelet strategy alternative	Arrearage harvest						Decadal rate based on FY 2011-2018 performance
	702 MMBF		462 MMBF		No specific level		
	Riparian thinning						
	10%	1%	10%	1%	10%	1%	
Alt. A	86	87	86	87	86	87	99
Alt. B	87	87	87	87	87	87	
Alt. C	86	87	86	87	86	87	
Alt. D	87	87	87	87	87	87	
Alt. E	86	87	86	87	86	87	
Alt. F	86	87	86	87	86	87	
Alt. G – 382 MMBF arrearage volume – Riparian not included					87		
Alt. H – 382 MMBF arrearage volume – Riparian not included					87		

Table D-24. 10-decade Net Present Value, Mason Sustainable Harvest Unit ($ millions)

Marbled murrelet strategy alternative	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	71	70	71	70	71	70
Alt. B	72	71	72	71	72	71
Alt. C	71	71	71	71	71	71
Alt. D	71	71	71	71	71	71
Alt. E	71	71	71	71	71	71
Alt. F	71	71	71	71	71	71
Alt. G – 382 MMBF arrearage volume – Riparian not included					71	
Alt. H – 382 MMBF arrearage volume – Riparian not included					71	

Pacific

Table D-25. Planning Decade Volume, Pacific Sustainable Harvest Unit (MMBF/decade)

Marbled murrelet strategy alternative	Arrearage harvest						Decadal rate based on FY 2011-2018 performance
	702 MMBF		462 MMBF		No specific level		
	Riparian thinning						
	10%	1%	10%	1%	10%	1%	
Alt. A	40	37	40	36	40	35	58
Alt. B	53	48	53	47	52	46	
Alt. C	40	35	40	35	39	34	
Alt. D	39	34	39	34	37	33	
Alt. E	40	35	40	35	39	34	
Alt. F	35	31	35	31	34	30	
Alt. G – 382 MMBF arrearage volume – Riparian not included					34		
Alt. H – 382 MMBF arrearage volume – Riparian not included					36		

Table D-26. 10-decade Net Present Value, Pacific Sustainable Harvest Unit ($ millions)

Marbled murrelet strategy alternative	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	36	33	36	33	36	33
Alt. B	43	40	43	40	43	40
Alt. C	35	32	35	32	35	32
Alt. D	33	31	33	31	33	31
Alt. E	35	32	35	32	35	32
Alt. F	31	29	31	29	31	29
Alt. G – 382 MMBF arrearage volume – Riparian not included						31
Alt. H – 382 MMBF arrearage volume – Riparian not included						32

Pierce

Table D-27. Planning Decade Volume, Pierce Sustainable Harvest Unit (MMBF/decade)

Marbled murrelet strategy alternative	Arrearage harvest						Decadal rate based on FY 2011-2018 performance
	702 MMBF		462 MMBF		No specific level		
	Riparian thinning						
	10%	1%	10%	1%	10%	1%	
Alt. A	44	44	44	44	44	44	15
Alt. B	44	44	44	44	44	44	
Alt. C	44	43	44	43	44	43	
Alt. D	44	44	44	44	44	44	
Alt. E	44	43	44	43	44	43	
Alt. F	18	18	18	18	18	18	
Alt. G – 382 MMBF arrearage volume – Riparian not included						43	
Alt. H – 382 MMBF arrearage volume – Riparian not included						43	

Table D-28. 10-decade Net Present Value, Pierce Sustainable Harvest Unit ($ millions)

Marbled murrelet strategy alternative	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	35	35	35	35	35	35
Alt. B	35	35	35	35	35	35
Alt. C	35	35	35	35	35	35
Alt. D	35	35	35	35	35	35
Alt. E	35	35	35	35	35	35
Alt. F	15	15	15	15	15	15
Alt. G – 382 MMBF arrearage volume – Riparian not included						35
Alt. H – 382 MMBF arrearage volume – Riparian not included						35

Skagit

Table D-29. Planning Decade Volume, Skagit Sustainable Harvest Unit (MMBF/decade)

Marbled murrelet strategy alternative	Arrearage harvest						Decadal rate based on FY 2011-2018 performance
	702 MMBF		462 MMBF		No specific level		
	Riparian thinning						
	10%	1%	10%	1%	10%	1%	
Alt. A	320	311	320	311	320	311	328
Alt. B	322	312	322	312	322	312	
Alt. C	315	305	315	305	315	305	
Alt. D	319	309	319	309	319	309	
Alt. E	315	305	315	305	315	305	
Alt. F	251	254	251	253	250	254	
Alt. G – 382 MMBF arrearage volume – Riparian not included					301		
Alt. H – 382 MMBF arrearage volume – Riparian not included					308		

Table D-30. 10-decade Net Present Value, Skagit Sustainable Harvest Unit ($ millions)

Marbled murrelet strategy alternative	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	272	267	272	267	272	267
Alt. B	273	268	273	268	273	268
Alt. C	268	263	268	263	268	263
Alt. D	271	265	271	265	271	265
Alt. E	268	263	268	263	268	263
Alt. F	227	222	227	222	227	222
Alt. G – 382 MMBF arrearage volume – Riparian not included						259
Alt. H – 382 MMBF arrearage volume – Riparian not included						265

Skamania

Table D-31. Planning Decade Volume, Skamania Sustainable Harvest Unit (MMBF/decade)

Marbled murrelet strategy alternative	Arrearage harvest						Decadal rate based on FY 2011-2018 performance
	702 MMBF		462 MMBF		No specific level		
	Riparian thinning						
	10%	1%	10%	1%	10%	1%	
Alt. A	116	107	116	107	107	103	54
Alt. B	120	107	118	107	107	103	
Alt. C	120	107	118	107	107	103	
Alt. D	120	107	118	107	107	103	
Alt. E	120	107	117	107	107	103	
Alt. F	113	107	107	107	103	103	
Alt. G – 382 MMBF arrearage volume – Riparian not included						100	
Alt. H – 382 MMBF arrearage volume – Riparian not included						101	

Table D-32. 10-decade Net Present Value, Skamania Sustainable Harvest Unit ($ millions)

Marbled murrelet strategy alternative	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	70	69	70	69	70	69
Alt. B	70	69	70	69	70	69
Alt. C	70	69	70	69	70	69
Alt. D	70	69	70	69	70	69
Alt. E	70	69	70	69	70	69
Alt. F	70	69	70	69	70	69
Alt. G – 382 MMBF arrearage volume – Riparian not included						65
Alt. H – 382 MMBF arrearage volume – Riparian not included						65

Snohomish

Table D-33. Planning Decade Volume, Snohomish Sustainable Harvest Unit (MMBF/decade)

Marbled murrelet strategy alternative	Arrearage harvest						Decadal rate based on FY 2011-2018 performance
	702 MMBF		462 MMBF		No specific level		
	Riparian thinning						
	10%	1%	10%	1%	10%	1%	
Alt. A	221	226	222	226	223	226	325
Alt. B	224	226	225	226	228	225	
Alt. C	216	217	217	217	218	217	
Alt. D	218	219	219	219	221	218	
Alt. E	216	218	217	217	218	217	
Alt. F	182	193	182	193	183	193	
Alt. G – 382 MMBF arrearage volume – Riparian not included					210		
Alt. H – 382 MMBF arrearage volume – Riparian not included					223		

Table D-34. 10-decade Net Present Value, Snohomish Sustainable Harvest Unit ($ millions)

Marbled murrelet strategy alternative	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	200	196	200	196	200	196
Alt. B	200	196	200	196	200	196
Alt. C	194	190	194	190	194	190
Alt. D	194	190	194	190	194	190
Alt. E	194	190	194	190	194	190
Alt. F	178	175	178	175	178	175
Alt. G – 382 MMBF arrearage volume – Riparian not included					183	
Alt. H – 382 MMBF arrearage volume – Riparian not included					193	

Thurston

Table D-35. Planning Decade Volume, Thurston Sustainable Harvest Unit (MMBF/decade)

Marbled murrelet strategy alternative	Arrearage harvest						Decadal rate based on FY 2011-2018 performance
	702 MMBF		462 MMBF		No specific level		
	Riparian thinning						
	10%	1%	10%	1%	10%	1%	
Alt. A	22	22	22	22	22	22	53
Alt. B	22	22	22	22	23	22	
Alt. C	22	22	22	22	23	22	
Alt. D	22	22	22	22	23	22	
Alt. E	22	22	22	22	23	22	
Alt. F	22	22	21	22	21	22	
Alt. G – 382 MMBF arrearage volume – Riparian not included					22		
Alt. H – 382 MMBF arrearage volume – Riparian not included					22		

Table D-36. 10-decade Net Present Value, Thurston Sustainable Harvest Unit ($ millions)

Marbled murrelet strategy alternative	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	20	19	20	19	20	19
Alt. B	20	20	20	20	20	20
Alt. C	20	20	20	20	20	20
Alt. D	20	20	20	20	20	20
Alt. E	20	20	20	20	20	20
Alt. F	20	19	20	19	20	19
Alt. G – 382 MMBF arrearage volume – Riparian not included					20	
Alt. H – 382 MMBF arrearage volume – Riparian not included					20	

Wahkiakum

Table D-37. Planning Decade Volume, Wahkiakum Sustainable Harvest Unit (MMBF/decade)

Marbled murrelet strategy alternative	Arrearage harvest						Decadal rate based on FY 2011-2018 performance
	702 MMBF		462 MMBF		No specific level		
	Riparian thinning						
	10%	1%	10%	1%	10%	1%	
Alt. A	42	41	39	39	36	36	50
Alt. B	73	70	69	66	62	59	
Alt. C	40	39	40	39	35	33	
Alt. D	42	41	39	38	34	32	
Alt. E	40	39	40	39	35	33	
Alt. F	30	29	30	28	24	23	
Alt. G – 382 MMBF arrearage volume – Riparian not included					31		
Alt. H – 382 MMBF arrearage volume – Riparian not included					59		

Table D-38. 10-decade Net Present Value, Wahkiakum Sustainable Harvest Unit ($ millions)

Marbled murrelet strategy alternative	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	31	30	31	30	31	30
Alt. B	45	44	45	44	45	43
Alt. C	27	26	27	26	27	26
Alt. D	26	26	26	26	26	25
Alt. E	27	26	27	26	27	26
Alt. F	21	20	21	20	21	20
Alt. G – 382 MMBF arrearage volume – Riparian not included					22	
Alt. H – 382 MMBF arrearage volume – Riparian not included					36	

Whatcom

Table D-39. Planning Decade Volume, Whatcom Sustainable Harvest Unit (MMBF/decade)

Marbled murrelet strategy alternative	Arrearage harvest						Decadal rate based on FY 2011-2018 performance
	702 MMBF		462 MMBF		No specific level		
	Riparian thinning						
	10%	1%	10%	1%	10%	1%	
Alt. A	83	85	80	81	75	75	116
Alt. B	84	85	82	83	76	77	
Alt. C	73	76	71	74	67	67	
Alt. D	79	82	78	78	71	72	
Alt. E	72	75	70	73	66	66	
Alt. F	59	61	57	59	52	52	
Alt. G – 382 MMBF arrearage volume – Riparian not included					65		
Alt. H – 382 MMBF arrearage volume – Riparian not included					75		

Table D-40. 10-decade Net Present Value, Whatcom Sustainable Harvest Unit ($ millions)

Marbled murrelet strategy alternative	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	73	72	73	72	73	72
Alt. B	74	73	74	73	74	73
Alt. C	68	67	67	67	67	67
Alt. D	70	70	70	70	70	69
Alt. E	67	66	67	66	67	66
Alt. F	52	52	52	52	52	52
Alt. G – 382 MMBF arrearage volume – Riparian not included					64	
Alt. H – 382 MMBF arrearage volume – Riparian not included					71	