

Revised Sustainable Harvest Financial Analysis

Update to Appendix P of the Marbled Murrelet Long-term Conservation Strategy Final Environmental Impact Statement (FEIS) | October 2019

The full title of this document is *Revised Financial Analysis of Alternatives for the Establishment of a Sustainable Harvest Level for Forested State Trust Lands in Western Washington*. 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 Final Environmental Impact Statement (FEIS)* (marbled murrelet FEIS; DNR 2019a) and the arrearage harvest and riparian thinning options presented in *Alternatives for the Establishment of a Sustainable Harvest Level for Forested State Trust Lands in Western Washington FEIS* (sustainable harvest FEIS; DNR 2019b). The other two scenarios represent Alternative G from the *Marbled Murrelet Long-term Conservation Strategy FEIS* (marbled murrelet FEIS; DNR 2019a) and DNR's HCP amendment (refer to Appendix Q of the marbled murrelet FEIS), combined with the Board of Natural Resources' preferred alternatives for arrearage harvest and riparian thinning (refer to "Key Decisions" in this document and the sustainable harvest FEIS).

This financial analysis is an update to the financial analysis included as Appendix P to the marbled murrelet FEIS. Updates included changes to yields (projections of tree growth), modeling constraints for northern spotted owl habitat, and DNR's forest inventory data. Refer to "Updates Since the October 2018 Financial Analysis" in this document for more information. Also, this revised financial analysis includes the HCP amendment instead of marbled murrelet conservation strategy Alternative H, which was analyzed in the marbled murrelet FEIS.

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Addendum No. 1 to the Marbled Murrelet Long-term
Conservation Strategy Final Environmental Impact Statement

Revised Financial Analysis

of

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

October 2019



WASHINGTON STATE DEPARTMENT OF
NATURAL RESOURCES

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October 2019

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
FEIS	Final Environmental Impact Statement
FY	Fiscal Year
HCP	State Trust Lands Habitat Conservation Plan
MMBF	Million Board Feet
MMLTCS	Marbled Murrelet Long-term Conservation Strategy
NAP	Natural Area Preserve
NRCA	Natural Resources Conservation Area
OESF	Olympic Experimental State Forest
RCW	Revised Code of Washington

Preface

This revised financial analysis is an update to the October, 2018 *Financial Analysis of Alternatives for Establishment of a Sustainable Harvest Level for Forested State Trust Lands in Western Washington* (DNR 2018). Changes include updated data and the inclusion of DNR's amendment to the 1997 *State Lands Habitat Conservation Plan* for the marbled murrelet long-term conservation strategy instead of Alternative H, which was analyzed in the *Marbled Murrelet Long-term Conservation Strategy Final Environmental Impact Statement*.

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

Acknowledgements

Mike Buffo, Assistant Division Manager, Forest Informatics

Cyndi Comfort, Environmental Planner

Doug Kennedy, Natural Resources Specialist

Kate McBurney, Forest Analyst

Abu Nurullah, Ph.D., Senior Forest Analyst

Jeff Ricklefs, Forest Inventory Lead

Justin Schmal, Environmental Planner

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 2006a) 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 a long-term marbled murrelet conservation 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 combinations¹ of scenarios for marbled murrelet conservation, arrearage harvest, and riparian thinning (the model will be discussed later in this analysis). **The purpose of this analysis is to provide financial projections to help the board**

Text Box 1. State Trust Lands

This analysis refers to “state trust lands” or “trust lands” to describe the following trusts defined under state law and managed by DNR.

- **State Lands** (RCW 79.02.010(14)): State lands are the approximately 3 million acres of lands granted to the territory of Washington by the Omnibus Enabling Act of 1889 (25 U.S. Statutes at Large, c. 180 p. 676) as a source of financial support for named beneficiaries, primarily public schools and colleges.
- **State Forest Lands** (RCW 79.02.010(13)): DNR manages two categories of State Forest Lands. *State Forest Transfer Lands* were acquired by 21 counties in the 1920s and 1930s through tax foreclosures and deeded to the state to be managed as state trust lands. *State Forest Purchase Lands* were either purchased by the state or acquired as a gift and managed similarly to State Lands.

Two other trusts are located within the analysis area, covering significantly fewer acres:

- **Community College Forest Reserve** (RCW 79.02.420): DNR manages more than 3,200 acres of forestlands for community colleges. These lands are managed for sustained timber production, but special consideration is given to aesthetics, watershed protection, and wildlife habitat.
- **King County Water Pollution Control Division State Trust Lands**: DNR manages more than 4,300 acres of state trust lands for King County and its Wastewater Treatment Division. These lands are managed for long-term forestry, the same as other state trust lands.

¹ There are 96 possible scenarios, but DNR modeled only 38. This report contains updated results for the 38 scenarios presented in the financial analysis published in October 2018. Instead of using Alternative H in the MMLTC FEIS, this analysis uses the HCP Amendment, which is slightly different than Alternative H in terms of acres of long-term forest cover and areas of conservation. The values in the HCP Amendment are still within the range of the alternatives analyzed. Refer to Appendix Q in the MMLTCS FEIS for more information on the HCP Amendment.

understand how each scenario affects DNR's 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 2006a). 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 2006a). 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 a range of harvest activities, lands restricted to thinning only, and lands that are not available for any harvest activity. Lands that are available for a range of harvest activities 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 harvest under each marbled murrelet strategy (Alternatives A through G and the HCP amendment; refer to the following page).

Key Decisions

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

Marbled Murrelet Long-term Conservation Strategy

The seven marbled murrelet conservation strategy alternatives (A through G) included in this analysis are described in detail in the *Final Environmental Impact Statement on a Long-Term Conservation Strategy for the Marbled Murrelet* (marbled murrelet FEIS; DNR 2019a). In this analysis, DNR also included its amendment to the *State Lands Habitat Conservation Plan* (1997 HCP). The HCP amendment² is based on marbled murrelet conservation strategy Alternative H, but includes 441 more acres of long-term forest cover³ than Alternative H.

Table 1 lists the conservation acres (collectively referred to as long-term forest cover) proposed under each marbled murrelet conservation strategy (alternatives A through G and the HCP amendment).

² The HCP Amendment is the document submitted to the U.S. Fish and Wildlife Service to amend the 1997 HCP with a marbled murrelet long-term conservation strategy. Refer to the marbled murrelet FEIS, Appendix Q for more information.

³ 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 FEIS (DNR 2019a) for more information.

Table 1. Summary of Conservation Acres Proposed Under Marbled Murrelet Strategies (Alternatives A through G and the HCP Amendment)

	Alt. A (no action)	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G	HCP Amend -ment
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 ⁴	33,000	9,000	49,000	51,000	54,000	176,000	75,000	37,000
Total approximate acres of long-term conservation (long-term forest cover) ⁵	600,000	576,000	617,000	618,000	621,000	743,000	642,000	605,000

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 Section 2.1 of the *Final Environmental Impact Statement on Alternatives for the Establishment of a Sustainable Harvest Level for Forested State Trust Lands in Western Washington* [sustainable harvest FEIS, DNR 2019b] for more detail).

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 *Draft Environmental Impact Statement on Alternatives for Establishment of a Sustainable Harvest Level for Forested State Trust Lands in Western Washington* (sustainable harvest DEIS). The board selected the preferred alternative based on multiple factors including the analysis in the sustainable harvest DEIS, comments received on the sustainable harvest DEIS, and stakeholder comments received at board meetings. Analysis of the preferred alternative has been included in the sustainable harvest FEIS. For each option, DNR specifies an arrearage 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

⁴ Acres reported here are those that do not overlap other existing conservation lands.

⁵ Numbers are rounded to the nearest thousand so totals may not always match.

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 analyzed in the sustainable harvest FEIS are to:

- Harvest 702 million board feet (MMBF) proportionally from those sustainable harvest units with deficits over five years.
- Harvest 462 MMBF proportionally from those sustainable harvest units with deficits over ten years.
- Harvest 462 MMBF proportionally from sustainable harvest units with deficits in one year, and then harvest the remaining sustainable harvest level volume for the decade over the next nine years. Under this option, harvest would occur only in units with deficits in the first year of the decade.
- Set harvest levels without specifying arrearage quantity.
- Harvest 382 MMBF proportionally from those sustainable harvest units with deficits over ten 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 units 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 FEIS.

Riparian Thinning Options

The board provided direction on riparian thinning levels to be analyzed in the sustainable harvest FEIS. These thinning levels apply to the five west-side HCP⁶ planning units, excluding the Olympic Experimental State Forest (OESF; Figure 1). These riparian harvest options are 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. The preferred alternative does not set a specific level of riparian thinning. During implementation, riparian thinning can occur consistent with the 1997 HCP. Under the preferred alternative, volume from thinning in riparian areas will count toward the implementation of the sustainable harvest level.

⁶ *State Trust Lands Habitat Conservation Plan (HCP)*, available at <http://www.dnr.wa.gov/programs-and-services/forest-resources/habitat-conservation-state-trust-lands>.

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 for the five west-side HCP planning units analyzed in the sustainable harvest FEIS are to:

- **Thin up to ten percent of the total riparian area.** Riparian areas in the five west-side planning units cover 361,000 acres and are composed of stream, wetland, and associated buffers. Buffers range from 100 to more 190 feet wide, depending on stream type or wetland size. This option would limit thinning in riparian thinning areas to a maximum of 36,100 acres for the decade.
- **Thin an area less than or equal to one percent of the acres harvested in non-riparian areas.** For example, if DNR expected to harvest on 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.
- **Riparian volume not included when setting the sustainable harvest level (preferred alternative in the sustainable harvest FEIS).**

No change in management of riparian areas is proposed for the OESF HCP planning unit. Limited harvest can occur in riparian areas in the OESF in accordance with the *OESF HCP Planning Unit Forest Land Plan* (DNR 2016). For more information on the riparian thinning options, refer to the sustainable harvest FEIS.

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 Straits HCP planning units. This area includes approximately 1.57 million acres of DNR-managed lands, which include state trust lands as well as natural area preserves (NAPs), natural resources conservation areas (NRCAs), and non-forested acreage.

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, which is approximately 1.38 million acres (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 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 revenue generated from them would be expected to remain 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 sustainable harvest need, purpose, and objectives (refer to Section 1.1 of the sustainable harvest FEIS); 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

Figure 1. Analysis Area for the Sustainable Harvest Level (labeled HCP Planning Units) and Marbled Murrelet Strategy



be—made at the operational level, after considering the best interests of the trusts and following appropriate environmental review.

Analysis Methods

This analysis uses data from a forest estate model (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 FEIS for more detail).

The model used for this analysis was programmed to calculate the sustainable harvest level associated with each scenario. 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 Lands.

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 FEIS, 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.⁷

The net present value numbers presented in this analysis take into account the economic assumptions described in Appendix F of the sustainable harvest FEIS. 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 October 2018 Financial Analysis

The following changes were made to the forest estate model since the 2018 financial analysis was released (refer also to Table 2):

- **Yields (projections of tree growth):** Yields in several DNR districts (each DNR region is divided into districts) were adjusted to better reflect volumes found in pre-harvest timber cruise data. Previously, yields were developed based on timber cruise data that had been compiled for

⁷ 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

all of western Washington and did not account for differences in yields at the district scale. This update improves the accuracy of the yields at the district scale.

- **Northern spotted owl management:** Modeling constraints on northern spotted owl habitat were updated to better reflect implementation of the 1997 HCP northern spotted owl conservation strategy. In the model, moderate thinning⁸ was excluded from northern spotted habitat because implementation has shown that habitat is not maintained on the landscape when this level of thinning is applied. Additionally in the model, variable retention harvest has been restricted in northern spotted owl habitat and next best stands 60 years old and older during the first decade. This update retains forest stands in the model that allow spotted owl management units to meet habitat requirements. Operationally, stands over 60 years old could be harvested if such harvest is consistent with the northern spotted owl strategy in the 1997 HCP.
- **Forest inventory data:** updated as described in Marbled Murrelet Long-term Conservation Strategy FEIS Appendix O.

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
Yields	Updates to the yields resulted in very little change in planning decade harvest volume at the scale of western Washington. However, harvest volumes in some sustainable harvest units increased while others decreased.	Updates to the yields resulted in very little change in net present value at the scale of western Washington. However, net present value in some sustainable harvest units increased while others decreased.
Northern spotted owl management	Updates to northern spotted owl management decreased the areas of northern spotted owl habitat harvested in the planning decade. This update decreased the planning decade harvest volume.	Updates to northern spotted owl management decreased the areas of northern spotted owl habitat harvested in the planning decade. This update decreased the 10-decade net present value.
Forest inventory data	Updates to forest inventory resulted in a decreased standing volume. This update decreased the planning decade harvest volume.	Updates to forest inventory resulted in a decreased standing volume. This update decreased the 10-decade net present value.

⁸ A thinning that allows for the removal of 45 percent of the basal area, applied across all diameter classes.

Key Understandings

Arrearage

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

- Harvest 462 MMBF proportionally from those sustainable harvest units with deficits over ten years.
- Harvest 462 MMBF proportionally from sustainable harvest units with deficits in one year, and then harvest the remaining sustainable harvest level volume for the decade over the next nine 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 ten 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, that may not be the case. 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 3).

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

	Even-age Harvest		Thinning		Total	
	MMBF	Percent of projected volume	MMBF	Percent of projected volume	MMBF	Percent 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 FEIS 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 harvested⁹.

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,¹⁰
- 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.

For fiscal years 2001 through 2018, harvest volumes averaged 454.5 MMBF per year¹¹. Converting this annual figure into a decadal level requires multiplying by ten. Therefore, harvesting an average of 454.5 MMBF per year equates to 4,545 MMBF per decade. Appendix B contains the actual harvest volumes from fiscal year 2001 through 2018 for each sustainable harvest unit, each trust, and the State Forest Transfer Lands for each county. In the appendix, volumes are converted to volume per decade for comparison with model results, along with revenue generated for each trust from the harvest of this timber.

How Data are Presented

Since there are seven marbled murrelet strategy alternatives and the HCP amendment, 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 which cover the range of possible results. Results for the 38 scenarios are shown in tables throughout this document. For 36 scenarios, the marbled murrelet conservation strategies (alternatives A through G and the HCP amendment) are 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 the HCP amendment are in separate rows below the other 36 scenarios.

⁹ A portion of the total revenue from a sale is collected as a deposit prior to harvest.

¹⁰ 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.

¹¹ In this same time period, this volume was 468 MMBF per year.

Tables are color formatted to more clearly illustrate the results for each scenario. Some tables include the “Decadal rate based on fiscal year 2011-2018 performance” in the green column on the right side of the table. Harvest levels that are below this decadal rate are shown in orange, and harvest levels that are above this decadal rate are shown in blue. A darker color indicates a higher contrast with the decadal rate. Harvest levels that are roughly equivalent to the decadal rate are not shaded.

For tables showing 10-decade net present value, blue shading indicated net present values that are closest to the maximum net present value. Orange shading indicates net present values that are closest to the minimum net present value. In some instances, two net present values may appear to be the same but have different shading. The reason is that shading is based on the net present value before it is rounded.

Volume data are presented in millions of board feet (MMBF) per decade unless otherwise noted. The cell with the red border is marbled murrelet Alternative B with arrearage harvest of 702 MMBF and thinning of up to ten percent of the riparian area. In this example, the cells are compared against the amount in the green column on the far right that lists the decadal rate performance. The red bordered cell is shaded dark blue, indicating its value is greater than the value in the green column.

Figure 2. Example of a Table Showing Results for all 38 Scenarios Plus Comparison to Recent Harvest Level

Marbled murrelet strategy	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%	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	
HCP amendment– 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 \$3.11 billion to \$3.92 billion (Table 4).

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

Marbled murrelet strategy	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	3.78	3.68	3.78	3.68	3.78	3.68
Alt. B	3.92	3.82	3.92	3.82	3.92	3.82
Alt. C	3.74	3.64	3.74	3.64	3.74	3.64
Alt. D	3.73	3.63	3.73	3.63	3.73	3.63
Alt. E	3.72	3.62	3.72	3.62	3.72	3.62
Alt. F	3.20	3.11	3.20	3.11	3.20	3.11
Alt. G – 382 MMBF arrearage volume – Riparian not included						3.50
HCP amendment – 382 MMBF arrearage volume – Riparian not included						3.67

EFFECTS OF THE MARBLED MURRELET STRATEGY ON NET PRESENT VALUE

The marbled murrelet long term conservation strategies (alternatives A through G and the HCP amendment) have a larger impact on 10-decade net present value than either arrearage harvest or riparian thinning options.

Marbled murrelet conservation strategy Alternative B produces the highest 10-decade net present value. Marbled murrelet conservation strategy alternatives A and C through F have lower values in the following

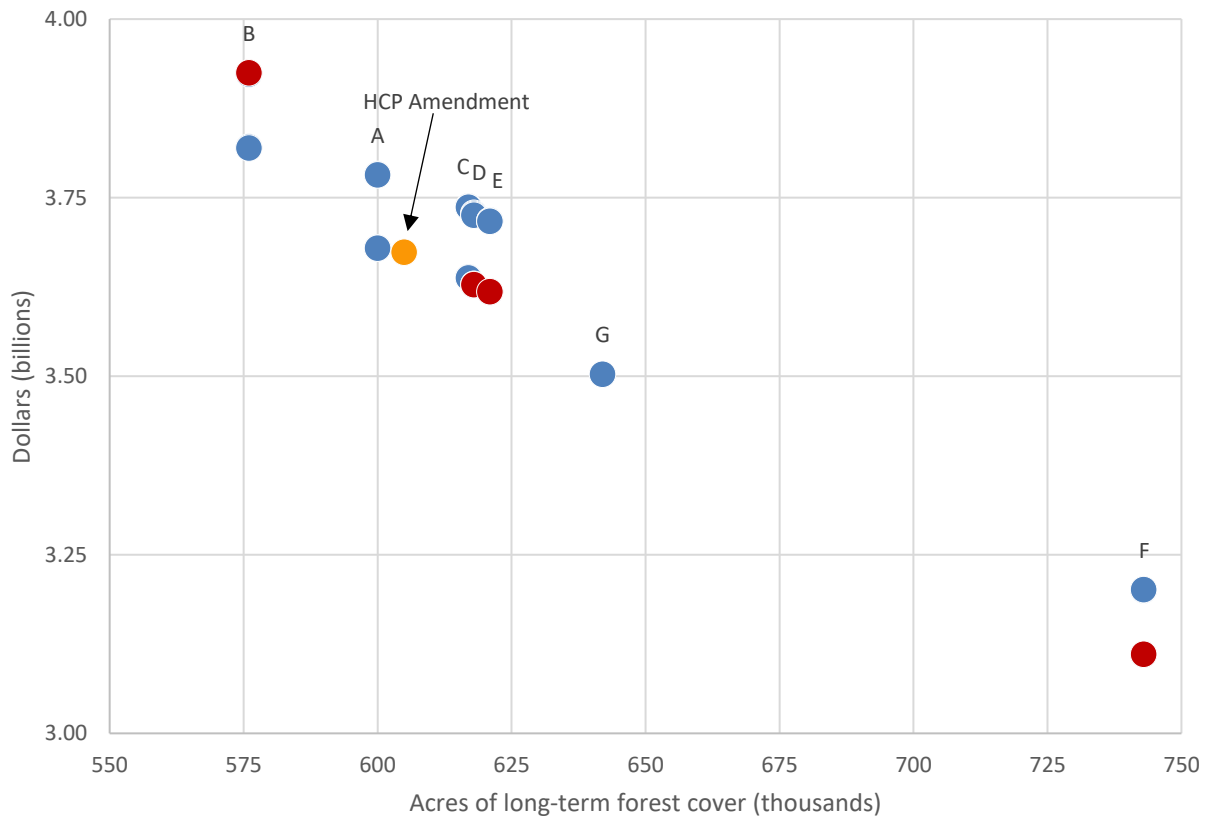
order from highest to lowest value; A, C, D, E, and finally, F. The 10-decade net present value of Alternative F is approximately \$709 to \$724 million (or roughly 18 percent) lower than Alternative B, with each pairing of arrearage harvest and riparian thinning options (Table 4).

Marbled murrelet conservation strategy Alternative G and the HCP amendment are modeled under a scenario that does not include riparian thinning in the harvest level, resulting in a lower 10-decade net present value. However, isolating the effect of the marbled murrelet conservation strategy shows that the HCP amendment has a 10-decade net present value between marbled murrelet conservation strategy alternatives A and C, while Alternative G is between alternatives E and F (Figure 3).

The extent to which a trust or county may be impacted by the marbled murrelet conservation 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 10-decade net present value for each trust, and for the State Forest Transfer Lands 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 aligned blue dots correspond to marbled murrelet conservation strategy alternatives B, A, C, D, E, G, and F. The red dots represent the alternatives analyzed in the sustainable harvest FEIS for potential environmental impacts (excluding the No Action alternative). The orange dot represents the HCP amendment (Alternative 6 in the sustainable harvest FEIS).



EFFECTS OF ARREARAGE HARVEST OPTIONS ON NET PRESENT VALUE

Compared to the marbled murrelet conservation strategy, arrearage harvest has a much smaller effect on 10-decade net present value (Tables 5 and 6). Arrearage harvest of 382 MMBF, 462 MMBF, and 702 MMBF of timber are equivalent to the volume typically harvested by DNR over approximately ten months, one year, and one and one-half years, while 10-decade net present value spans 100 years of harvest.

All else being equal, 10-decade 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 (Table 4). 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 \$104 million, or less than three percent of the 10-decade net present value.

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

The scenarios with marbled murrelet conservation strategy Alternative G and the HCP amendment do not include any riparian volume in 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 CONSERVATION STRATEGY ON NET PRESENT VALUE

The marbled murrelet conservation strategies (alternatives A through G and the HCP amendment) 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 marbled murrelet conservation strategy alternatives A through E, but substantially lower for Alternative F. For example, for the Scientific School Trust, the 10-decade net present value is 19 to 21 percent lower under Alternative F than the other alternatives (Table 5; refer to Appendix C for 10-decade net present value and planning decade harvest volumes for all trusts and counties).¹²

¹² A similar pattern occurs on the Agricultural School Grant and Common School and Indemnity Trust and the State Forest Transfer Lands in King, Lewis, Pierce, and Skagit counties.

- For State Forest Transfer Lands in Wahkiakum County, the 10-decade net present value varies amongst all the scenarios, with a marked difference of up to 54 percent lower under marbled murrelet conservation strategy Alternative F than under Alternative B (Table 6)¹³.
- For other trusts, such as State Forest Transfer Lands in Mason County, the marbled murrelet conservation strategies (alternatives A through G and the HCP amendment) have relatively little effect (one percent) on 10-decade net present value (Table 6)¹⁴.

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	86	18%	0%	4%
Capitol Building Grant	250	25%	0%	2%
CEP&RI	97	22%	0%	3%
Common School and Indemnity	1,335	22%	0%	3%
Community College Forest Reserve	14	2%	0%	5%
Normal school	89	18%	0%	3%
Other	0	0%	0%	0%
Scientific School	174	21%	0%	4%
State Forest Purchase	311	8%	0%	3%
State Forest Transfer	1,453	14%	0%	2%
University Grant	97	47%	0%	2%
Water Pollution Control Division	20	3%	0%	1%

¹³ A similar pattern of variation among all of the alternatives, with the most significant difference between alternatives B and F, occurs on the Capitol Building Grant, CEPRI and CEPR Transferred, Normal School, State Forest Purchase Lands, and University Grant trust, and the State Forest Transfer Lands in Pacific and Whatcom Counties.

¹⁴ A similar patter occurs on the Community College Forest Reserve and Water Pollution Control Division trusts, and State Forest Transfer Lands in Clark, Cowlitz, Jefferson, Kitsap, Mason, Skamania, and Thurston counties.

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

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

State Forest Transfer Lands	County	Magnitude of change in 10-decade net present value as a percent of maximum 10-decade net present value			
		Maximum 10-decade net present value (\$ millions)	Due to marbled murrelet conservation	Due to arrearage harvest	Due to riparian thinning
	Clallam	212	14%	0%	1%
	Clark	60	1%	0%	3%
	Cowlitz	27	0%	0%	3%
	Grays Harbor	10	15%	1%	3%
	Jefferson	42	5%	0%	3%
	King	59	22%	0%	1%
	Kitsap	16	1%	0%	2%
	Lewis	163	19%	0%	3%
	Mason	80	1%	0%	1%
	Pacific	47	25%	0%	6%
	Pierce	34	65%	0%	1%
	Skagit	248	17%	0%	2%
	Skamania	78	0%	0%	1%
	Snohomish	182	10%	0%	2%
	Thurston	87	3%	1%	3%
	Wahkiakum	45	54%	1%	3%
	Whatcom	64	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 can be small at the scale of individual trusts and counties. An example is the 10-decade net present value for Skamania State Forest Transfer Lands. For the Skamania State Forest Transfer Lands, the difference in 10-decade net present value under the 702 MMBF arrearage harvest option and the no specific arrearage option is less than 0.6 percent (Table 7). Marbled murrelet conservation strategy alternative G and the HCP amendment have slightly 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 Lands in Skamania County (\$ millions)

Marbled murrelet strategy	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	78	77	78	77	78	77
Alt. B	78	77	78	77	78	77
Alt. C	78	77	78	77	78	77
Alt. D	78	77	78	77	78	77
Alt. E	78	77	78	77	78	77
Alt. F	78	77	78	77	78	77
Alt. G – 382 MMBF arrearage volume – Riparian not included						77
HCP amendment– 382 MMBF arrearage volume – Riparian not included						77

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 strategies (alternatives A through G and the HCP amendment). For example, for Common School and Indemnity Trust lands, the difference in 10-decade

net present value is about three percent between the riparian thinning options (Table 8). This difference is similar in other trusts and counties (refer to Appendix C for a complete list of 10-decade net present values for all of the federally granted trusts and the State Forest Transfer Lands by county.)

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

Marbled murrelet strategy	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	1290	1253	1290	1252	1290	1253
Alt. B	1335	1297	1335	1297	1335	1297
Alt. C	1274	1238	1273	1238	1274	1238
Alt. D	1266	1231	1266	1230	1267	1231
Alt. E	1266	1231	1266	1230	1267	1230
Alt. F	1039	1007	1040	1008	1040	1008
Alt. G – 382 MMBF arrearage volume – Riparian not included						1169
HCP amendment– 382 MMBF arrearage volume – Riparian not included						1240

Harvest Volume

In Western Washington

In western Washington, the planning decade timber harvest volume under the scenarios ranges from 3,837 MMBF to 5,202 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”).

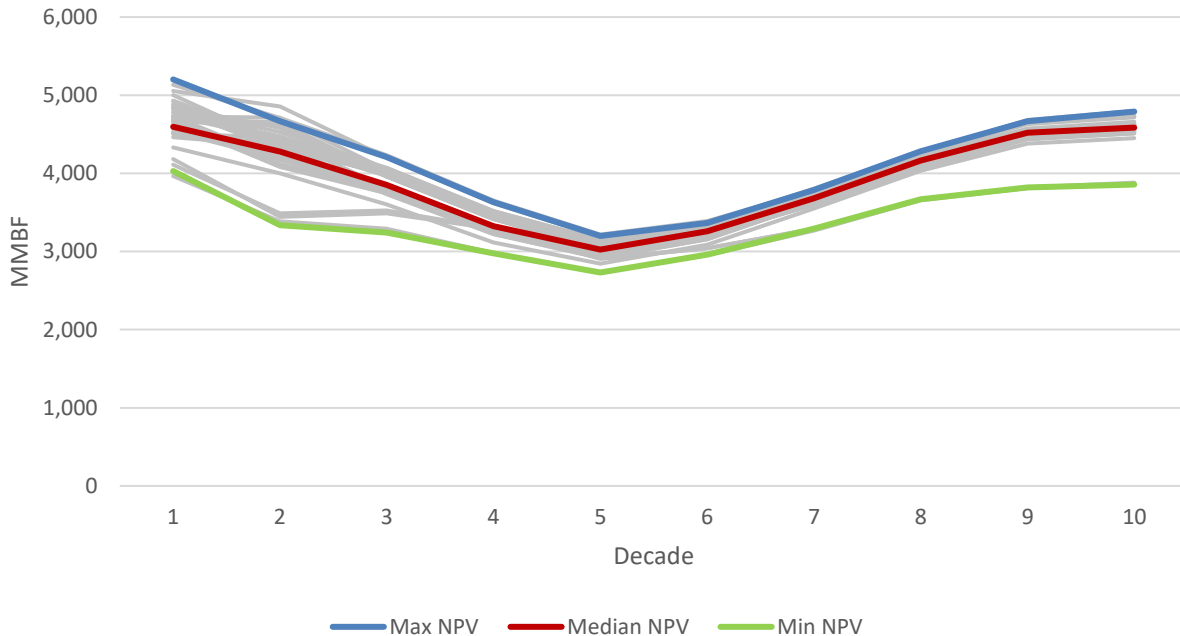
Table 9. Planning-decade Timber Harvest Volume of Each Scenario (MMBF/decade)

Marbled murrelet strategy	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	4,926	4,731	4,819	4,596	4,728	4,522
Alt. B	5,202	5,001	5,134	4,931	5,054	4,847
Alt. C	4,872	4,687	4,769	4,575	4,699	4,504
Alt. D	4,887	4,692	4,788	4,590	4,718	4,516
Alt. E	4,838	4,652	4,733	4,533	4,661	4,461
Alt. F	4,182	4,029	4,111	3,965	4,007	3,837
Alt. G – 382 MMBF arrearage volume – Riparian not included						4,333
HCP amendment – 382 MMBF arrearage volume – Riparian not included						4,654

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

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 conservation strategy Alternative B, the 702 MMBF of arrearage harvest option, and the ten percent riparian thinning option. The scenario with the 19th highest volume of the 38 scenarios is the combination of marbled murrelet conservation strategy Alternative A, the 462 MMBF of arrearage harvest option, and the one percent riparian thinning option. The scenario with the minimum net present value is the combination of marbled murrelet conservation strategy Alternative F, the 702 MMBF arrearage harvest option, and the one percent riparian thinning option.

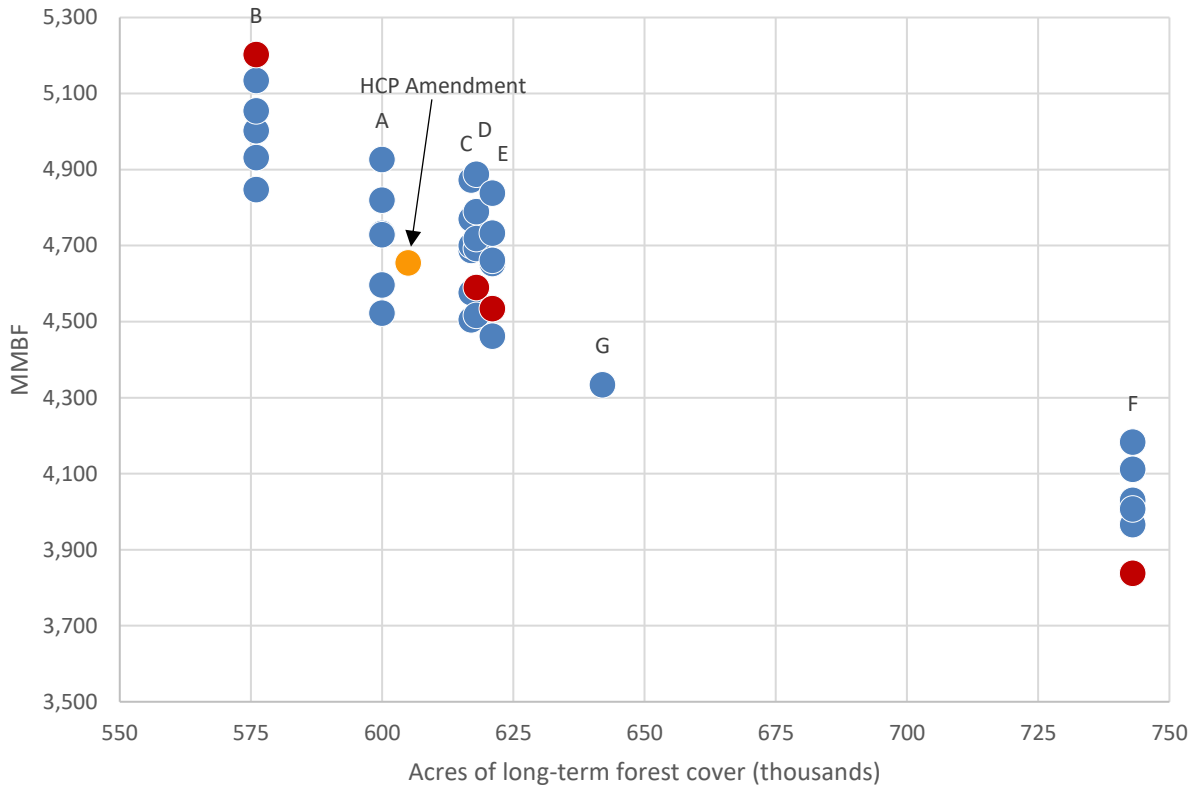
EFFECTS OF MARBLED MURRELET STRATEGY ON HARVEST VOLUME

Results for harvest volume are comparable to those for net present value. Marbled murrelet conservation strategy Alternative B produces the highest planning decade harvest volume, followed by alternatives A, C, D, E, and, finally, F (Figure 5). Marbled murrelet conservation strategy Alternative B produces about 1,000 MMBF (about 20 percent) more harvest volume in the planning decade than Alternative F, regardless of arrearage harvest or riparian thinning option (Table 9). The maximum effect of marbled murrelet conservation strategies (alternatives A through G and the HCP amendment) on harvest volume moderates over time, but is at least 406 MMBF per decade for the next ten decades (Figure 4).

Marbled murrelet conservation strategy Alternatives G and the HCP amendment are modeled under a scenario that does not include riparian thinning in the harvest level, generally resulting in lower planning decade harvest volumes. However, isolating the effect of the murrelet long-term conservation strategy shows that the HCP amendment has a planning decade volume between alternatives A and C, while Alternative G is between alternatives E and F (Figure 5).

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 conservation strategy alternatives B, A, C, D, E, G, and F. The red dots represent the alternatives analyzed in the sustainable harvest FEIS for potential environmental impacts (excluding the No Action alternative). The orange dot represents the HCP amendment (Alternative 6 of the sustainable harvest FEIS).



As with 10-decade net present value, the effect of the marbled murrelet conservation strategies (alternatives A through G and the HCP amendment) on planning decade harvest volumes differs by trust and county (Tables 10 and 11).

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	132	23%	2%	7%
Capitol Building Grant	442	22%	1%	4%
CEP&RI	124	21%	1%	5%
Common School and Indemnity	1,664	25%	2%	5%
Community College Forest Reserve	12	60%	3%	1%
Normal school	96	17%	4%	7%
Other	0	0%	0%	0%
Scientific School	269	26%	5%	6%
State Forest Purchase	426	6%	11%	9%
State Forest Transfer	1,899	15%	4%	4%
University Grant	140	58%	4%	4%
Water Pollution Control Division	11	37%	34%	1%

Note: The sum of maximum planning decade harvest volumes in Table 11 is different than the maximum planning decade harvest volume shown in Table 10 for State Forest Transfer Lands. The reason is that no single scenario produces the maximum planning decade harvest volume in every county at once.

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

County	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
Clallam	392	15%	14%	1%
Clark	54	14%	0%	11%
Cowlitz	25	5%	0%	5%
Grays Harbor	10	26%	7%	6%
Jefferson	70	6%	0%	7%
King	81	22%	6%	1%
Kitsap	13	2%	0%	5%
Lewis	204	19%	0%	6%
Mason	98	1%	0%	2%
Pacific	59	31%	4%	12%

State Forest Transfer Lands		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
Pierce	29	68%	0%	1%
Skagit	267	17%	0%	1%
Skamania	107	1%	4%	6%
Snohomish	212	18%	0%	3%
Thurston	142	19%	12%	6%
Wahkiakum	74	59%	15%	5%
Whatcom	78	30%	12%	1%

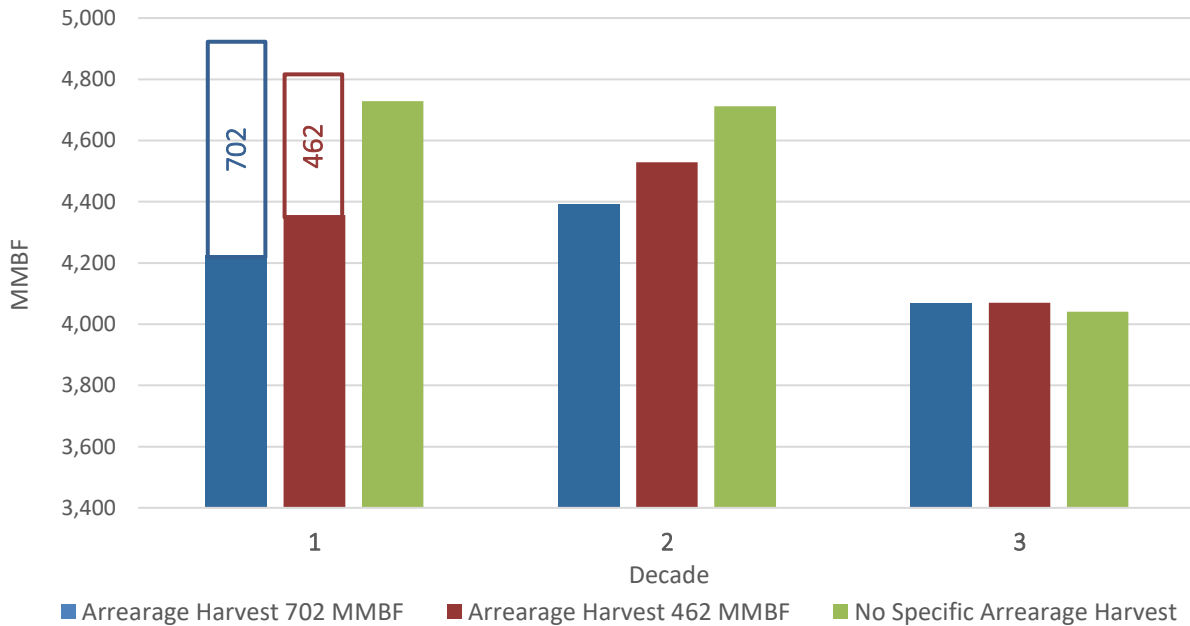
EFFECTS OF ARREARAGE HARVEST OPTIONS ON HARVEST VOLUME

Scenarios that include 702 MMBF and 462 MMBF in arrearage harvest generally result in a somewhat 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 198 MMBF higher than scenarios with the no specific arrearage option, when paired with the ten percent thinning option (Table 9). When paired with the one percent riparian thinning option, the difference is no more than 210 MMBF (Table 9).

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 two. That, in turn, reduces harvest volumes in decade two. 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 MMBF or 462 MMBF of arrearage harvest result in slightly less total harvest volume than scenarios with no specific arrearage volume.

Marbled murrelet alternatives G and the HCP amendment 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.

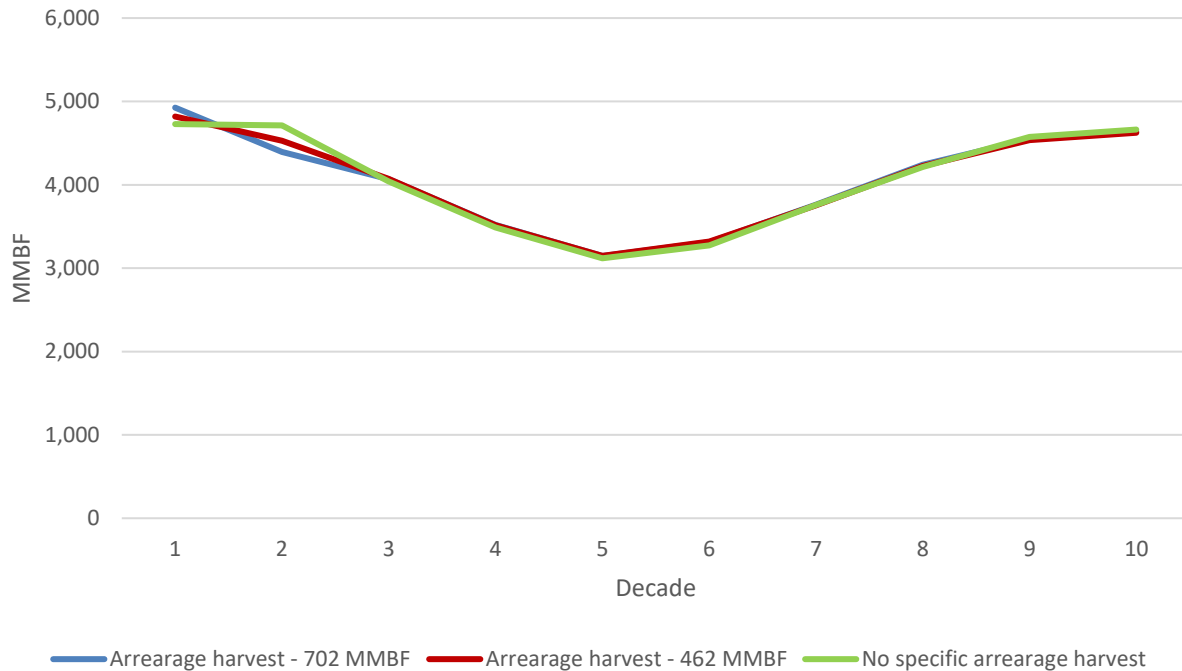
Figure 6. Sustainable Harvest Level (solid bars) and Arrearage Harvest (hollow bars) in Western Washington Under Three Arrearage Options Combined with Marbled Murrelet Strategy Alternative A and the Ten Percent Riparian Thinning Option



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 Ten 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. However, under all options, DNR would harvest the specified arrearage volume by the end of the planning decade, fiscal year 2024. As it is currently fiscal year 2020, and only four 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 one 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 Lands that benefit Clark, Cowlitz, Kitsap, Lewis, Mason, Pierce, Skagit, and 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 staff additions would be needed to set up and perform 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.

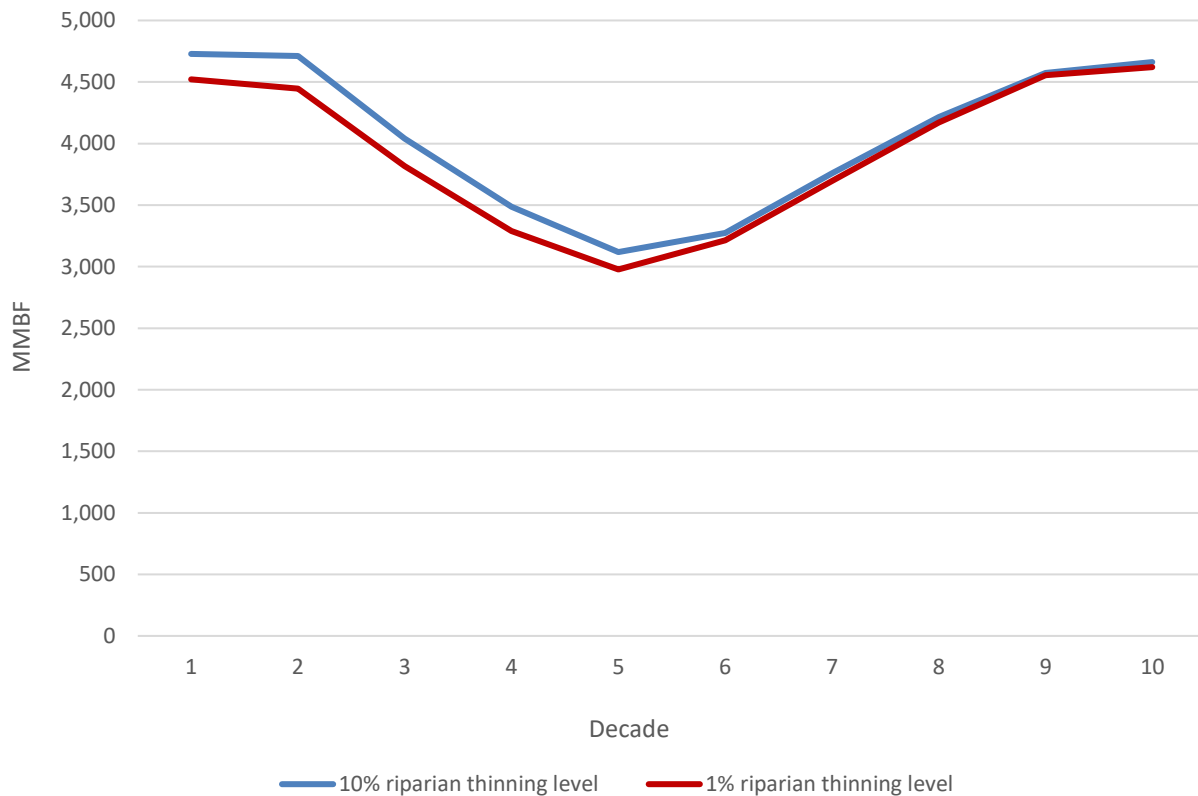
The spike in volume offered for sale in one year also may depress revenue per volume sold: excess timber supply on the market may suppress prices, and increased demand for logging crews may increase logging costs for purchasers

EFFECTS OF RIPARIAN THINNING OPTIONS ON HARVEST VOLUME

Scenarios that include the ten percent riparian thinning option result in between 145 MMBF and 223 MMBF more harvest volume in the planning decade than the one percent thinning option, depending on marbled murrelet conservation strategy and arrearage option. Harvest levels over a 10-decade period are also highest under the ten percent riparian thinning option (Figure 8).

Marbled murrelet conservation strategy Alternative G and the HCP amendment 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* (DNR 2006b) and *Olympic Experimental State Forest HCP Unit Forest Land Plan* (DNR 2016). 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 of Arrearage Harvest Option



By Trust and County

EFFECTS OF THE MARBLED MURRELET CONSERVATION STRATEGY 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 Lands.

The marbled murrelet conservation strategies (alternatives A through G and the HCP amendment) affect the harvest level differently in the different trusts and counties. For example, for State Forest Transfer Lands in Wahkiakum County, the harvest level under marbled murrelet conservation strategy Alternative F is up to 43 percent of the level under Alternative B (Table 12).

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

Marbled murrelet strategy	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	43	42	40	38	36	37	50
Alt. B	74	70	70	66	63	60	
Alt. C	39	39	39	38	35	33	
Alt. D	42	41	41	38	34	32	
Alt. E	39	39	39	38	35	33	
Alt. F	30	29	30	29	25	23	
Alt. G – 382 MMBF arrearage volume – Riparian not included						31	
HCP amendment – 382 MMBF arrearage volume – Riparian not included						59	

For the Scientific School Trust lands, the harvest level under marbled murrelet conservation strategy Alternative F is about 71% to 77% of recent harvest levels (Table 13). The HCP amendment produces harvest volumes that approach Alternative B levels.

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

Marbled murrelet strategy	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	265	250	253	241	252	236	257
Alt. B	266	259	268	257	268	255	
Alt. C	260	250	260	243	256	246	
Alt. D	262	254	261	245	257	244	
Alt. E	269	253	260	244	255	242	
Alt. F	199	183	193	184	195	184	
Alt. G – 382 MMBF arrearage volume – Riparian not included						200	
HCP amendment – 382 MMBF arrearage volume – Riparian not included						243	

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 marbled murrelet conservation strategy alternatives F and G (Table 13), while others, like State Forest Transfer Lands in Jefferson County, are largely unaffected (Table 14).

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

Marbled murrelet strategy	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	66	62	66	62	66	62	62
Alt. B	70	65	70	65	70	65	
Alt. C	70	65	70	65	70	65	
Alt. D	70	65	70	65	70	65	
Alt. E	70	65	70	65	70	65	
Alt. F	69	65	69	65	70	65	
Alt. G – 382 MMBF arrearage volume – Riparian not included						65	
HCP amendment – 382 MMBF arrearage volume – Riparian not included						65	

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 Lands in Whatcom County (Table 15). Marbled murrelet conservation strategy Alternative G and the HCP amendment have lower planning decade harvest levels than many of 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 Lands in Whatcom County (MMBF/decade)

Marbled murrelet strategy	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	76	77	74	73	68	68	116
Alt. B	77	78	75	74	69	68	
Alt. C	67	68	65	66	61	60	
Alt. D	73	73	70	71	64	64	
Alt. E	66	67	64	65	60	60	
Alt. F	53	54	51	52	46	46	
Alt. G – 382 MMBF arrearage volume – Riparian not included						58	
HCP amendment– 382 MMBF arrearage volume – Riparian not included						67	

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. The Common School and Indemnity Trust lands show approximately a four percent to six percent difference between the ten percent and one percent riparian harvest options for all alternatives and arrearage options (refer to Table 16).

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

Marbled murrelet strategy	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	1,560	1,494	1,535	1,453	1,516	1,444	1,193
Alt. B	1,664	1,588	1,657	1,580	1,635	1,567	
Alt. C	1,536	1,476	1,519	1,451	1,505	1,440	
Alt. D	1,546	1,468	1,520	1,459	1,515	1,446	
Alt. E	1,529	1,461	1,510	1,439	1,497	1,429	
Alt. F	1,255	1,188	1,233	1,168	1,186	1,119	
Alt. G – 382 MMBF arrearage volume – Riparian not included						1,318	
HCP amendment– 382 MMBF arrearage volume – Riparian not included						1,448	

Land Base Available for Production

The area available for harvest varies by marbled murrelet conservation strategy. 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 FEIS in Sections 3.11 and 4.11. Table 17 provides the number of acres available for even-aged management under the marble murrelet strategies (alternatives A through G and the HCP amendment), since DNR generates the most revenue from these acres.

Table 17. Area Available for Harvest Activities in Western Washington

Marbled murrelet strategy	Lands where even-aged management may not occur (acres)	Lands where even-aged management may occur (acres)	Total (acres)¹⁵
Alt. A	685,000	779,000	1,465,000
Alt. B	678,000	787,000	1,465,000
Alt. C	705,000	760,000	1,465,000
Alt. D	709,000	756,000	1,465,000
Alt. E	709,000	756,000	1,465,000
Alt. F	818,000	646,000	1,465,000
Alt. G	724,000	740,000	1,465,000
HCP amendment	698,000	767,000	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 research¹⁶.

During the planning decade, management funds available to DNR under each scenario range from \$40 million to \$54 million per year (Table 18). The marbled murrelet conservation strategies (alternatives A through G and the HCP amendment) have the greatest impact on management funds. Under Alternative F, funds are about \$10 to \$11 million per year less than under Alternative B and \$8 million to \$11 million less than they were in the fiscal years 2012 through 2017 period.

As described in Appendix F of the sustainable harvest FEIS, indirect expenditures are likely to remain constant over a range of harvest levels. Under marbled murrelet conservation strategy Alternative F, indirect expenditures will either account for a much larger proportion of the total cost of harvesting timber

¹⁵ 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 FEIS Appendix F for more information about these data limits.

¹⁶ 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.

than under other murrelet strategies (alternatives A through E and G or the HCP amendment), or these activities will be curtailed.

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

Marbled murrelet strategy	Arrearage harvest						Decadal rate based on FY 2012-2017 ¹⁷ performance
	702 MMBF		462 MMBF		Rolled in		
	Riparian thinning						
	10%	1%	10%	1%	10%	1%	
Alt. A	51	49	50	48	50	47	51
Alt. B	54	52	53	51	53	50	
Alt. C	50	48	50	47	49	47	
Alt. D	51	48	50	48	49	47	
Alt. E	50	48	49	47	49	46	
Alt. F	43	41	43	41	42	40	
Alt. G – 382 MMBF arrearage volume – Riparian not included						45	
HCP amendment– 382 MMBF arrearage volume – Riparian not included						48	

¹⁷ The date range presented in the 2018 Financial Analysis was incorrect and has been updated.

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Appendix A. Arrearage Detail

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, 462 MMBF, or 382 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 levels 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 recent harvest levels and 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. Recent Harvest Levels 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 2011–2018 (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 Lands*	254	32	318	\$6
	State Forest Transfer Lands	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 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
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

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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 Lands, for each county. Planning decade volume is compared to the actual harvest volume from fiscal years 2011 through 2018 data that has been converted into a decadal rate.

By Trust

Agricultural School Grant

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

Marbled murrelet strategy	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	130	119	126	117	114
Alt. B	132	123	131	122	129	120	
Alt. C	131	122	128	119	126	119	
Alt. D	130	120	127	117	126	116	
Alt. E	130	120	128	117	127	117	
Alt. F	102	95	101	94	105	94	
Alt. G – 382 MMBF arrearage volume – Riparian not included							
HCP amendment– 382 MMBF arrearage volume – Riparian not included							118

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

Marbled murrelet strategy	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	86	83	86	83	86	83
Alt. C	84	81	84	81	85	81
Alt. D	84	81	84	81	84	81
Alt. E	84	80	84	81	84	81
Alt. F	71	68	71	68	71	68
Alt. G – 382 MMBF arrearage volume – Riparian not included						78
HCP amendment– 382 MMBF arrearage volume – Riparian not included						81

Capitol Building Grant

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

Marbled murrelet strategy	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	419	403	415	397	411	391	294
Alt. B	441	426	438	423	442	425	
Alt. C	411	395	405	389	403	391	
Alt. D	407	392	405	389	402	388	
Alt. E	406	393	404	386	400	385	
Alt. F	362	346	355	343	344	330	
Alt. G – 382 MMBF arrearage volume – Riparian not included						344	
HCP amendment– 382 MMBF arrearage volume – Riparian not included						370	

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

Marbled murrelet strategy	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	241	235	241	235	241	235
Alt. B	250	245	250	245	250	245
Alt. C	234	229	234	230	234	229
Alt. D	233	229	234	229	233	228
Alt. E	234	229	234	229	234	229
Alt. F	187	183	187	183	188	183
Alt. G – 382 MMBF arrearage volume – Riparian not included						217
HCP amendment– 382 MMBF arrearage volume – Riparian not included						229

CEP&RI¹⁸ (including CEP&RI transferred)

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

Marbled murrelet strategy	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	108	104	101	96	103	96	128
Alt. B	122	118	124	118	123	116	
Alt. C	102	95	99	92	98	91	
Alt. D	104	99	103	96	103	97	
Alt. E	100	94	98	91	98	91	
Alt. F	97	89	97	90	97	90	
Alt. G – 382 MMBF arrearage volume – Riparian not included						91	
HCP amendment– 382 MMBF arrearage volume – Riparian not included						107	

¹⁸ Charitable, Educational, Penal, and Reformatory Institutions Grant

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

Marbled murrelet strategy	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	90	87	90	87	90	87
Alt. B	97	94	97	93	97	93
Alt. C	87	84	87	84	87	84
Alt. D	86	83	86	84	86	83
Alt. E	87	84	87	84	87	84
Alt. F	75	72	75	72	75	72
Alt. G – 382 MMBF arrearage volume – Riparian not included						83
HCP amendment– 382 MMBF arrearage volume – Riparian not included						90

Common School and Indemnity

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

Marbled murrelet strategy	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	1,560	1,494	1,535	1,453	1,516	1,444	1,193
Alt. B	1,664	1,588	1,657	1,580	1,635	1,567	
Alt. C	1,536	1,476	1,519	1,451	1,505	1,440	
Alt. D	1,546	1,468	1,520	1,459	1,515	1,446	
Alt. E	1,529	1,461	1,510	1,439	1,497	1,429	
Alt. F	1,255	1,188	1,233	1,168	1,186	1,119	
Alt. G – 382 MMBF arrearage volume – Riparian not included						1,318	
HCP amendment– 382 MMBF arrearage volume – Riparian not included						1,448	

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

Marbled murrelet strategy	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	1,290	1,253	1,290	1,252	1,290	1,253
Alt. B	1,335	1,297	1,335	1,297	1,335	1,297
Alt. C	1,274	1,238	1,273	1,238	1,274	1,238
Alt. D	1,266	1,231	1,266	1,230	1,267	1,231
Alt. E	1,266	1,231	1,266	1,230	1,267	1,230
Alt. F	1,039	1,007	1,040	1,008	1,040	1,008
Alt. G – 382 MMBF arrearage volume – Riparian not included						1,169
HCP amendment– 382 MMBF arrearage volume – Riparian not included						1,240

Community College Forest Reserve

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

Marbled murrelet strategy	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	12	12	12	12	11	12	13
Alt. B	11	12	11	12	11	11	
Alt. C	12	12	11	12	11	12	
Alt. D	12	12	11	12	11	12	
Alt. E	12	12	11	11	11	12	
Alt. F	5	11	5	11	8	11	
Alt. G – 382 MMBF arrearage volume – Riparian not included						11	
HCP amendment– 382 MMBF arrearage volume – Riparian not included						11	

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

Marbled murrelet strategy	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	14	14	14	14	14	14
Alt. C	14	14	14	14	14	14
Alt. D	14	14	14	14	14	14
Alt. E	14	14	14	14	14	14
Alt. F	14	13	14	13	14	13
Alt. G – 382 MMBF arrearage volume – Riparian not included						14
HCP amendment– 382 MMBF arrearage volume – Riparian not included						14

Normal School

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

Marbled murrelet strategy	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	84	90	87	86	85	80
Alt. B	96	89	96	92	92	91	
Alt. C	87	78	86	83	85	78	
Alt. D	89	88	91	82	86	87	
Alt. E	85	84	83	79	81	83	
Alt. F	80	79	82	76	79	79	
Alt. G – 382 MMBF arrearage volume – Riparian not included						84	
HCP amendment– 382 MMBF arrearage volume – Riparian not included						86	

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

Marbled murrelet strategy	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	86	83	86	83	86	83
Alt. B	89	86	89	86	89	86
Alt. C	81	79	81	79	81	79
Alt. D	82	80	83	80	82	80
Alt. E	81	78	81	79	81	79
Alt. F	73	70	73	70	73	70
Alt. G – 382 MMBF arrearage volume – Riparian not included						77
HCP amendment– 382 MMBF arrearage volume – Riparian not included						80

Scientific School

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

Marbled murrelet strategy	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	265	250	253	241	252	236	257
Alt. B	266	259	268	257	268	255	
Alt. C	260	250	260	243	256	246	
Alt. D	262	254	261	245	257	244	
Alt. E	269	253	260	244	255	242	
Alt. F	199	183	193	184	195	184	
Alt. G – 382 MMBF arrearage volume – Riparian not included						200	
HCP amendment– 382 MMBF arrearage volume – Riparian not included						243	

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

Marbled murrelet strategy	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	169	162	169	162	169	162
Alt. B	174	167	174	167	174	167
Alt. C	168	162	168	162	168	162
Alt. D	168	162	168	162	168	162
Alt. E	168	162	168	162	168	162
Alt. F	137	131	137	132	137	132
Alt. G – 382 MMBF arrearage volume – Riparian not included						150
HCP amendment– 382 MMBF arrearage volume – Riparian not included						164

State Forest Purchase

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

Marbled murrelet strategy	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	426	389	407	373	378	354	318
Alt. B	423	411	417	406	393	381	
Alt. C	403	385	388	377	379	367	
Alt. D	420	398	414	376	396	361	
Alt. E	402	381	386	365	386	355	
Alt. F	404	382	390	382	398	374	
Alt. G – 382 MMBF arrearage volume – Riparian not included						374	
HCP amendment– 382 MMBF arrearage volume – Riparian not included						397	

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

Marbled murrelet strategy	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	305	294	305	294	304	294
Alt. B	311	301	311	300	310	300
Alt. C	301	291	301	291	301	291
Alt. D	300	290	300	290	300	289
Alt. E	301	291	301	291	301	291
Alt. F	286	276	286	276	286	276
Alt. G – 382 MMBF arrearage volume – Riparian not included						291
HCP amendment– 382 MMBF arrearage volume – Riparian not included						296

State Forest Transfer

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

Marbled murrelet strategy	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	1,776	1,737	1,738	1,686	1,712	1,652	2,070
Alt. B	1,899	1,831	1,847	1,774	1,819	1,736	
Alt. C	1,802	1,749	1,750	1,687	1,714	1,637	
Alt. D	1,799	1,747	1,742	1,700	1,709	1,654	
Alt. E	1,793	1,741	1,742	1,694	1,696	1,638	
Alt. F	1,613	1,591	1,591	1,557	1,532	1,497	
Alt. G – 382 MMBF arrearage volume – Riparian not included						1,695	
HCP amendment– 382 MMBF arrearage volume – Riparian not included						1,755	

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

Marbled murrelet strategy	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	1,393	1,362	1,393	1,363	1,393	1,363
Alt. B	1,453	1,421	1,453	1,421	1,452	1,420
Alt. C	1,393	1,363	1,393	1,362	1,393	1,362
Alt. D	1,397	1,367	1,398	1,367	1,397	1,367
Alt. E	1,387	1,357	1,388	1,357	1,387	1,357
Alt. F	1,246	1,218	1,246	1,218	1,245	1,217
Alt. G – 382 MMBF arrearage volume – Riparian not included						1,334
HCP amendment– 382 MMBF arrearage volume – Riparian not included						1,381

University Grant (original and transferred)

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

Marbled murrelet strategy	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	127	127	122	126	125	69
Alt. B	140	134	138	137	135	134	
Alt. C	117	116	116	113	116	113	
Alt. D	107	103	107	103	106	102	
Alt. E	102	104	102	100	102	100	
Alt. F	59	59	57	55	56	53	
Alt. G – 382 MMBF arrearage volume – Riparian not included						98	
HCP amendment– 382 MMBF arrearage volume – Riparian not included						111	

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

Marbled murrelet strategy	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	90	88	90	88	90	88
Alt. B	97	94	97	94	96	94
Alt. C	80	78	80	78	80	78
Alt. D	74	72	74	72	73	72
Alt. E	75	72	74	73	74	72
Alt. F	51	50	51	50	52	50
Alt. G – 382 MMBF arrearage volume – Riparian not included						71
HCP amendment– 382 MMBF arrearage volume – Riparian not included						79

Water Pollution Control Division

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

Marbled murrelet strategy	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	7	11	8
Alt. B	7	11	7	11	7	11	
Alt. C	11	11	7	11	7	11	
Alt. D	11	11	7	11	7	11	
Alt. E	11	11	8	8	7	10	
Alt. F	7	7	7	7	7	7	
Alt. G – 382 MMBF arrearage volume – Riparian not included						7	
HCP amendment– 382 MMBF arrearage volume – Riparian not included						7	

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

Marbled murrelet strategy	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	20	20	20	20	20	20
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	20	20	20	20	20
Alt. G – 382 MMBF arrearage volume – Riparian not included						20
HCP amendment– 382 MMBF arrearage volume – Riparian not included						20

Other¹⁹

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

Marbled murrelet strategy	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	
HCP amendment– 382 MMBF arrearage volume – Riparian not included						0	

¹⁹ Includes transacted lands where DNR holds timber rights.

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

Marbled murrelet strategy	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
HCP amendment– 382 MMBF arrearage volume – Riparian not included						0

State Forest Transfer Lands by County

Clallam County

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

Marbled murrelet strategy	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	333	333	297	293	282	279	278
Alt. B	392	387	352	346	337	332	
Alt. C	369	364	323	318	311	306	
Alt. D	363	360	322	318	309	305	
Alt. E	358	353	315	314	301	296	
Alt. F	364	359	346	346	333	326	
Alt. G – 382 MMBF arrearage volume – Riparian not included						340	
HCP amendment– 382 MMBF arrearage volume – Riparian not included						350	

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

Marbled murrelet strategy	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	181	180	181	181	182	181
Alt. B	212	210	212	210	212	210
Alt. C	195	194	196	195	196	195
Alt. D	196	195	197	195	196	195
Alt. E	191	190	191	190	191	190
Alt. F	190	189	190	189	190	189
Alt. G – 382 MMBF arrearage volume – Riparian not included						183
HCP amendment– 382 MMBF arrearage volume – Riparian not included						192

Clark County

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

Marbled murrelet strategy	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	54	48	54	48	54	48	214
Alt. B	54	48	54	48	54	48	
Alt. C	54	48	54	48	54	48	
Alt. D	54	48	54	48	54	48	
Alt. E	54	48	54	48	54	48	
Alt. F	47	48	48	48	49	48	
Alt. G – 382 MMBF arrearage volume – Riparian not included						48	
HCP amendment– 382 MMBF arrearage volume – Riparian not included						48	

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

Marbled murrelet strategy	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	60	59	60	59	60	59
Alt. B	60	59	60	59	60	59
Alt. C	60	59	60	59	60	59
Alt. D	60	59	60	59	60	59
Alt. E	60	59	60	59	60	59
Alt. F	60	58	60	58	60	58
Alt. G – 382 MMBF arrearage volume – Riparian not included						59
HCP amendment– 382 MMBF arrearage volume – Riparian not included						59

Cowlitz County

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

Marbled murrelet strategy	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	25	23	25	23	25	23	66
Alt. B	25	23	25	23	25	23	
Alt. C	25	23	25	23	25	23	
Alt. D	25	23	25	23	25	23	
Alt. E	25	23	25	23	25	23	
Alt. F	23	23	23	23	23	23	
Alt. G – 382 MMBF arrearage volume – Riparian not included						23	
HCP amendment– 382 MMBF arrearage volume – Riparian not included						23	

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

Marbled murrelet strategy	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	27	26	27	26	27	26
Alt. B	27	26	27	26	27	26
Alt. C	27	26	27	26	27	26
Alt. D	27	26	27	26	27	26
Alt. E	27	26	27	26	27	26
Alt. F	27	26	27	26	27	26
Alt. G – 382 MMBF arrearage volume – Riparian not included						26
HCP amendment– 382 MMBF arrearage volume – Riparian not included						26

Grays Harbor County

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

Marbled murrelet strategy	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	8	7	8	7	8	7	13
Alt. B	10	9	10	9	9	9	
Alt. C	9	9	9	9	10	9	
Alt. D	10	9	9	9	10	9	
Alt. E	10	9	10	9	10	9	
Alt. F	7	7	7	7	7	7	
Alt. G – 382 MMBF arrearage volume – Riparian not included						9	
HCP amendment– 382 MMBF arrearage volume – Riparian not included						9	

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

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

Jefferson County

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

Marbled murrelet strategy	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	66	62	66	62	66	62	62
Alt. B	70	65	70	65	70	65	
Alt. C	70	65	70	65	70	65	
Alt. D	70	65	70	65	70	65	
Alt. E	70	65	70	65	70	65	
Alt. F	69	65	69	65	70	65	
Alt. G – 382 MMBF arrearage volume – Riparian not included						65	
HCP amendment– 382 MMBF arrearage volume – Riparian not included						65	

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

Marbled murrelet strategy	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	40	39	40	39	40	39
Alt. B	42	40	42	40	42	40
Alt. C	42	40	42	40	42	40
Alt. D	42	40	42	40	42	40
Alt. E	42	40	42	40	42	40
Alt. F	42	40	42	40	42	40
Alt. G – 382 MMBF arrearage volume – Riparian not included						40
HCP amendment– 382 MMBF arrearage volume – Riparian not included						40

King County

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

Marbled murrelet strategy	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	81	80	81	80	76	76	56
Alt. B	81	80	81	80	76	77	
Alt. C	80	80	80	80	76	76	
Alt. D	81	80	81	80	76	77	
Alt. E	80	80	80	80	76	76	
Alt. F	66	68	63	65	58	59	
Alt. G – 382 MMBF arrearage volume – Riparian not included						80	
HCP amendment– 382 MMBF arrearage volume – Riparian not included						80	

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

Marbled murrelet strategy	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	59	59	59	59	59	59
Alt. B	59	59	59	59	59	59
Alt. C	59	58	59	58	59	58
Alt. D	59	59	59	59	59	59
Alt. E	59	58	59	58	59	58
Alt. F	46	46	46	46	46	46
Alt. G – 382 MMBF arrearage volume – Riparian not included						58
HCP amendment– 382 MMBF arrearage volume – Riparian not included						59

Kitsap County

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

Marbled murrelet strategy	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	12	13	12	13	12	19
Alt. B	13	12	13	12	13	12	
Alt. C	13	12	13	12	13	12	
Alt. D	13	12	13	12	13	12	
Alt. E	13	12	13	12	13	12	
Alt. F	12	12	12	12	12	12	
Alt. G – 382 MMBF arrearage volume – Riparian not included						12	
HCP amendment– 382 MMBF arrearage volume – Riparian not included						12	

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

Marbled murrelet strategy	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	16	16	16	16	16
Alt. C	16	16	16	16	16	16
Alt. D	16	16	16	16	16	16
Alt. E	16	16	16	16	16	16
Alt. F	16	16	16	16	16	16
Alt. G – 382 MMBF arrearage volume – Riparian not included						16
HCP amendment– 382 MMBF arrearage volume – Riparian not included						16

Lewis County

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

Marbled murrelet strategy	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	202	191	202	191	202	191	218
Alt. B	203	192	203	192	203	192	
Alt. C	202	191	202	190	202	190	
Alt. D	204	192	204	192	204	192	
Alt. E	202	191	202	190	202	190	
Alt. F	165	154	165	154	165	154	
Alt. G – 382 MMBF arrearage volume – Riparian not included						190	
HCP amendment– 382 MMBF arrearage volume – Riparian not included						191	

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

Marbled murrelet strategy	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	162	157	162	157	162	157
Alt. B	162	158	162	157	162	157
Alt. C	162	157	162	157	162	157
Alt. D	163	158	163	158	163	158
Alt. E	162	157	162	157	162	157
Alt. F	132	127	132	127	132	127
Alt. G – 382 MMBF arrearage volume – Riparian not included						156
HCP amendment– 382 MMBF arrearage volume – Riparian not included						157

Mason County

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

Marbled murrelet strategy	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	97	95	97	95	97	95	99
Alt. B	98	95	98	95	98	95	
Alt. C	97	95	97	95	97	95	
Alt. D	97	95	97	95	97	95	
Alt. E	97	95	97	95	97	95	
Alt. F	97	95	97	95	97	95	
Alt. G – 382 MMBF arrearage volume – Riparian not included						95	
HCP amendment– 382 MMBF arrearage volume – Riparian not included						95	

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

Marbled murrelet strategy	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	79	78	79	78	79	78
Alt. B	80	79	80	79	80	79
Alt. C	79	78	79	78	79	78
Alt. D	80	78	80	78	80	78
Alt. E	79	78	79	78	79	78
Alt. F	79	78	79	78	79	78
Alt. G – 382 MMBF arrearage volume – Riparian not included						78
HCP amendment– 382 MMBF arrearage volume – Riparian not included						78

Pacific County

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

Marbled murrelet strategy	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	46	40	46	39	45	38	58
Alt. B	59	52	59	52	57	50	
Alt. C	46	40	46	40	44	38	
Alt. D	44	39	44	38	43	37	
Alt. E	46	40	46	40	44	38	
Alt. F	41	35	40	35	39	33	
Alt. G – 382 MMBF arrearage volume – Riparian not included						39	
HCP amendment– 382 MMBF arrearage volume – Riparian not included						41	

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

Marbled murrelet strategy	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	40	37	40	37	40	37
Alt. B	47	44	47	44	47	44
Alt. C	39	36	39	36	39	36
Alt. D	38	35	38	35	38	35
Alt. E	39	36	39	36	39	36
Alt. F	35	33	35	33	35	33
Alt. G – 382 MMBF arrearage volume – Riparian not included						35
HCP amendment– 382 MMBF arrearage volume – Riparian not included						37

Pierce County

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

Marbled murrelet strategy	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	29	29	29	29	29	29	15
Alt. B	29	29	29	29	29	29	
Alt. C	29	29	29	29	29	29	
Alt. D	29	29	29	29	29	29	
Alt. E	29	29	29	29	29	29	
Alt. F	9	9	9	9	9	9	
Alt. G – 382 MMBF arrearage volume – Riparian not included						29	
HCP amendment– 382 MMBF arrearage volume – Riparian not included						29	

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

Marbled murrelet strategy	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	34	34	34	34	34	34
Alt. B	34	33	34	33	34	34
Alt. C	34	33	34	33	34	34
Alt. D	34	34	34	33	34	34
Alt. E	34	33	34	33	34	34
Alt. F	12	12	12	12	12	12
Alt. G – 382 MMBF arrearage volume – Riparian not included						34
HCP amendment– 382 MMBF arrearage volume – Riparian not included						33

Skagit County

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

Marbled murrelet strategy	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	263	264	264	265	264	265	328
Alt. B	264	267	265	267	265	267	
Alt. C	249	257	250	257	250	257	
Alt. D	259	263	261	263	260	263	
Alt. E	250	256	250	257	250	257	
Alt. F	219	222	220	222	227	223	
Alt. G – 382 MMBF arrearage volume – Riparian not included						252	
HCP amendment– 382 MMBF arrearage volume – Riparian not included						259	

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

Marbled murrelet strategy	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	247	241	247	241	247	241
Alt. B	248	242	248	242	248	242
Alt. C	243	237	243	237	243	237
Alt. D	245	239	245	239	245	239
Alt. E	243	237	243	237	243	237
Alt. F	205	200	205	200	205	200
Alt. G – 382 MMBF arrearage volume – Riparian not included						235
HCP amendment– 382 MMBF arrearage volume – Riparian not included						240

Skamania County

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

Marbled murrelet strategy	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	107	101	103	97	102	89	54
Alt. B	107	101	103	97	102	89	
Alt. C	107	101	103	97	102	89	
Alt. D	107	101	103	97	103	89	
Alt. E	107	101	103	97	103	89	
Alt. F	107	101	102	97	93	89	
Alt. G – 382 MMBF arrearage volume – Riparian not included						101	
HCP amendment– 382 MMBF arrearage volume – Riparian not included						101	

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

Marbled murrelet strategy	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	78	77	78	77	78	77
Alt. B	78	77	78	77	78	77
Alt. C	78	77	78	77	78	77
Alt. D	78	77	78	77	78	77
Alt. E	78	77	78	77	78	77
Alt. F	78	77	78	77	78	77
Alt. G – 382 MMBF arrearage volume – Riparian not included						77
HCP amendment– 382 MMBF arrearage volume – Riparian not included						77

Snohomish County

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

Marbled murrelet strategy	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	211	207	211	206	211	206	325
Alt. B	212	207	212	206	212	205	
Alt. C	204	199	204	198	204	198	
Alt. D	205	200	205	199	205	198	
Alt. E	204	198	204	198	204	197	
Alt. F	211	207	211	206	211	206	
Alt. G – 382 MMBF arrearage volume – Riparian not included						191	
HCP amendment– 382 MMBF arrearage volume – Riparian not included						203	

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

Marbled murrelet strategy	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	181	177	181	177	181	177
Alt. B	182	177	182	177	182	177
Alt. C	176	171	176	171	176	171
Alt. D	176	171	176	171	176	171
Alt. E	176	171	176	171	176	171
Alt. F	163	158	163	158	163	158
Alt. G – 382 MMBF arrearage volume – Riparian not included						165
HCP amendment– 382 MMBF arrearage volume – Riparian not included						174

Thurston County

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

Marbled murrelet strategy	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	128	131	128	136	128	99
Alt. B	133	116	131	112	138	116	
Alt. C	142	131	141	122	132	110	
Alt. D	123	116	115	122	115	116	
Alt. E	142	134	142	133	125	121	
Alt. F	133	130	135	121	105	106	
Alt. G – 382 MMBF arrearage volume – Riparian not included						134	
HCP amendment– 382 MMBF arrearage volume – Riparian not included						124	

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

Marbled murrelet strategy	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	85	83	85	83	85	83
Alt. B	87	84	87	84	87	84
Alt. C	87	85	87	84	87	84
Alt. D	86	84	86	84	86	84
Alt. E	87	85	87	85	87	84
Alt. F	86	84	87	84	86	83
Alt. G – 382 MMBF arrearage volume – Riparian not included						85
HCP amendment– 382 MMBF arrearage volume – Riparian not included						84

Wahkiakum County

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

Marbled murrelet strategy	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	43	42	40	38	36	37	50
Alt. B	74	70	70	66	63	60	
Alt. C	39	39	39	38	35	33	
Alt. D	42	41	41	38	34	32	
Alt. E	39	39	39	38	35	33	
Alt. F	30	29	30	29	25	23	
Alt. G – 382 MMBF arrearage volume – Riparian not included						31	
HCP amendment– 382 MMBF arrearage volume – Riparian not included						59	

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

Marbled murrelet strategy	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	31	29	31	30	31	30
Alt. B	45	44	45	44	45	43
Alt. C	27	26	27	26	27	26
Alt. D	27	26	27	25	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
HCP amendment– 382 MMBF arrearage volume – Riparian not included						36

Whatcom County

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

Marbled murrelet strategy	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	76	77	74	73	68	68	116
Alt. B	77	78	75	74	69	68	
Alt. C	67	68	65	66	61	60	
Alt. D	73	73	70	71	64	64	
Alt. E	66	67	64	65	60	60	
Alt. F	53	54	51	52	46	46	
Alt. G – 382 MMBF arrearage volume – Riparian not included						58	
HCP amendment– 382 MMBF arrearage volume – Riparian not included						67	

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

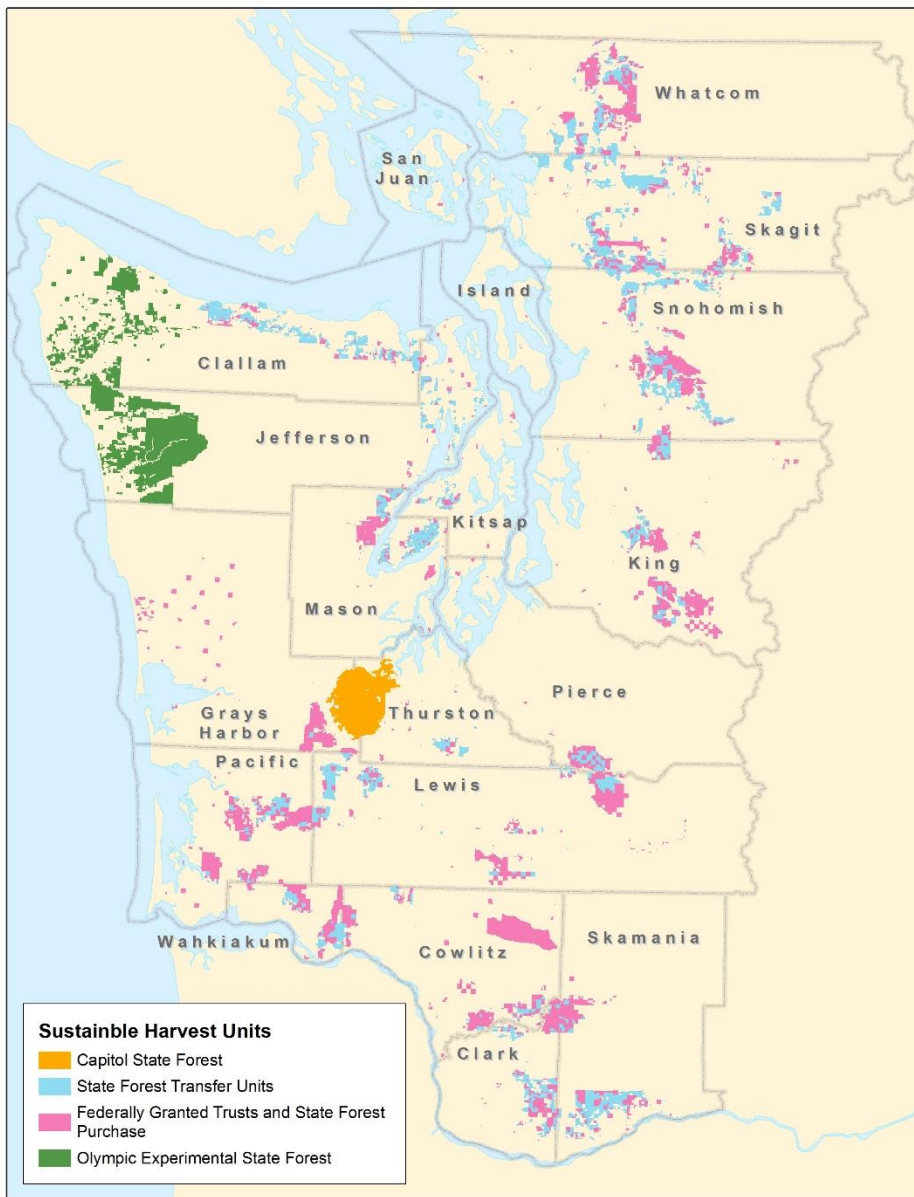
Marbled murrelet strategy	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	64	63	64	63	64	63
Alt. B	64	64	64	64	64	64
Alt. C	59	58	59	58	59	58
Alt. D	61	61	61	61	61	61
Alt. E	58	58	58	58	58	58
Alt. F	46	45	46	45	45	45
Alt. G – 382 MMBF arrearage volume – Riparian not included						56
HCP amendment– 382 MMBF arrearage volume – Riparian not included						62

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 fiscal years 2011 through 2018 data that has been converted into a decadal rate.

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	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	2,052	1,942	2,005	1,871	1,984	1,867	1,853
Alt. B	2,165	2,053	2,166	2,053	2,166	2,053	
Alt. C	1,995	1,891	1,960	1,846	1,955	1,849	
Alt. D	2,003	1,890	1,969	1,859	1,970	1,861	
Alt. E	1,983	1,879	1,949	1,827	1,940	1,829	
Alt. F	1,637	1,536	1,637	1,539	1,645	1,540	
Alt. G – 382 MMBF arrearage volume – Riparian not included						1,662	
HCP amendment– 382 MMBF arrearage volume – Riparian not included						1,876	

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

Marbled murrelet strategy	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	1,705	1,646	1,705	1,646	1,705	1,646
Alt. B	1,760	1,701	1,760	1,700	1,760	1,700
Alt. C	1,663	1,607	1,663	1,607	1,663	1,607
Alt. D	1,654	1,598	1,654	1,599	1,653	1,598
Alt. E	1,656	1,600	1,656	1,600	1,656	1,600
Alt. F	1,371	1,321	1,371	1,321	1,370	1,321
Alt. G – 382 MMBF arrearage volume – Riparian not included						1,529
HCP amendment– 382 MMBF arrearage volume – Riparian not included						1,633

OESF

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

Marbled murrelet strategy	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	790	791	755	754	733	734	394
Alt. B	835	834	792	793	764	768	
Alt. C	776	775	731	733	714	716	
Alt. D	773	773	731	730	713	713	
Alt. E	764	764	717	720	702	704	
Alt. F	617	619	569	579	505	508	
Alt. G – 382 MMBF arrearage volume – Riparian not included						696	
HCP amendment– 382 MMBF arrearage volume – Riparian not included						739	

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

Marbled murrelet strategy	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	405	405	405	405	406	405
Alt. B	429	429	430	430	430	430
Alt. C	394	393	394	394	395	394
Alt. D	392	392	393	392	393	393
Alt. E	386	386	387	387	388	387
Alt. F	287	287	288	288	289	289
Alt. G – 382 MMBF arrearage volume – Riparian not included						358
HCP amendment– 382 MMBF arrearage volume – Riparian not included						385

Capitol State Forest

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

Marbled murrelet strategy	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	554	517	542	506	520	485	409
Alt. B	567	530	555	519	532	497	
Alt. C	567	530	555	519	532	497	
Alt. D	567	530	555	519	532	497	
Alt. E	567	530	555	519	532	497	
Alt. F	565	530	553	519	530	496	
Alt. G – 382 MMBF arrearage volume – Riparian not included						529	
HCP amendment– 382 MMBF arrearage volume – Riparian not included						529	

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

Marbled murrelet strategy	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	422	408	422	408	421	407
Alt. B	430	416	430	415	429	415
Alt. C	430	416	430	415	429	415
Alt. D	430	416	430	415	429	415
Alt. E	430	416	430	415	429	415
Alt. F	430	416	429	415	428	415
Alt. G – 382 MMBF arrearage volume – Riparian not included						415
HCP amendment– 382 MMBF arrearage volume – Riparian not included						415

Clallam

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

Marbled murrelet strategy	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	190	186	185	181	176	171	154
Alt. B	242	236	237	231	226	221	
Alt. C	222	217	217	211	207	202	
Alt. D	212	208	207	203	198	193	
Alt. E	211	206	206	201	197	192	
Alt. F	228	224	223	218	214	209	
Alt. G – 382 MMBF arrearage volume – Riparian not included						205	
HCP amendment– 382 MMBF arrearage volume – Riparian not included						210	

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

Marbled murrelet strategy	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	107	106	107	106	107	106
Alt. B	135	133	135	133	134	133
Alt. C	124	123	124	123	124	122
Alt. D	120	119	120	118	120	118
Alt. E	119	118	119	118	119	118
Alt. F	128	126	127	126	127	126
Alt. G – 382 MMBF arrearage volume – Riparian not included						118
HCP amendment– 382 MMBF arrearage volume – Riparian not included						120

Clark

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

Marbled murrelet strategy	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	54	48	54	48	54	48	214
Alt. B	54	48	54	48	54	48	
Alt. C	54	48	54	48	54	48	
Alt. D	54	48	54	48	54	48	
Alt. E	54	48	54	48	54	48	
Alt. F	47	48	48	48	49	48	
Alt. G – 382 MMBF arrearage volume – Riparian not included						48	
HCP amendment– 382 MMBF arrearage volume – Riparian not included						48	

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

Marbled murrelet strategy	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	60	59	60	59	60	59
Alt. B	60	59	60	59	60	59
Alt. C	60	59	60	59	60	59
Alt. D	60	59	60	59	60	59
Alt. E	60	59	60	59	60	59
Alt. F	60	58	60	58	60	58
Alt. G – 382 MMBF arrearage volume – Riparian not included						59
HCP amendment– 382 MMBF arrearage volume – Riparian not included						59

Cowlitz

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

Marbled murrelet strategy	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	25	23	25	23	25	23	66
Alt. B	25	23	25	23	25	23	
Alt. C	25	23	25	23	25	23	
Alt. D	25	23	25	23	25	23	
Alt. E	25	23	25	23	25	23	
Alt. F	23	23	23	23	23	23	
Alt. G – 382 MMBF arrearage volume – Riparian not included						23	
HCP amendment– 382 MMBF arrearage volume – Riparian not included						23	

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

Marbled murrelet strategy	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	27	26	27	26	27	26
Alt. B	27	26	27	26	27	26
Alt. C	27	26	27	26	27	26
Alt. D	27	26	27	26	27	26
Alt. E	27	26	27	26	27	26
Alt. F	27	26	27	26	27	26
Alt. G – 382 MMBF arrearage volume – Riparian not included						26
HCP amendment– 382 MMBF arrearage volume – Riparian not included						26

Grays Harbor

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

Marbled murrelet strategy	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	4	4	4	4	4	4	3
Alt. B	5	5	5	5	5	5	
Alt. C	5	5	5	5	5	5	
Alt. D	5	5	5	5	5	5	
Alt. E	5	5	5	5	5	5	
Alt. F	3	3	3	3	3	3	
Alt. G – 382 MMBF arrearage volume – Riparian not included						5	
HCP amendment– 382 MMBF arrearage volume – Riparian not included						5	

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

Marbled murrelet strategy	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	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	2	2	2	2	2	2
Alt. G – 382 MMBF arrearage volume – Riparian not included						4
HCP amendment– 382 MMBF arrearage volume – Riparian not included						4

Jefferson

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

Marbled murrelet strategy	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	66	62	66	62	66	62	62
Alt. B	70	65	70	65	70	65	
Alt. C	70	65	70	65	70	65	
Alt. D	70	65	70	65	70	65	
Alt. E	70	65	70	65	70	65	
Alt. F	69	65	69	65	70	65	
Alt. G – 382 MMBF arrearage volume – Riparian not included						65	
HCP amendment– 382 MMBF arrearage volume – Riparian not included						65	

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

Marbled murrelet strategy	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	40	39	40	39	40	39
Alt. B	42	40	42	40	42	40
Alt. C	42	40	42	40	42	40
Alt. D	42	40	42	40	42	40
Alt. E	42	40	42	40	42	40
Alt. F	42	40	42	40	42	40
Alt. G – 382 MMBF arrearage volume – Riparian not included						40
HCP amendment– 382 MMBF arrearage volume – Riparian not included						40

King

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

Marbled murrelet strategy	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	81	80	81	80	76	76	56
Alt. B	81	80	81	80	76	77	
Alt. C	80	80	80	80	76	76	
Alt. D	81	80	81	80	76	77	
Alt. E	80	80	80	80	76	76	
Alt. F	66	68	63	65	58	59	
Alt. G – 382 MMBF arrearage volume – Riparian not included						80	
HCP amendment– 382 MMBF arrearage volume – Riparian not included						80	

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

Marbled murrelet strategy	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	59	59	59	59	59	59
Alt. B	59	59	59	59	59	59
Alt. C	59	58	59	58	59	58
Alt. D	59	59	59	59	59	59
Alt. E	59	58	59	58	59	58
Alt. F	46	46	46	46	46	46
Alt. G – 382 MMBF arrearage volume – Riparian not included						58
HCP amendment– 382 MMBF arrearage volume – Riparian not included						59

Kitsap

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

Marbled murrelet strategy	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	12	13	12	13	12	19
Alt. B	13	12	13	12	13	12	
Alt. C	13	12	13	12	13	12	
Alt. D	13	12	13	12	13	12	
Alt. E	13	12	13	12	13	12	
Alt. F	12	12	12	12	12	12	
Alt. G – 382 MMBF arrearage volume – Riparian not included						12	
HCP amendment– 382 MMBF arrearage volume – Riparian not included						12	

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

Marbled murrelet strategy	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	16	16	16	16	16
Alt. C	16	16	16	16	16	16
Alt. D	16	16	16	16	16	16
Alt. E	16	16	16	16	16	16
Alt. F	16	16	16	16	16	16
Alt. G – 382 MMBF arrearage volume – Riparian not included						16
HCP amendment– 382 MMBF arrearage volume – Riparian not included						16

Lewis

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

Marbled murrelet strategy	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	202	191	202	191	202	191	218
Alt. B	203	192	203	192	203	192	
Alt. C	202	191	202	190	202	190	
Alt. D	204	192	204	192	204	192	
Alt. E	202	191	202	190	202	190	
Alt. F	165	154	165	154	165	154	
Alt. G – 382 MMBF arrearage volume – Riparian not included						190	
HCP amendment– 382 MMBF arrearage volume – Riparian not included						191	

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

Marbled murrelet strategy	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	162	157	162	157	162	157
Alt. B	162	158	162	157	162	157
Alt. C	162	157	162	157	162	157
Alt. D	163	158	163	158	163	158
Alt. E	162	157	162	157	162	157
Alt. F	132	127	132	127	132	127
Alt. G – 382 MMBF arrearage volume – Riparian not included						156
HCP amendment– 382 MMBF arrearage volume – Riparian not included						157

Mason

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

Marbled murrelet strategy	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	97	95	97	95	97	95	99
Alt. B	98	95	98	95	98	95	
Alt. C	97	95	97	95	97	95	
Alt. D	97	95	97	95	97	95	
Alt. E	97	95	97	95	97	95	
Alt. F	97	95	97	95	97	95	
Alt. G – 382 MMBF arrearage volume – Riparian not included						95	
HCP amendment– 382 MMBF arrearage volume – Riparian not included						95	

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

Marbled murrelet strategy	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	79	78	79	78	79	78
Alt. B	80	79	80	79	80	79
Alt. C	79	78	79	78	79	78
Alt. D	80	78	80	78	80	78
Alt. E	79	78	79	78	79	78
Alt. F	79	78	79	78	79	78
Alt. G – 382 MMBF arrearage volume – Riparian not included						78
HCP amendment– 382 MMBF arrearage volume – Riparian not included						78

Pacific

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

Marbled murrelet strategy	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	46	40	46	39	45	38	58
Alt. B	59	52	59	52	57	50	
Alt. C	46	40	46	40	44	38	
Alt. D	44	39	44	38	43	37	
Alt. E	46	40	46	40	44	38	
Alt. F	41	35	40	35	39	33	
Alt. G – 382 MMBF arrearage volume – Riparian not included						39	
HCP amendment– 382 MMBF arrearage volume – Riparian not included						41	

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

Marbled murrelet strategy	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	40	37	40	37	40	37
Alt. B	47	44	47	44	47	44
Alt. C	39	36	39	36	39	36
Alt. D	38	35	38	35	38	35
Alt. E	39	36	39	36	39	36
Alt. F	35	33	35	33	35	33
Alt. G – 382 MMBF arrearage volume – Riparian not included						35
HCP amendment– 382 MMBF arrearage volume – Riparian not included						37

Pierce

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

Marbled murrelet strategy	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	29	29	29	29	29	29	15
Alt. B	29	29	29	29	29	29	
Alt. C	29	29	29	29	29	29	
Alt. D	29	29	29	29	29	29	
Alt. E	29	29	29	29	29	29	
Alt. F	9	9	9	9	9	9	
Alt. G – 382 MMBF arrearage volume – Riparian not included							
HCP amendment– 382 MMBF arrearage volume – Riparian not included							29

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

Marbled murrelet strategy	Arrearage harvest						
	702 MMBF		462 MMBF		No specific level		
	Riparian thinning						
	10%	1%	10%	1%	10%	1%	
Alt. A	34	34	34	34	34	34	
Alt. B	34	33	34	33	34	34	
Alt. C	34	33	34	33	34	34	
Alt. D	34	34	34	33	34	34	
Alt. E	34	33	34	33	34	34	
Alt. F	12	12	12	12	12	12	
Alt. G – 382 MMBF arrearage volume – Riparian not included							34
HCP amendment– 382 MMBF arrearage volume – Riparian not included							33

Skagit

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

Marbled murrelet strategy	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	263	264	264	265	264	265	328
Alt. B	264	267	265	267	265	267	
Alt. C	249	257	250	257	250	257	
Alt. D	259	263	261	263	260	263	
Alt. E	250	256	250	257	250	257	
Alt. F	219	222	220	222	227	223	
Alt. G – 382 MMBF arrearage volume – Riparian not included						252	
HCP amendment– 382 MMBF arrearage volume – Riparian not included						259	

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

Marbled murrelet strategy	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	247	241	247	241	247	241
Alt. B	248	242	248	242	248	242
Alt. C	243	237	243	237	243	237
Alt. D	245	239	245	239	245	239
Alt. E	243	237	243	237	243	237
Alt. F	205	200	205	200	205	200
Alt. G – 382 MMBF arrearage volume – Riparian not included						235
HCP amendment– 382 MMBF arrearage volume – Riparian not included						240

Skamania

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

Marbled murrelet strategy	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	107	101	103	97	102	89	54
Alt. B	107	101	103	97	102	89	
Alt. C	107	101	103	97	102	89	
Alt. D	107	101	103	97	103	89	
Alt. E	107	101	103	97	103	89	
Alt. F	107	101	102	97	93	89	
Alt. G – 382 MMBF arrearage volume – Riparian not included						101	
HCP amendment– 382 MMBF arrearage volume – Riparian not included						101	

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

Marbled murrelet strategy	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	78	77	78	77	78	77
Alt. B	78	77	78	77	78	77
Alt. C	78	77	78	77	78	77
Alt. D	78	77	78	77	78	77
Alt. E	78	77	78	77	78	77
Alt. F	78	77	78	77	78	77
Alt. G – 382 MMBF arrearage volume – Riparian not included						77
HCP amendment– 382 MMBF arrearage volume – Riparian not included						77

Snohomish

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

Marbled murrelet strategy	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	211	207	211	206	211	206	325
Alt. B	212	207	212	206	212	205	
Alt. C	204	199	204	198	204	198	
Alt. D	205	200	205	199	205	198	
Alt. E	204	198	204	198	204	197	
Alt. F	172	179	172	179	173	179	
Alt. G – 382 MMBF arrearage volume – Riparian not included							
HCP amendment– 382 MMBF arrearage volume – Riparian not included							203

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

Marbled murrelet strategy	Arrearage harvest						
	702 MMBF		462 MMBF		No specific level		
	Riparian thinning						
	10%	1%	10%	1%	10%	1%	
Alt. A	181	177	181	177	181	177	
Alt. B	182	177	182	177	182	177	
Alt. C	176	171	176	171	176	171	
Alt. D	176	171	176	171	176	171	
Alt. E	176	171	176	171	176	171	
Alt. F	163	158	163	158	163	158	
Alt. G – 382 MMBF arrearage volume – Riparian not included							165
HCP amendment– 382 MMBF arrearage volume – Riparian not included							174

Thurston

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

Marbled murrelet strategy	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	25	23	25	23	25	23	53
Alt. B	25	23	25	23	25	23	
Alt. C	25	23	25	23	25	23	
Alt. D	25	23	25	23	25	23	
Alt. E	25	23	25	23	25	23	
Alt. F	24	23	24	23	24	23	
Alt. G – 382 MMBF arrearage volume – Riparian not included						23	
HCP amendment– 382 MMBF arrearage volume – Riparian not included						23	

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

Marbled murrelet strategy	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	22	21	22	21	22	21
Alt. B	22	21	22	21	22	21
Alt. C	22	21	22	21	22	21
Alt. D	22	21	22	21	22	21
Alt. E	22	21	22	21	22	21
Alt. F	22	21	22	21	22	21
Alt. G – 382 MMBF arrearage volume – Riparian not included						21
HCP amendment– 382 MMBF arrearage volume – Riparian not included						21

Wahkiakum

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

Marbled murrelet strategy	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	43	42	40	38	36	37	50
Alt. B	74	70	70	66	63	60	
Alt. C	39	39	39	38	35	33	
Alt. D	42	41	41	38	34	32	
Alt. E	39	39	39	38	35	33	
Alt. F	30	29	30	29	25	23	
Alt. G – 382 MMBF arrearage volume – Riparian not included						31	
HCP amendment– 382 MMBF arrearage volume – Riparian not included						59	

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

Marbled murrelet strategy	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	31	29	31	30	31	30
Alt. B	45	44	45	44	45	43
Alt. C	27	26	27	26	27	26
Alt. D	27	26	27	25	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
HCP amendment– 382 MMBF arrearage volume – Riparian not included						36

Whatcom

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

Marbled murrelet strategy	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	76	77	74	73	68	68	116
Alt. B	77	78	75	74	69	68	
Alt. C	67	68	65	66	61	60	
Alt. D	73	73	70	71	64	64	
Alt. E	66	67	64	65	60	60	
Alt. F	53	54	51	52	46	46	
Alt. G – 382 MMBF arrearage volume – Riparian not included						58	
HCP amendment– 382 MMBF arrearage volume – Riparian not included						67	

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

Marbled murrelet strategy	Arrearage harvest					
	702 MMBF		462 MMBF		No specific level	
	Riparian thinning					
	10%	1%	10%	1%	10%	1%
Alt. A	64	63	64	63	64	63
Alt. B	64	64	64	64	64	64
Alt. C	59	58	59	58	59	58
Alt. D	61	61	61	61	61	61
Alt. E	58	58	58	58	58	58
Alt. F	46	45	46	45	45	45
Alt. G – 382 MMBF arrearage volume – Riparian not included						56
HCP amendment– 382 MMBF arrearage volume – Riparian not included						62