Washington Department of Natural Resources
Sustainable Harvest Calculation for Eastern Washington

Staff Report

To: Sustainable Harvest Calculation (SHC) Steering Committee and Board of Natural Resources

From: SHC Project Team

Prepared by: Glynis Gordon and Justin Schmal, DNR Environmental Planners

Subject: Arrearage Report for the Sustainable Harvest Calculation for Eastern Washington

---

Proposed Action

By Washington state legislative statute (Revised Code of Washington (RCW) 79.10.300 through 340), the Washington Department of Natural Resources (department), with the Board of Natural Resources (Board), must determine if a timber harvest arrearage exists during the recalculation of a sustainable harvest level, and if so, what actions should be taken. In 2019, the Board of Natural Resources approved the End of Decade Analysis: Arrearage policy, Resolution No. 1560. This policy provides a definition of arrearage and the process by which arrearage should be calculated, analyzed, and incorporated into the SHC project. This report seeks to fulfill the requirements of this policy and provide information, analysis, and a staff recommendation to the Board on a course of action for addressing arrearage during the upcoming sustainable harvest calculation in eastern Washington.

Background and History

The content of this staff report is partially adapted from the Arrearage Report to the Board of Natural Resources and Proposed Management Approach for the 2005-2014 westside planning decade, written in 2015 and updated in 2016 (WA DNR 2015).

What is Arrearage in the Context of the SHC?

The DNR must establish a sustainable harvest level for forested state trust lands in eastern Washington. A statutory scheme, RCW 79.10.300 – 79.10.340, directs DNR to calculate the sustainable harvest level on a decadal basis. The sustainable harvest level is a decadal volume target that is adopted by the Board of Natural Resources (Board) and is ultimately used to determine harvest volume deliverables from state trust lands for the upcoming planning decade. Given DNR's current authorizing environment (RCWs, WACs, Policies, and federal laws) and fiduciary responsibilities as a trust land manager, DNR will model harvest volume projections by sustainable harvest unit (SHU) that allow for timber to be harvested on a sustained yield basis while optimizing the economic value of forest stands and timber production over time, as stated in the Policy for Sustainable Forests.

To accomplish this task, DNR will formulate a forest estate model. A forest estate model is a mathematical computer model that is designed to find a solution to the problem of determining decadal volume for each planning decade within each SHU to meet DNR's objectives and obligations. The forest estate model is intended to represent both growing conditions of forests on DNR-managed lands in eastern Washington and the legal and policy considerations of managing these lands. The forest estate model will provide one (of potentially many) solution(s) that optimize economic value by modeling harvest volume maximums, that can theoretically be achieved in perpetuity, within specific geographic areas, across eastern Washington state trust lands.

The DNR has not conducted a sustainable harvest calculation for eastern Washington since 1996, which produced the current eastside sustainable harvest level of 78.6 MMBF adopted by the Board at that time.

Within the statutes that direct DNR to calculate a sustainable harvest level, there are requirements that direct the department to calculate whether a timber harvest arrearage exists from the previous decade and what course of action should be taken to address the arrearage. The Board-adopted 2019 policy *End of Decade Analysis: Arrearage*, adds clarifications for how these arrearage statutes should be interpreted and implemented.

Arrearage is a term typically associated with finance and used in reference to overdue debts, referring to the amount owed after one or more payments are missed. In context of the sustainable harvest calculation, arrearage is defined in practice as the difference between the sustainable harvest level and the amount of volume sold at auction and not defaulted[1], within a planning decade. This may be thought of as the difference between what the department planned to sell at auction and what it actually sold and harvested. This formula has been agreed upon and used by the department for the fulfillment of legal obligations since the creation of the law that defined it.

RCW 79.10.300 provides the definition of arrearage as: "'Arrearage' means the summation of the annual sustainable harvest timber volume since July 1, 1979, less the sum of state timber sales contract default volume and the state timber sales volume deficit since July 1, 1979." This formula as stated in the statute is confusing, and does not accurately describe how DNR has performed this task. Because of this, the traditional definition of arrearage (the difference between the sustainable harvest level and the amount actually sold and not defaulted), has always been used. This was clarified in DNR's 2019 arrearage policy, described in an upcoming section of this document.

RCW 79.10.330 states: "If an arrearage exists at the end of any planning decade, the department shall conduct an analysis of alternatives to determine the course of action regarding the arrearage which provides the greatest return to the trusts based upon economic conditions then existing and forecast, as well as impacts on the environment of harvesting the additional timber. The department shall offer for sale the arrearage in addition to the sustainable harvest level adopted by the board of natural resources

1 The department's timber sales volume data used to calculate arrearage volume in this analysis primarily comes from 'finalized volume' which is the most accurate post-harvest volume available and is DNR's official final volume-of-record (in NaturE). However, given that harvesting does not happen immediately after sale and often can take 2 years, 'awarded volume' is also used when necessary, which represents estimated volume from DNR's timber cruisers. 'Awarded volume' is the most accurate pre-harvest volume estimate that DNR has available but does not reflect post-harvest measurements.

for the next planning decade if the analysis determined doing so will provide the greatest return to the trusts."

These RCWs were adopted into law in 1987 and the first arrearage analysis was completed in 1994 at the end of the 1984 – 1993 planning decade. Since then, the department, through the Board, has taken action on any arrearage at the end of a planning decade.

Legislative History

The arrearage statutes (RCW 79.10.330 – 340) resulted from the economic downturn of the late 1970s and early 1980s. The department's primary focus for the timber harvest program was the harvest of the high-value old-growth forests that existed at that time. Because of the downturn, many of the department's purchasers were unable to meet the terms of their contracts and hence defaulted on their sales. The term "defaults" is used to refer to such circumstances. The legislature then made several policy decisions that temporarily created economic relief for the timber purchasers by canceling their obligations under their contracts. As a result, in 1984, counties and other beneficiaries with state trust lands, in particular Skamania County, challenged the department for dereliction of its trust management duties and the implementation of the legislative direction (County of Skamania v. State of Washington, 102 W.n.2d, 685 P.2d 576 [1984]). This challenge became the leading Washington State legal case that applied trust principles to the federally granted lands (State Lands) and State Forest Lands.

At the beginning of the fiscal year (FY) 1984 – 1993 planning decade, the department had over 1 billion board feet of timber in arrears[2]. Because "arrearage" had not yet been defined in statute, it is believed that a common definition of arrearage (the difference between the sustainable harvest level and the amount actually sold and not defaulted within a planning decade) was applied. Due to this massive arrearage, in 1985 and 1986, the Washington State Legislature commissioned a full report on the arrearage from the Board through House Concurrent Resolution Number 29 (DNR 1986). This report was prompted by House Bill 508, which was introduced in the legislature in 1985. This bill was introduced for two reasons: one, it was requested by small mill owners who depended upon public timber sales and desired the arrearage to be sold in their interests (many had defaulted on timber sale contracts years earlier); and two, timber sale revenues were low, school construction needs were not being fulfilled, and the Superintendent of Public Instruction had requested the sale of bonds to solve the shortfall. The state legislature saw an opportunity to relieve the latter problem by selling the arrearage and demanded additional research. A final report with recommendations was delivered to the state legislature by the Board in August 1986.

The report's findings were taken up in the 50th state legislative session (1987). The report and subsequent bill language was passed out of both the House and Senate subcommittees, with final reading and passage in March (House) and April (Senate). That report is the most recent statutory work completed on the state laws that govern arrearage.

[2] Arrears defined in the Meriam Webster Dictionary as "the state of being behind in the discharge of obligations."

Management History

Since the RCWs on arrearage were adopted into law, the department, through the Board, has taken action on any arrearage at the end of a planning decade. When an arrearage has existed, the Board has determined whether the arrearage volume or a portion of it should be harvested within the upcoming planning decade or whether it should be incorporated back into the sustainable harvest timber base. This choice has been based on analysis of what will provide the greatest return to the trust based on economic conditions then existing and forecast, as well as impacts on the environment, as stated in RCW 79.10.330.

The term "greatest return to the trusts" gave the Board the responsibility to consider the full range of factors that affect the interests of the trusts in regards to harvesting the arrearage, including intergenerational equity, and to consider the "impacts on the environment" of such harvest. This reflects the fact that whether an arrearage exists or not, the Department manages only one land base with a specific amount of available forest inventory. If arrearage is harvested sooner, it uses part of the forest inventory on the land base to bring that volume forward in time, while reducing the size of the remaining forest inventory for the rest of the sustainable harvest calculation.

The legislative findings for RCW 79.10.300 reflect the legislative intent that the arrearage be sold "without adversely affecting the continued productivity of state-owned forests" (Laws of 1987, Ch. 159, p.1). In cases in which the choice was made to incorporate some or all of the arrearage volume back into the sustainable harvest timber base, the department and Board demonstrated their common law duty as trustee to not favor either present or future trust beneficiaries in regards to the arrearage. In cases in which the choice was made to harvest the arrearage volume or a portion of the arrearage volume, the department and the Board determined that this would provide the greatest return to the trusts, while not adversely affecting the continued productivity of state-owned forests.

In the first decade in which arrearage was analyzed in western Washington, 1984-1993, the Board chose to add the arrearage volume to the sustainable harvest level targets for the decade. As mentioned previously, there was an arrearage of over one billion board feet of timber from the previous planning decade. It was determined that revenues were not sufficient to meet school needs and that it would provide the greatest return to the trusts to harvest the arrearage volume in the upcoming planning decade. In the next two decades after that for western Washington (1994-2003 and 2005-2014)[3], the Board chose to incorporate the calculated arrearage volume back into the sustainable timber harvest base and not to harvest any additional volume classified as arrearage volume. For the last SHC for western Washington (2015-2024), the Board determined that a portion of the calculated arrearage volume should be harvested in addition to the sustainable harvest level. In the last SHC calculation for eastern Washington in 1996, there is no documentation that any arrearage volume was harvested.

Policy on Arrearage

During the last SHC project conducted for the 2015 – 2024 planning decade in western Washington, the Board directed department staff to develop a policy on how to consistently calculate and address

[3] Due to various operational issues through the years, planning decades have not always been successive.

arrearage. In 2019, the Board of Natural Resources approved the *End of Decade Analysis: Arrearage* policy, Resolution No. 1560.

The policy states:

- "Before the Board of Natural Resources approves a decadal sustainable harvest level, the department will determine whether an arrearage exists for the prior decade. A decadal arrearage exists if the actual timber volume sold and not defaulted for the decade is less than the sustainable harvest level for that decade.
- If a decadal arrearage exists, the department will conduct an analysis. The analysis should:
    - Determine how much of the shortfall in volume is actually available for sale.
    - Identify the shortfall volume available for sale by the sustainable harvest units used in the sustainable harvest calculation.
    - Consider the economic and environmental impacts of alternative courses of action to address sale of the additional timber in the following decade.
- The Board of Natural Resources will consider the analysis and adopt a course of action to address the decadal arrearage that is in the best interest of the trusts."

This policy provides a definition of arrearage and the process by which arrearage should be calculated, analyzed, and incorporated into the SHC project. This report seeks to fulfill the requirements of this policy and provide a recommendation to the Board on a course of action for the upcoming planning decade in eastern Washington.

Why is Arrearage Important?

Arrearage constitutes timber volume that was expected to be sold and harvested but was not. That shortage may result in lower than expected revenue for the trust beneficiaries, depending on market conditions and department costs. The trust beneficiaries depend, to varying degrees, on this timber revenue. Reduced returns may impact the trust beneficiaries' ability to meet their current needs. It also affects the department's management accounts and the department's ability to manage lands for current and future revenue generations.

Since the department has a responsibility to generate revenue and other benefits for the trusts, it has an obligation to consider how to best handle unsold timber volume. Consideration of both the short- and long-term effects of harvesting arrearage volume on revenue generation and the environment is part of the department's obligation.

Considerations for Eastern Washington

Time Elapsed Since Last SHC

The last time that new sustainable harvest levels were adopted by the Board of Natural Resources for eastern Washington was in 1996 for the fiscal year (FY) 1998 to 2007 planning decade. However, it is likely that the last true recalculation of eastside harvest levels occurred even further back in time. Other than adjustments in the 1980s and an adjustment to Southeast Region's harvest level (due to the anticipated adoption of DNR's HCP) as part of the 1996 SHC, staff are not aware of a comprehensive

recalculation of eastern WA sustainable harvest levels other than a calculation that occurred in 1970 which relied on inventory data from the late 1960s (WA DNR 1984). DNR's policies require that the department calculate a new sustainable harvest level every ten years, but the recalculation of a new sustainable harvest level for eastern Washington has been significantly delayed by numerous competing agency planning priorities and a lack of comprehensive forest inventory data until recent times. This has created a unique situation which impacts multiple aspects of the arrearage analysis.

The department models sustainable harvest levels over a long time span (generally 100 years or more) to ensure the long-term sustainability of timber production for the trusts, as required by statute. The sustainable harvest level adopted for a particular planning decade is intended to be valid for ten years before a subsequent recalculation occurs, which aligns with how the sustained yield is modeled on a decadal basis. However, when a recalculation does not occur on time, the department generally uses the last Board approved harvest levels to guide its management until a recalculation occurs and new sustainable harvest levels are adopted, unless the Board directs otherwise. Because new eastside harvest levels presumably should have been calculated for the FY 2008-2017 and the FY 2018-2027 planning decades, the 1996 sustainable harvest level targets have outlasted their intended usage by almost 20 years. Despite the long period over which the 1996 harvest levels were implemented and the planning decade for the 1996 calculation being for FY 1998-2007, DNR's policy on arrearage dictates that arrearage be calculated for the prior decade. This arrearage analysis is therefore a departure from DNR's usual process for calculating arrearage, whereby planning decades are successive and arrearage is calculated based off the planning decade for which the current Board approved harvest levels were calculated.

Additionally, due to the length of time that has passed since the last calculation was completed (approximately 29 years), there have been significant changes in DNR's policies, forest practices regulations, land base, forest inventory, and technology in eastern Washington. Some of these changes are listed below:

- Changes in laws, policies, and land plans, including:
    - Revisions to the 1996 Lynx Habitat Management Plan For DNR-Managed Lands in 2006 (DNR 2006a).
    - Implementation of the Okanogan Lynx Management Zone Interim Guidelines and Recommendations in 2010 (DNR 2010).
    - The establishment of new forest practices rules (i.e., 1999 Forests and Fish Laws (ESHB 2091)) stemming from the 1999 Forests and Fish Report (USFWS et al. 1999) and articulated in the Forest Practices HCP (DNR 2005).
    - The 2004 adoption of Amendment No. 1 to the department's 1997 Habitat Conservation (HCP) – Administrative Amendment to the Northern Spotted Owl Conservation Strategy for the Klickitat HCP Planning Unit (DNR 2004).
    - The adoption of the 2006 Policy for Sustainable Forests (PSF; DNR 2006b).
    - Issuance of a Forest Health Hazard Warning for portions of Ferry, Klickitat, Okanogan, and Yakima counties in 2012 by the Commissioner of Public Lands as required under RCW 76.06.
    - Passage of E2SHB 1711 in 2017, which requires the department to prioritize forest health treatments on state trust lands for the next 20 years and created a Forest Health Revolving Account to help cover treatment costs (DNR 2024b).

- Changes in the managed land base
    - Numerous large trust land transfers and exchanges, including the transfer of 24,677 acres of trust lands into a Natural Resources Conservation Area (NRCA) in the Loomis State Forest in 2000.
- Changes in forest inventory
    - Large wildfires on forested state trust lands in 2014 and 2015, leading to the highest burned acreage of DNR-managed forested lands on record with 25,000 and 51,000 acres, respectively. Additionally, about 6,000 acres burned in the Tripod Fire in 2006 which compounded existing constraints in the Loomis State Forest. See 'Possible Causes of Arrearage' section for more information on wildfire impacts on forested DNR-managed lands since 1996.
    - Adoption of a new inventory system by DNR in 2015 – Remotely Sensed Forest Resource Inventory System (RSFRIS) which provides much broader inventory coverage than was available at the time of the previous eastside calculations.
- Changes in technology
    - Improvements in hardware and software technology that allow computers to store and process more data
    - Improvements in DNR's forest modeling capabilities and geographic information systems (GIS) data

Due to these numerous changes, calculated eastside arrearage values based on 1996 anticipated harvest levels cannot be assumed to reflect excess timber inventory. Some of the changes listed above likely contributed to operational deviations from the 1996 harvest targets, which will be discussed later in this report. However, even more significantly, these changes make the 1996 targets of limited utility for representing sustainable harvest targets under DNR's current operating environment. Technological advances related to forest inventory, forest estate modeling, and GIS data and analysis capabilities have drastically improved since 1996; therefore, the accuracy of any estimates of shortfall volume available for sale would also be limited by the underlying accuracy of the original 1996 calculation. Due to these limitations, the department has not invested limited staff resources in attempting to determine how much of the shortfall volume is actually available for sale. However, this report provides estimates of arrearage in accordance with DNR's policy on arrearage and discusses potential causes of arrearage since the 1996 calculation in order to provide the Board with as much information as possible to inform their decision on arrearage.

Change in Sustainable Harvest Units

The 1996 calculation was based on the following five SHUs, which followed DNR district lines:

- Highlands and South Okanogan – 199,445 acres[4]
- North Columbia - 127,769 acres
- Arcadia - 66,202 acres

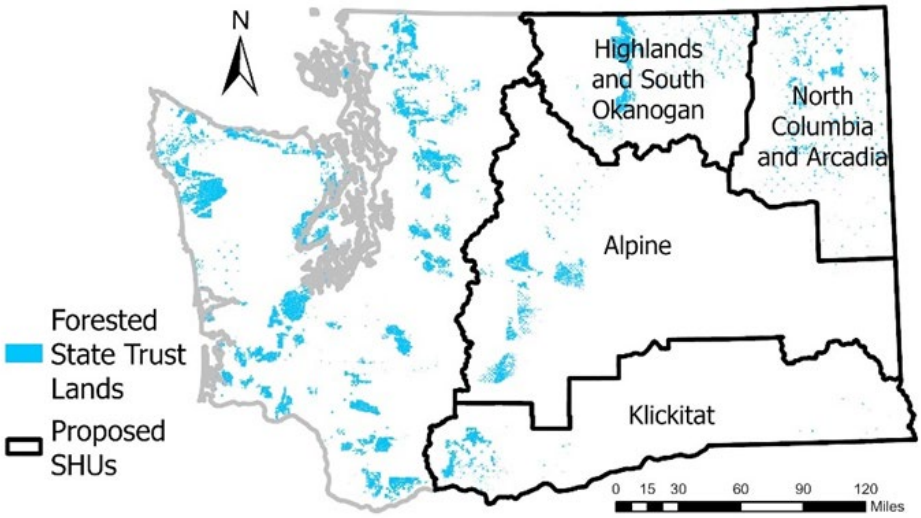
[4] Please note, the acres listed reflect the current acreage of forested state trust lands encompassed in these SHU boundaries and not the acreage present in 1996. Land transactions have significantly altered the land base over time.

- Klickitat - 90,988 acres
- Yakima River - 199,923 acres

Figure 1: SHU Map From the 1996 Eastern Washington Sustainable Harvest Calculation

As permitted by the Policy on the Definition of Sustainability for the Sustainable Harvest Calculation (PSF, p. 29), department staff chose to update the eastern Washington SHUs for the upcoming SHC. These new SHUs were presented to the Board at the November 5, 2024 meeting and detailed in a staff report. The new SHUs are designed to align more closely with DNR's current management structure and expand the land base included in the calculation with the addition of the Snake River and Columbia Basin administrative units in the southeast portion of the state, which contain forested state trust lands.

Figure 2: Map Showing the Updated SHUs for Eastern Washington



Arrearage volumes will be calculated using the 1996 SHUs, while a decision to harvest arrearage volume in the first decade of the model would be applied to the new SHUs. Therefore, changes in the SHU configuration would need to be considered if the Board were to decide to harvest arrearage volume within the first decade of the model. The changes in the SHUs are minor enough that it would be possible to estimate how the arrearage volumes should best be applied to each SHU.

Eastside Arrearage Calculation

Staff calculated the arrearage in accordance with the Board's policy. The following assumptions were made in calculating eastside arrearage:

- Arrearage was calculated for each SHU that was used in the 1996 SHC, since the volume target is approved individually for each SHU. However, changes in the land base between 1996 and the present day have not been accounted for in this calculation. To simplify the calculation, all timber sale volume that originated within the boundaries of the 1996 SHUs is considered within the calculation, regardless of whether the lands were managed by DNR for the duration of this period.
- This report only considers arrearage that has accrued during "the prior decade" before the upcoming planning decade, since that is the language stated in DNR's policy on arrearage and the assumed intent of RCW 79.10.330. Since fiscal year (FY) 2025 is not yet completed and the eastside planning decade may be adjusted, staff have elected to use volume harvested from the most recently completed fiscal years (i.e., FY 2015-2024) to estimate eastside arrearage and avoid making assumptions about the future harvest of planned volume. It is important to note that arrearage is not generally calculated with large gaps between planning decades and that this is a deviation from the DNR's usual process for arrearage. If a new eastside SHC had been calculated in 2008 at the end of the planning decade according to agency policy, then arrearage would have been calculated using the harvest volumes from FY 1998 to 2007 (Figure 2).

Figure 2. Timeline of Planning Decades (Assuming the SHC for Eastern Washington had Been Calculated on Time for each Planning Decade) Showing how the Late SHC has Impacted the Arrearage Calculation.

This calculation considers the harvest volume levels set by the 1996 SHC and compares them to DNR's sold volume from FY 2015 to 2024 for each SHU. The unit of measurement is "MBF," which stands for one thousand board feet. The volume sold from FY 2015 to 2024 was queried on March 11, 2025 from DNR's State Uplands Data Cubes, which is based off DNR's Large Day Overlay (LDO), daily updates from DNR's Land Resources Manager (LRM), and weekly updates of DNR Parcel data. This data uses DNR's finalized timber sale volume where possible, and in situations where finalized volume is not available (i.e., because a sale is sold but still in-progress), it uses awarded timber sale volume.[1]

Table 1: Calculated Arrearage for Eastside SHC Planning Decade for Eastern Washington Queried From DNR's State Uplands Data Cubes on March 11, 2025.

Sustainable Harvest Unit (SHU)	Sold volume 2015-2024[a] (MBF)	1996 SHC target volume (MBF)	Difference in volume (MBF)	Arrearage (MBF)
Arcadia	174,542	90,000	84,542	0
Highlands and South Okanogan	183,293	211,000	-27,707	-27,707
Klickitat	66,594	129,000	-62,406	-62,406
North Columbia	197,528	187,000	10,528	0
Yakima River	45,090	169,000	-123,910	-123,910
Total	**667,046**	**786,000**	**-118,954**	**-214,023**

[a] These values represent the most accurate estimate of sold volume from DNR timber sales during FY 2015-2024. However, sold volume for the same time period can change over time for several reasons: 1) As opposed to a lump sum sale (where DNR is paid for a timber sale based on estimated volume from DNR timber cruises) tonnage or scale sales allow DNR to be paid for the actual volume harvested and removed as loads of state timber are weighed or scaled. Once the timber sale contract is completed, DNR relies on the sum of volume from all loads for which the department was paid to determine finalized volume rather than the estimates of total sale volume from DNR timber cruises. Therefore, in DNR's volume tracking database a tonnage or scale sale's volume will transition from cruised volume to finalized volume upon sale completion and audit (see below). 2) DNR timber sales contain clauses that require the department be paid for additional volume that was not designated for harvest in the contract. Circumstances leading to harvest and sale of this additional volume can include trees needed for tail-holds, tree being inadvertently damaged by the purchaser, natural disturbances, and road widening. 3) After timber sale contracts are completed (usually within 30 days) the sales undergo an internal audit. Errors or discrepancies discovered during these audits may result in adjustments being made to amounts paid to DNR and to volume sold. 4) Given that the typical duration of a DNR timber sale contract is 2-3 years (with options for contract extension), finalized volume may not be added to DNR's database until over 3 years from the date a timber sale sells. Therefore, sold volume for more recent fiscal years for sales that have yet to be completed or audited can still change.

In Table 1, the column titled "Sold volume 2015-2024" shows the volume sold but not defaulted in each SHU over the last ten completed fiscal years. The column titled "1996 SHC target volume" shows the decadal target volumes based on the approved 1996 harvest levels. The column titled "Difference in volume" shows the difference in volume between the target volume and the sold volume. Negative values in this column indicate an arrearage, while positive values indicate an overage of harvest volume. In the column titled "Arrearage," the arrearage values are summed together to provide the total arrearage for the decade. Please note that the overage volumes are not factored into the total arrearage. In other words, arrearage is calculated separately for each SHU, so an overage in one SHU does not offset the arrearage in another SHU. The individual SHU accounting approach to determine arrearage is why the total sum of the "difference in volume" for the SHUs is not equivalent to the total sum of the arrearage volumes.

While overages do not factor into the arrearage analysis, the possible causes of overages warrant discussion. In the late 2000s Northeast and Southeast regions began assigning deliverables based on target acres of forest health treatments. These acreage targets were treated as a separate deliverable that were in addition to the region's sustainable harvest level deliverables. Therefore, total annual harvest volume for an SHU sometimes exceeded the harvest levels from the 1996 SHC when forest health treatments contained merchantable timber volume.

DNR staff have determined that an arrearage exists for the prior eastside planning decade in three SHUs. In DNR's Northeast Region, the Highlands and South Okanogan SHU has an arrearage of about 27.7 million board feet (MMBF) for the last decade. The Arcadia and North Columbia SHUs in Northeast Region do not have an arrearage. In DNR's Southeast Region, the Klickitat and Yakima River SHUs have a much larger decadal arrearage, with about 62.4 MMBF in the Klickitat SHU and about 123.9 MMBF in the Yakima River SHU. The total sum of arrearage for the last decade of completed fiscal years is about 214 MMBF.

Possible Causes of Arrearage

Changes to DNR's Operating Environment

As listed previously (see 'Time Elapsed Since Last SHC'), since 1996 there have been multiple changes and additions to the policies, plans, and regulations that DNR operates under. Since these changes were not captured in the 1996 SHC, any harvest volume impacts resulting from them are not represented in the Board approved harvest levels from 1996. This has led to a situation in which DNR staff are trying to attain harvest levels that do not account for all the constraints that currently impact DNR timber sales.

One example of current constraints staff face that were not represented in the 1996 calculation are DNR's retention tree requirements that exceed those required under Washington Forest Practices rules (WAC 222-30-020(12)) in certain areas. These requirements stem from DNR's 2011 'Retention and Perpetuation of Biological Legacies and Green Trees (Eastern Washington)' procedure (PR 14-006-091) which requires staff in eastern Washington to retain all legacy trees[5] and increases leave tree retention to ≥10 trees per acre in northern spotted owl nesting rooting and foraging (NRF) management areas. These increased retention requirements both reduce harvestable volume and impact growth of the regenerating cohorts.

Several major changes that occurred post-1996 stem from changes to forest practices regulations. Emergency, temporary rule changes concerning stream typing began in very late 1996, and broader changes continued through the permanent rule adoptions based upon the 1999 Forest and Fish Report (USFWS et al. 1999) and legislation. These changes included: physical feature criteria being added to the definition of Type 3 streams resulting in more streams being typed as fish streams (WAC 222-16-031); increased riparian management zone widths (e.g., an increase from 30 foot average width on Type 1-3 streams to 100-130 foot width depending on site class) (WAC 222-30-022); increased leave tree retention within riparian management zones (WAC 222-30-022); and increased buffer widths subject to shade requirements to maintain stream temperature (WAC 222-30-040). Other rule changes affected the permits subject to Class IV-Special permits due to potentially unstable slopes (WAC 222-16-

[5] In the procedure for eastern WA legacy trees are defined as live trees that key out to mature tree ≥ 150 years (i.e., age classes 2 or 3 with vigor classes of A or B) using keys provided in Appendix 1 of the procedure and Robert Van Pelt's 2008 guide to Identifying Old Trees and Forests in Eastern WA.

050(1)(d)). These changes collectively reduced the land base available for harvest and/or reduced the amount of volume that could be removed where harvest was permitted.

Natural Disturbances

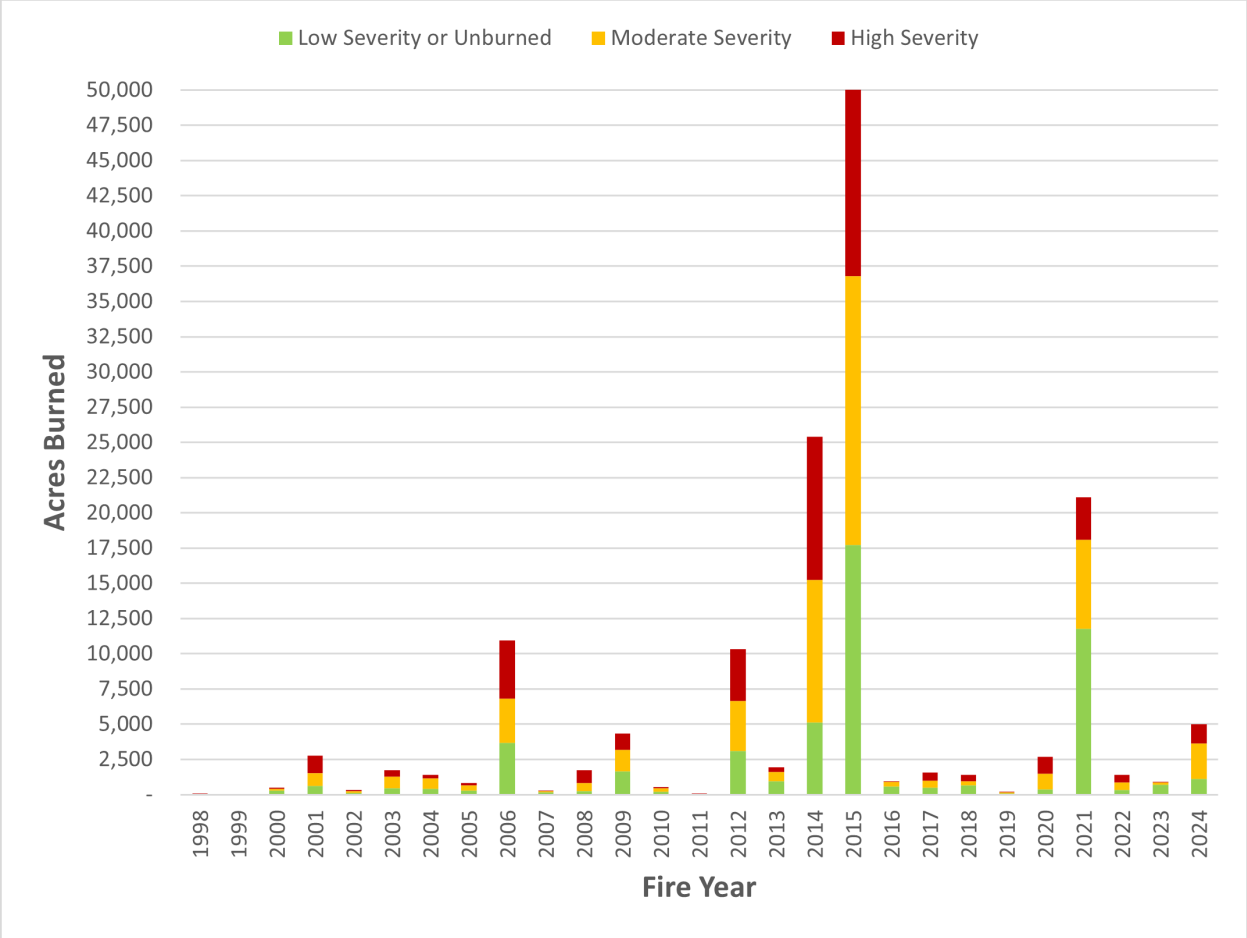
Natural disturbances from insects and disease as well as wildfire can impact planned timber sales as well as available inventory for future timber sales. While staff cannot ascribe how much of the shortfall in harvest volume in the last decade is directly attributable to different disturbance agents and events, impacts from wildfires and insect and disease damage have presented challenges for region staff in meeting their harvest targets. While the Policy on Recalculation of the Sustainable Harvest Level (PSF p. 30) allows the department to adjust the calculation when changing circumstances dictate (e.g., new information about the resource base available for harvest), no adjustments have been made to the 1996 SHC despite increasing rates of mortality from wildfire, insects, and disease. Trends in each of these factors are described in the sections that follow.

Wildfire

The average annual acreage of forested DNR-managed lands impacted by wildfires has been increasing over the last few decades (Figure 3). During the 10-year period from 1998-2007 the average annual acres burned was approximately 2,100 acres per year while during the 10-year period from 2015-2024 the average annual forested acres burned increased to over four times the 1998-2007 average to 8,600 forested acres per year. Large wildfires in 2014 and 2015 resulted in the worst wildfire seasons for forested DNR-managed lands on record with over 76,000 acres experiencing wildfire. Overall, during the period of 1998 to 2024 over 20%[6] of forested DNR-managed lands in eastern WA have experienced a wildfire (WA DNR 2024a). In terms of SHUs, Highlands and South Okanogan and Yakima River had 34% and 25% of their forested acres impacted by wildfire during the 1998 to 2024 period, respectively.

[6] Includes overlapping acreage where multiple fires burned the same area during the time period.

Figure 3. Acres of Forested DNR-managed State Trust Lands, Natural Area Preserves, and NRCAs Impacted by Wildfires From 1998 to 2024. Burn severity acreage is based on Landsat data that is processed by DNR's Forest Resiliency Division using published methodologies. Cumulative burn severity acres from 1984-203 are available at WA DNR 2024a. 2024 burn severity data is still in draft form. Some unburned acreage is included when occurring within the perimeter of a wildfire.



In the last decade, we know from communications with DNR staff in our Northeast and Southeast regions that over two dozen planned timber sales have been impacted by wildfires in DNR's eastside regions. These sales are typically reconfigured and sold or sold as fire salvage sales, but in some cases they are completely lost when salvage isn't economically feasible or when a particular salvage harvest is opposed by the public. While the department is efficient at conducting salvage harvests of recently burned areas, economic factors, operational and regulatory constraints, and the short harvesting window (i.e., due to log degradation post-wildfire) within which to conduct a salvage limit the portion of the burned areas where the department can conduct a salvage harvest. To illustrate, during fiscal years 2015-2024, approximately 16% of the area burned on forested DNR-managed lands in eastern WA had a salvage harvest.

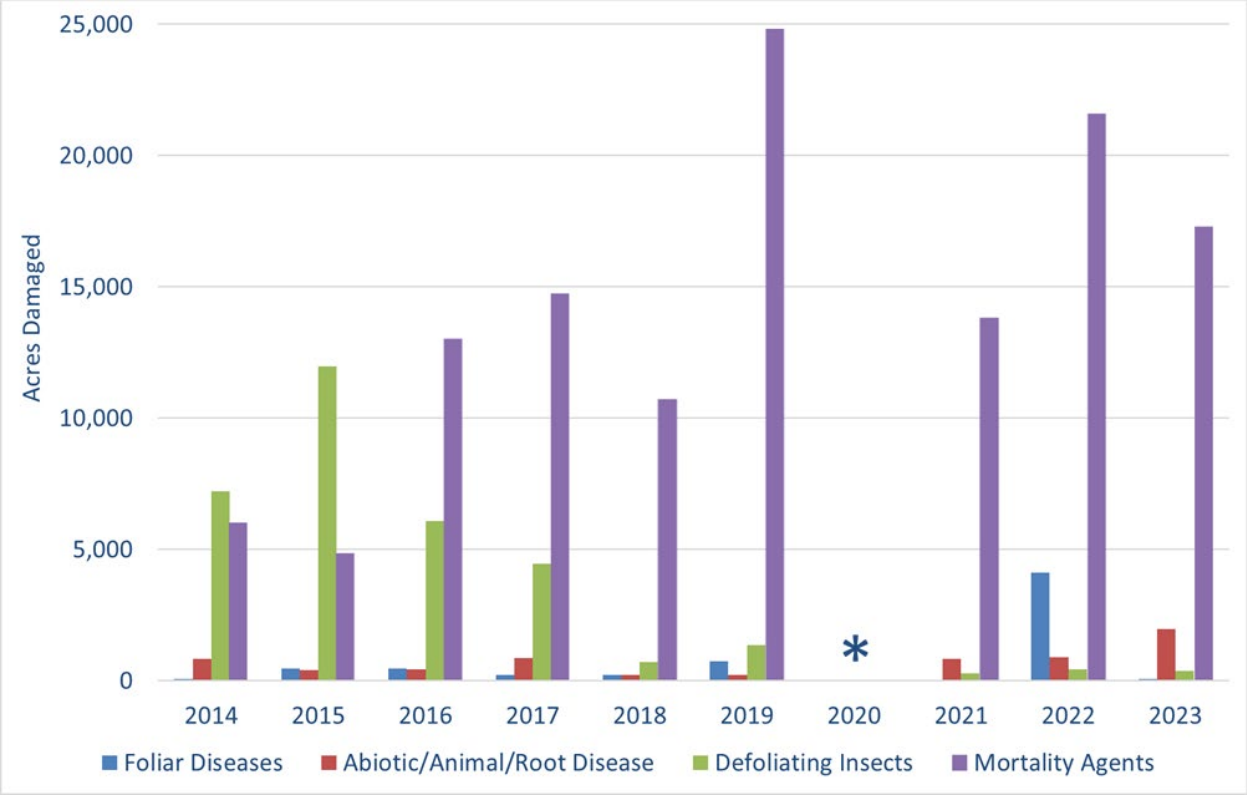
Aside from the direct impacts to standing inventory and planned timber sales that wildfires present, they have also limited DNR's ability to conduct timber sales in certain landscapes that have wildlife habitat requirements for northern spotted owls and Canada lynx. DNR's 1997 State Trust Lands Habitat

Conservation Plan (HCP; WA DNR 1997a) and associated amendment (WA DNR 2004) have requirements that DNR meet or maintain a certain habitat percentage within individual spotted owl management units (SOMUs) (i.e., 33-50% of the management unit by area must meet certain habitat definitions). Wildfires have resulted in some SOMUs falling below threshold (e.g., 2015 Cougar Creek and 2008 Cold Springs wildfires in Yakima County). While some level of harvest may occur in below threshold SOMUs in non-habitat if it can be demonstrated the harvest will expedite habitat development, the small amount of commercial volume removed with these harvests often make them financially difficult to conduct. DNR's 2006 Lynx Habitat Management Plan (WA DNR 2006a) also imposes certain habitat threshold requirements and habitat conversion limitations within lynx analysis units (LAUs). Fires in some LAUs (e.g., 2006 Tripod Complex) brought certain LAUs below habitat thresholds and resulted in additional restrictions that further limit DNR's ability to conduct timber harvests and address forest health issues within the Loomis State Forest (WA DNR and USFWS 2010).

Insects and Disease

The past century of fire exclusion and land use patterns has resulted in forests that are less resistant to disease and insect outbreaks, as well as highly susceptible to large wildfires. The severity of damage from insects and disease in eastern WA prompted the Commissioner of Public Lands to issue a Forest Health Hazard Warning in 2012 for Okanogan, Ferry, Klickitat, and Yakima Counties as authorized under RCW 76.06. While DNR has been proactively addressing forest health issues on forested state trust lands, the impacts from insect and disease are apparent as evidenced by annual insect and disease aerial detection surveys and as illustrated in Figure 4. Ultimately, mortality induced by insects and disease leads to less harvestable volume on DNR-managed trust lands and stands that are at higher risk of catastrophic loss from wildfire.

Figure 4. State Trust Lands Damaged by Insects and Disease Agents in Eastern Washington 2014-2023. Adapted from DNR 2024b. Data from the 2024 survey season is not yet available.



Source: USDA Forest Service in cooperation with DNR, April 2023. Acres damaged are specific to the year surveyed and are not cumulative with previous years. Multiple damage agents may occur on the same forested acre but the graph reports only the most damaging agent to eliminate double counting acres impacted. Mortality agents are primarily nine different species of tree-killing bark beetles that include mountain pine beetle, western pine beetle, Douglas-fir beetle, fir engraver, spruce beetle, and others. This category also includes mortality in tree species that are rarely killed by bark beetles that can't be attributed to a specific causal agent. These include the "dying hemlock" and "dying cedar" codes. Balsam woolly adelgid is an aphid-like sucking insect that is sometimes categorized as a mortality agent.

*Due to the COVID-19 pandemic, aerial surveys were not conducted in 2020.

Economic Factors

Declines in mill infrastructure, an overall decline in stumpage[7] prices since 1996, and the sale of low value materials from forest health treatments have made it difficult for some eastern WA timber sales to cover the department's costs of preparing and administering the sales as well as post-harvest silviculture activities necessary to regenerate the next cohort to meet forest practices requirements. These factors, coupled with the Great Recession, led to staffing decreases in certain eastern WA SHUs

7 Stumpage is the payment DNR receives for selling timber harvesting rights to private purchasers and is typically expressed as $/MBF or $/ton.

which hindered the department's ability to attain sustainable harvest volumes. These factors are described in more detail below.

Mill Infrastructure

In 1996 eight counties in eastern WA (including Skamania) had a combined total of 18 sawmills (WA DNR 1997b). By 2020[8] the total number of sawmills had declined to 12 total (Scott 2024). Notably, Asotin and Chelan counties in DNR's southeast region lost all of their sawmills from 1996 to 2020. For certain blocks of DNR land, the loss of nearby mills results in very long timber hauling distances and costs which significantly reduces the stumpage the department receives from timber sales. For example, some DNR timber that is harvested in eastern WA counties is now hauled west across the Cascades to processing facilities in western WA counties such as Lewis and Skagit.

Stumpage Prices

While DNR's eastside stumpage prices have varied over time, the overall trend has been a decline since the 1980s. Causes of DNR's decreased stumpage prices include certain market forces that affect all timberland owners in WA such as increased labor costs, increased milling efficiencies (which allows sawmills to produce more lumber from fewer logs which can help offset increases in demand), mill closures, and natural disturbances that create surges in timber supply such as the harvest of beetle killed pines in British Columbia which suppressed prices from the late-1990s till 2019). Other factors responsible for DNR's decreased stumpage are more specific to the department such as the export restriction on logs sold from state trust lands (WAC 240-15), the unique requirements in DNR timber sale contracts attributable to DNR's 1997 HCP, 2006 Lynx Plan, policies and procedures (e.g., wildlife timing restrictions), unique road-building, maintenance, and abandonment standards (e.g., requirement of purchasers to pay into the access road revolving fund (ARRF) based on the volume they remove from a DNR timber sale), and certain sales that have extra requirements related to forest health (e.g., whip felling of advanced regeneration).

From a stumpage price appreciation standpoint, a 40-year analysis of stumpage prices by DNR staff for the period 1973 to 2014 found that DNR's stumpage prices were not keeping pace with inflation in DNR's Southeast Region. The lack of stumpage price appreciation means silvicultural investments in some stands are no longer a good investment from a financial return perspective. In order to avoid investments in site preparation and artificial regeneration and to reduce the risk of planted seedling mortality from increased droughts and resulting costly replants, DNR staff will often retain higher tree densities in certain landscapes to provide a natural seed source for the regenerating cohort. While this approach is acceptable from a long-term financial return perspective, it can result in reductions in harvestable volume for these sales.

8 Data for more recent mill surveys is currently not available.

Forest Health Treatments

In an effort to address the serious forest health problems facing the state the WA State Legislature passed the Washington State Forest Insect and Disease Act (SSSB 6144) in 2004 which required the department to produce a statewide plan for increasing forest resistance and resilience and use contract harvesting to administer a Forest Improvement Treatment (FIT) program. Historically, forest health treatments were difficult for the department to conduct under the management fee funding structure whereby a portion of timber sale revenue goes into DNR's management accounts and the remainder is distributed to trust beneficiaries. Low value products from forest health treatments combined with long hauling distances can result in low value timber sales that do not cover DNR's costs to set-up and administer or sometimes result in merchantable volume that is cut but left on-site and therefore not sold. For example, one recent DNR timber sale in Chelan and Kittitas counties resulted in a stumpage value of only $2.10 per ton, with the sold product mainly consisting of low value utility wood.

To improve the financial feasibility of forest health treatments the legislature began appropriating DNR capital funding in FY 2009 to continue the important work of the FIT program that was facing added difficulties from economic factors resulting from the Great Recession. However, the capital funding required an individual timber sale's revenue to equal or exceed the costs of preparing and administering the sale. This was difficult to achieve and sometimes resulted in low value materials being left on-site instead of being hauled to purchasers and credited to DNR's sold timber harvest volume.

While the FIT program permitted the department to continue harvest of low-value stands, the pace and scale of forest health treatments was limited by capital funding. Therefore, in 2017 E2SHB 1711 created a Forest Health Revolving Account (FHRA) for the department to utilize for conducting forest health treatments. Timber sales set up using the FHRA started being sold in FY 2018. The FHRA allows DNR to retain all revenues (up to $10 million in unobligated funds) from commercial forest health treatments in an interest-bearing revolving account that may then be used to cover management costs of subsequent forest health treatments (both commercial and non-commercial). Prior to the FHRA funding mechanism, it was becoming increasingly difficult for the department to cover the cost of its eastside timber sales program due to declining stumpage values on low value products and extraordinary hauling costs.

E2SHB 1711 also required the department to develop a prioritization and implementation plan for how it will conduct forest health treatments on state trust lands for the next 20 years. DNR reports progress on this effort in required legislative reports every two years (DNR 2024b). The plan prioritizes landscapes for treatment based on factors (e.g., forest health scores, values at risk, and forest structure) that are blind to sustainable harvest level targets. Thus, staff must focus on treating acreage within certain SHUs where forest health treatments are a higher priority and that may be inhibiting them from meeting harvest levels in other SHUs.

Analysis

Due to the length of time that has elapsed since the last eastside sustainable harvest calculation, there are multiple factors that render the 1996 harvest levels functionally obsolete in the context of calculating a new sustainable harvest level:

- The 1996 sustainable harvest level targets were only intended to be implemented for a decade, or until FY 2007. However, in the absence of more recently Board approved harvest levels for eastern Washington; the 1996 SHC harvest targets were used to determine arrearage. There is a risk that the 1996 harvest levels would not have been sustainable over this extended time period and especially during the last decade.
- Changes in DNR's policies and plans, regulatory environment, land base, and forest inventory have changed the entire framework on which the 1996 harvest levels were based. Furthermore, it is not possible to accurately determine how each of these changes may have impacted the 1996 harvest levels or whether shortfall volumes are still available for sale. These issues reaffirm that it is not reasonable to consider arrearage volume calculated from 1996 targets in the current eastern Washington SHC.

A recalculation of the sustainable harvest levels for eastern Washington is necessary to incorporate the numerous changes that have occurred since 1996 and that have been detailed in this report. The new calculation will incorporate DNR's current forest inventory and management constraints to provide a sustained yield plan that meets DNR's obligations under current statutes, policies, plans, and the trust mandate. The new calculation will allow DNR to determine how much volume is currently available for sale by SHU under the no action alternative (see staff report) and how the available volume compares to the 1996 harvest levels.

For the reasons previously mentioned, it would be erroneous and technically difficult for the department to discern "shortfall" volume or arrearage as a separate quantity of volume that could be spatially identified on the land base and analyzed distinctively from the remainder of DNR's forest inventory, even though this requirement is articulated in DNR's current arrearage policy[9]. This makes it impractical to adhere exactly to DNR's current policy, which asks DNR to identify how much of the shortfall is actually available for sale by sustainable harvest unit. For this reason, all available volume will be considered in the calculation of new sustainable harvest levels; the choice will be whether to harvest the amount of the "shortfall" volume in the first decade as opposed to allowing the model to recalculate a sustainable harvest level using all available volume.

This report suggests two general options for the Board to consider:

Option 1: The Board may choose to recalculate the sustainable harvest level using all available inventory. The arrearage volume will be considered to be "incorporated" back into the available inventory. This option would by default be part of the "no action" alternative analyzed as part of the draft environmental impact statement (DEIS) for the SHC project.

---

[9] DNR's policy on arrearage states:
"If a decadal arrearage exists, the department will conduct an analysis. The analysis should:
- Determine how much of the shortfall in volume is actually available for sale.
- Identify the shortfall volume available for sale by the sustainable harvest units used in the sustainable harvest calculation.
- Consider the economic and environmental impacts of alternative courses of action to address sale of the additional timber in the following decade."

Option 2: The Board may choose to analyze the harvest or partial harvest of the calculated arrearage volume as part of the action alternatives analyzed in the DEIS. In this case, scenarios will be modeled that will force the arrearage volume to be harvested in the first decade of the model. All remaining inventory will be modeled within the normal bounds of the sustainable harvest calculation.

Analysis of Economic Impacts

When considering possible economic impacts to the trusts related to the harvest of calculated arrearage volume, it is important to consider what the sustainable harvest calculation is already required to do by policy and law.

The Policy on the Definition of Sustainability for the Sustainable Harvest Calculation (PSF pp.28-29) states: "The department will analyze the financial characteristics of forest stands in order to optimize the economic value of forest stands and timber production over time, in calculating the sustainable harvest level, in planning and scheduling timber harvests, in making investments in forest growth, and in searching for the least-cost methods of achieving other forest management objectives."

The policy makes it clear that DNR must "optimize the economic value of forest stands and timber production over time, in calculating the sustainable harvest level." This direction underscores DNR's obligation to use the SHC as a tool to provide the trust beneficiaries with the most value possible over time. This has generally been accomplished in other SHC projects by maximizing net present value (NPV) in long-term harvest modeling. For this project, a recommendation from staff is being prepared on the best way to maximize long-term value for the trust beneficiaries, which will be presented to the Board.

DNR also has obligations to ensure the assets it manages remain productive for the trusts in perpetuity and to ensure intergenerational equity for current and future beneficiaries in providing benefits to the trusts. This is clarified in the statutes that require the DNR to perform a sustainable harvest calculation. RCW 79.10.320 requires DNR to manage its forested lands on a sustained yield basis and RCW 79.10.310 defines sustained yield plans as "management of the forest to provide harvesting on a continuing basis without major prolonged curtailment or cessation of harvest."

DNR further defines how it will "provide harvesting on a continuing basis without major prolonged curtailment or cessation of harvest" at the SHU scale in the PSF. The Policy on the Definition of Sustainability for the Sustainable Harvest Calculation (PSF, pp.28-29) states: "In order to ensure intergenerational equity among beneficiaries, within each sustainable harvest unit, the department shall calculate an estimated multi-decade harvest level such that the mean annual timber volume for any decade should not vary up or down more than 25 percent from the level of the preceding decade…." This policy sets maximum limits on how much the sustainable harvest level can vary from decade to decade in each SHU. Staff refer to this maximum limit on the variability of harvest level volumes between decades as the "harvest flow constraint."

"Option 1" would incorporate all available inventory into a new sustainable harvest level. The harvest model would seek to maximize long-term value for the trust beneficiaries using all available inventory while adhering to the harvest flow constraint. "Option 1" would optimize long-term economic value for the trust beneficiaries because that is part of DNR's requirements in completing the SHC.

"Option 2" would force harvest of the calculated arrearage volume or a portion of it in the planning decade. The arrearage volume would be removed from the available inventory and then the harvest model would decide how to harvest the remaining inventory in the long-term calculation of the sustainable harvest level. This would effectively result in volume being pulled forward from future decades and harvested in the first decade rather than allowing the model to harvest it over the next several decades. Arrearage harvest, if operationally feasible, would result in higher harvest volumes in the near-term but lower in subsequent decades. It could also result in a greater difference in harvest volume between the first two decades than would otherwise be permitted by harvest flow constraints in the model. However, it could also be possible that "Option 2" may not be a feasible model solution given current constraints on DNR's forested trust land base.

Overall, if the Board were to choose "Option 2" and seek to harvest the calculated arrearage volume in addition to the sustainable harvest level, there could be short term increases in the revenue provided to the trusts. However, there are also considerations around intergenerational equity (i.e., balancing economic value for present and future beneficiaries) on the decision to harvest arrearage volume. For instance, under "Option 2" the trusts may be provided with increased revenue in the short term at the expense of more stable long-term revenue.

Considering economic impacts beyond the trust beneficiaries, increasing short-term timber production at the expense of long-term timber production could impact mill owners and other local businesses that rely on DNR's timber sales. In general, maintaining a more stable rate of harvest over time would likely provide benefits to the local timber economies in eastern Washington and help ensure future forest health treatments have available purchasers.

It is important to note that if the Board were interested in accelerating timber harvest in eastern Washington in the upcoming decade in order to accomplish specific priorities, there are other means of analyzing scenarios that would result in this outcome without relying on arrearage estimates from the outdated 1996 harvest levels. Staff could analyze options that align with DNR's goals of accelerating the pace of forest health treatments in eastern Washington and this decision would not need to be justified through the harvest of calculated arrearage volume. There could be operational challenges associated with accelerating timber harvest in the next planning decade, but those could be discussed further after proposed alternatives are modeled.

Analysis of Environmental Impacts

Environmental impacts related to the SHC for eastern Washington will be discussed in detail in the DEIS for this project. This section will only seek to discuss general, qualitative differences between the two options discussed in this report.

There could be certain impacts to the environment from accelerating the pace of harvest in the planning decade, which would occur under option "Option 2" compared to "Option 1." These impacts would largely stem from changes to forest structure that would result from attaining differing harvest levels. These impacts could vary greatly depending on how and where harvested was conducted. Areas that are managed for legally mandated habitat commitments and are highly constrained in their harvest requirements, such as those managed for northern spotted owl and Canada lynx habitat, may limit how much of the arrearage volume may actually be feasible for harvest or lead to certain management areas

having curtailed harvest in future decades as habitat develops over time. In other areas, an increase in the pace of harvest might help the agency meet targets for forest health treatments more quickly and lead to positive long-term outcomes for increasing forest resilience. Regardless of the decision to harvest arrearage, impacts to the environment from timber harvesting activities on DNR-managed lands will still be subject to the extensive framework of existing regulations, policies, procedures, and plans that have been adopted with the intent of minimizing or avoiding adverse impacts.

Recommendation

Staff recommend "Option 1," which is to recalculate the sustainable harvest level for eastern Washington using all available inventory. The arrearage volume would be "incorporated" back into the available inventory for the next sustainable harvest calculation.

As discussed in the "Analysis" section of this document, we lack confidence in the accuracy or legitimacy of applying any arrearage volume to the current SHC, given the passage of time and lack of data about the 1996 calculation. The 1996 sustainable harvest levels are functionally obsolete due to the length of time that has elapsed since the last calculation and the many changes that have occurred in DNR's policies and plans, regulatory environment, land base, and forest inventory during this interim period. It would not be appropriate to try to force the model to harvest additional volume in the first planning decade simply to meet outdated harvest level targets. Doing so could lead to negative long term economic impacts to the trusts and to DNR's ability to manage the lands for long-term sustainability. Staff believe that it would be imprudent to consider the forced harvest of the calculated arrearage volume as a viable option in this SHC.

Literature Cited

DNR: refer to Washington Department of Natural Resources.

Scott, S. 2024. University of Montana Bureau of Business and Economic Research – Forest Industry Research Program. Forest Products Industry and Timber Harvest Reports. 2020 Tables. https://www.bber.umt.edu/FIR/S_WA.asp

U. S. Fish and Wildlife Service (USFWS); the National Marine Fisheries Service; the U. S. Environmental Protection Agency; the Office of the Governor of the State of Washington; the Washington State Departments of Natural Resources, Fish and Wildlife, and Ecology; Indian tribes and tribal organizations; the Washington State Association of Counties; the Washington Forest Protection Association, and the Washington Farm Forestry Association. 1999. Forests and Fish Report. 228 p. https://www.dnr.wa.gov/publications/fp_hcp_18appb.pdf

Washington Department of Natural Resources (DNR). 1984. Forest Land Management Program. Olympia, WA.

Washington Department of Natural Resources (DNR). 1986. Report to Legislature – Timber Sale Arrearage. Olympia, WA. 30 p.

Washington Department of Natural Resources (DNR). 1996. Loomis State Forest Final Landscape Plan. Olympia, WA. 125 p. https://www.dnr.wa.gov/LoomisLoupLoup

Washington Department of Natural Resources (DNR). 1997a. Final Habitat Conservation Plan, Olympia, WA. 546 p. https://www.dnr.wa.gov/publications/lm_hcp_plan_1997.pdf

Washington Department of Natural Resources (DNR). 1997b. Washington Mill Survey 1996. Series report # 14. https://www.dnr.wa.gov/publications/obe_econ_rprt_millsurv_1996.pdf

Washington Department of Natural Resources (DNR). 2004. HCP Amendment No. 1 - Administrative Amendment to the Northern Spotted Owl Conservation Strategy for the Klickitat HCP Planning Unit. Olympia, WA. 97 p. https://www.dnr.wa.gov/publications/lm_hcp_amendment1.pdf

Washington Department of Natural Resources (DNR). 2005. Final Forest Practices Habitat Conservation Plan. Olympia, WA.

https://www.dnr.wa.gov/programs-and-services/forest-practices/forest-practices-habitat-conservation-plan

Washington Department of Natural Resources (DNR). 2006a. Lynx Habitat Management Plan for DNR-Managed Lands. Olympia, WA. 166 p. https://www.dnr.wa.gov/publications/lm_ess_lynx_plan_final.pdf

Washington Department of Natural Resources (DNR). 2006b. Policy for Sustainable Forests. Olympia, WA. 72 p. https://www.dnr.wa.gov/publications/lm_psf_policy_sustainable_forests.pdf

Washington Department of Natural Resources (DNR). 2010. Okanogan Lynx Management Zone Interim Management Guidelines and Recommendations. https://www.dnr.wa.gov/publications/lm_lynx_interim_okanogan_guidance.pdf

Washington Department of Natural Resources (DNR). 2015. DEIS on Alternatives for the Establishment of a Sustainable Harvest Level, Appendix C, Arrearage Report. https://www.dnr.wa.gov/publications/amp_sepa_shc_deis_app_c.pdf

Washington Department of Natural Resources (DNR). 2021. Trust Lands Performance Assessment Project – Charting a Course for the Future. Legislative Report. January 2021. https://www.dnr.wa.gov/publications/em_tlpa_lege_report.pdf

Washington Department of Natural Resources (DNR), Forest Resiliency Division. 2024a. Burn Severity 1984-2023. https://www.arcgis.com/home/item.html?id=8c6b636684724d64b80f6c0e33e5131d Accessed March 2024.

Washington Department of Natural Resources (DNR). 2024b. Forest Health Treatment Prioritization and Implementation On State Trust Lands in Eastern Washington – A Report to the Washington State Legislature. https://www.dnr.wa.gov/sites/default/files/publications/rp_forest_health_treatment_prioritization_2024.pdf

Washington Department of Natural Resources (DNR) and United States Fish and Wildlife Service (USFWS). 2010. Okanogan Lynx Management Zone Interim Guidelines and Recommendations. https://www.dnr.wa.gov/publications/lm_lynx_interim_okanogan_guidance.pdf

Staff Review

Document was reviewed by the following staff:

- Kate McBurney – Assistant Division Manager – Forest Resources Division
- Larry Leach – Region Manager – Southeast Region
- Brett Walker – Assistant Region Manager – Northeast Region
- Andrew Townsend – District Manager – Northeast Region
- Denise Roush-Livingston – Environmental Planner – Strategic Planning
- Sharon Lumbantobing – Assistant Division Manager – Strategic Planning
- Kristoffer Larson – Lead Economist – Office of Finance, Budget, and Economics
- Dale Yi – Operations Research Specialist – Office of Finance, Budget, and Economics

Document was reviewed and approved by the following members of the SHC Steering Committee as of March 20, 2025:

- Todd Welker – Deputy Supervisor for State Uplands
- Cameron Crump – Forest Resources Division Manager
- Duane Emmons – Assistant Deputy Supervisor for State Uplands
- Michael Kearney – Product Sales and Leasing Division Manager