

# Washington Department of Natural Resources Sustainable Harvest Calculation for Eastern Washington

## Staff Report

**To:** Sustainable Harvest Calculation Steering Committee

**From:** Sustainable Harvest Calculation (SHC) Project Teams

**Prepared by:** Glynis Gordon, Project Manager of the Sustainable Harvest Calculation for Eastern Washington

**Subject:** Sustainable Harvest Units (SHUs) and the Harvest Flow Constraint

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### Proposed Actions

1. The Sustainable Harvest Calculation Steering Committee is requested to facilitate the determination of sustainable harvest units to be used in the sustainable harvest calculation for eastern Washington.
2. The Sustainable Harvest Calculation Steering Committee is requested to facilitate the determination of how the harvest flow constraint, or the maximum allowable variation between decadal harvest volume levels, will be applied to the sustainable harvest calculation for eastern Washington.

### Background

A sustainable harvest unit (SHU) is a geographic area of Washington state trust lands from which timber harvest is conducted on a continuing basis without major prolonged curtailment or cessation. The Department of Natural Resources (DNR) is required to calculate a sustainable harvest level for each SHU. DNR's Policy for Sustainable Forests (December 2006) provides the context for this definition below in the following excerpts:

- “For Eastern Washington, sustainable harvest units will be determined as part of the Eastern Washington sustainable harvest calculation.”
- “The department will calculate, and the Board of Natural Resources will adopt, a separate long-term decadal sustainable harvest level for each of several distinct sustainable harvest units.”
- “...within each sustainable harvest unit...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....” ([Policy for Sustainable Forests](#), pp.28-29)

In the excerpts quoted above, the Policy for Sustainable Forests states that SHUs will be determined as part of the sustainable harvest calculation (SHC) for eastern Washington, unlike for western Washington where each SHU is defined within the policy. It also specifies that the calculation and adoption of a long-term decadal sustainable harvest level will take place separately for each SHU. The definition for “sustainable harvest level” is derived from the statutes which guide DNR to calculate a sustainable harvest level, including [RCW 79.10.300](#), [RCW 79.10.310](#), and [RCW 79.10.320](#). Most notably, [RCW 79.10.310](#) defines that DNR’s sustained yield plans will “provide harvesting on a continuing basis without major prolonged curtailment or cessation of harvest.” This is further interpreted in the Policy for Sustainable Forests, quoted above, which states that DNR must calculate an estimated multi-decade harvest level in which the mean annual timber volume from any decade will not vary up or down more than 25 percent from the level of the preceding decade. This constraint specifies how DNR will ensure intergenerational equity for its trust beneficiaries at the SHU level by providing a sequential flow of harvest volume in perpetuity. This maximum limit on the variability of harvest level volumes between decades will be referred to in this document as the “harvest flow constraint.”

DNR will utilize an integrated optimization model to establish a sustainable harvest level that can theoretically be harvested in perpetuity. The harvest level will be expressed in thousands of board feet by eastern Washington sustainable harvest unit. The model will be formulated over a long timeframe (more than one harvest rotation) and will be bound by the constraints of the agency’s current operating environment. Additionally, the model will be formulated to ensure that the solution meets the harvest flow constraint described above while optimizing economic value.

As with any optimization model, the model will provide one of (potentially many) solutions. The more constrained the model is, the fewer solution pathways are available, which can make it harder to generate a suite of solutions. The delineation of SHUs and the harvest flow applied to these units act as constraints in the model. If the SHUs are too small (geographic area), or SHUs contain an uneven distribution of forest conditions (i.e. disproportionate amount of non-harvestable forest), the model may be unable to identify a solution that meets the agency’s operating environment and satisfies the harvest flow constraint within a given SHU. For this reason, fewer, larger SHUs offer the model more solution pathways (i.e. greater flexibility) to identify a solution. Additionally, if SHUs are too small, the model may provide solutions that are not operationally feasible or realistic. For instance, the sustainable harvest level for a planning decade may require a smaller quantity of volume to be harvested than what would generally be offered in a single timber sale, which would not make sense on the operational planning scale.

The 1996 eastside sustainable harvest calculation used SHUs based roughly on administrative DNR district boundaries. These SHUs, pictured in Figure 1 in the next section of this document, are described in DNR’s 1992 Forest Resource Plan in Policy No. 7, “Eastern Washington Ownership Groups.” This policy states, “the department will establish even-flow harvest levels within specified ownership groups in Eastern Washington” and then lists the five SHUs. However, this 1992 policy did not actually change the ownership groups (SHUs) that were used in the sustainable harvest calculation prior to 1996, stating, “the policy explains and clarifies current department practice. It will not change the department’s Eastern Washington ownership groups.” The policy

then briefly describes how the harvest level would be calculated and what the current harvest level was but does not explain why these five SHUs were chosen. However, the 1996 SHU configuration follows DNR district boundaries that logically align with the management structure of DNR.

## **Analysis of Potential SHUs**

DNR must identify SHUs to be used in the next sustainable harvest calculation for eastern Washington. Four potential options for SHU configurations are discussed below, along with explanations for why other options were excluded from consideration.

All acreage values are based on data from DNR’s large data overlay (LDO) querying forested state trust lands on January 25, 2024.

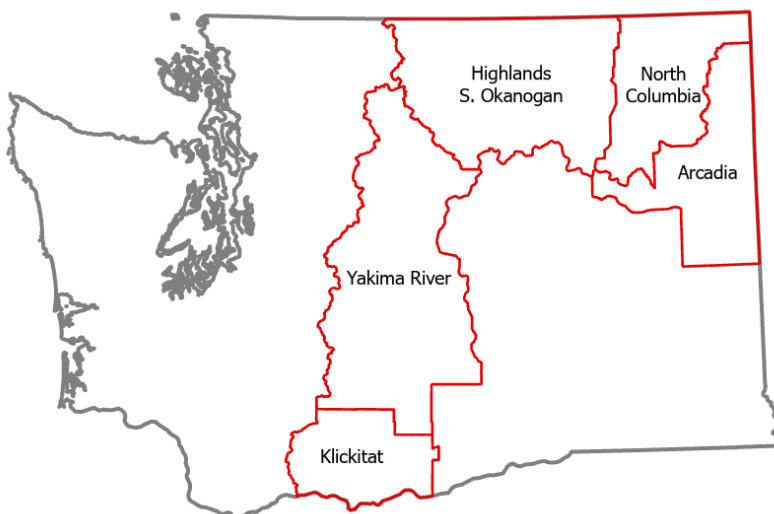
### ***Option 1: SHUs from the 1996 Eastern Washington Sustainable Harvest Calculation (5 SHUs)***

In 1996, five SHUs were designated for eastern Washington as follows:

- Highlands and South Okanogan – 199,445 acres
- North Columbia - 127,769 acres
- Arcadia - 66,202 acres
- Klickitat - 90,988 acres
- Yakima River - 199,923 acres

Please note, the acres above reflect the current acreage of forested state trust lands encompassed in these SHU boundaries and not the acreage present in 1996. Land trades and acquisitions have significantly altered the land base over time.

**Figure 1:** SHU map from the 1996 eastern Washington sustainable harvest calculation



The 1996 SHUs follow logical administrative boundaries along district lines, with the Highlands and South Okanogan Districts grouped together and the Yakima River SHU encompassing the current

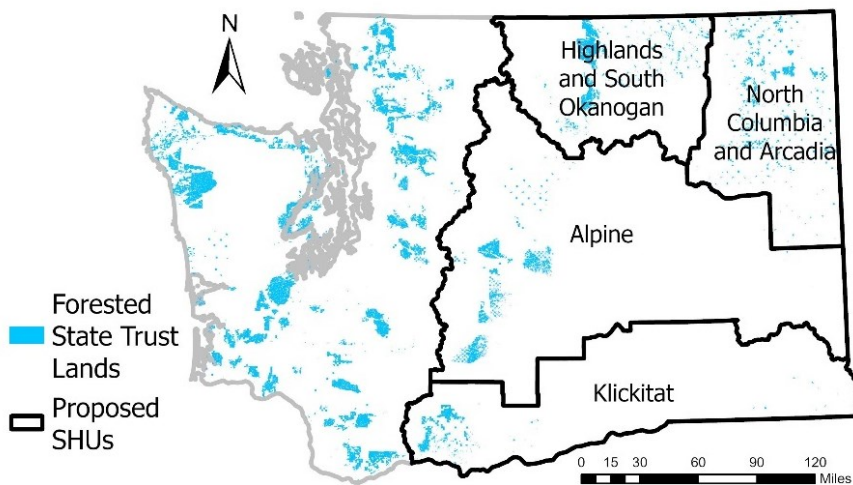
Alpine District. As mentioned previously, this configuration aligns with the management structure of DNR, in which the planning and implementation of timber sales to meet sustainable harvest levels takes place at the district level. However, these SHUs exclude the current Snake River and Columbia Basin administrative units, which do contain a small amount of forested state trust lands. For this reason, it may make sense to update the 1996 SHUs to align more closely with the current land base.

Adopting the 1996 SHUs or a similar SHU configuration would conform to management plan restrictions that impact individual geographic units. For instance, DNR’s Habitat Conservation Plan only impacts the Klickitat and Yakima River SHUs while the Loomis State Forest Plan only impacts the Highlands and South Okanogan SHU. These plans provide distinct objectives that must be taken into consideration alongside DNR’s obligations to provide economic value to trust beneficiaries. Providing individual sustainable harvest level targets for landscapes impacted by plan restrictions may assist the Regions in planning and implementing harvest plans that meet these distinct objectives and constraints.

**Option 2: Administrative Unit SHUs – Updated from 1996 SHUs**

- Highlands and South Okanogan – 199,445 acres
- North Columbia and Arcadia – 193,971 acres
- Klickitat (Klickitat Unit and Snake River block) – 93,394 acres
- Alpine (Alpine Unit and Columbia Basin block)- 193,910 acres

**Figure 2:** Map showing the proposed Option 2 SHU



Option 2 proposes a similar SHU configuration to the 1996 SHUs, with minor updates that align it more closely with the current management structure of DNR Regions and expand the SHUs to encompass state trust lands in the Snake River and Columbia Basin administrative units. In Northeast Region, the North Columbia SHU and the Arcadia SHU will be grouped to reflect that

these two districts are now managed concurrently with many of the same objectives and management constraints. In Southeast Region, the Yakima River SHU will be renamed to the “Alpine” SHU to align with current DNR district names. Additionally, the small Snake River administrative block (2,406 forested acres) will be grouped into the Klickitat SHU and the Columbia Basin administrative block (988 forested acres) will be grouped into the Alpine SHU.

This SHU configuration aligns with DNR’s land plan restrictions and is supported by DNR Region management. Like in Option 1, the landscapes that are bound by land plan restrictions would be logically divided among these four SHUs. Option 2 proposes SHUs that are large enough to afford the model flexibility in providing optimized solutions for the sustainable harvest level while also providing DNR Regions with the ability to plan for future harvests in individual landscapes that have habitat or landscape constraints.

**Option 3: Trust-based SHUs**

**Table 1:** Forested state trust land ownership by acres in eastern Washington

<b>Forested Surface Trust Ownership in Eastern Washington</b>	<b>Acres</b>
Agricultural School	<b>27,266</b>
Capitol Grant	<b>11,883</b>
Charitable, Educational, Penal & Reformatory Institutions	<b>12,490</b>
Common School and Indemnity	<b>557,743</b>
Escheat	<b>1,498</b>
Normal School	<b>21,891</b>
Scientific School	<b>12,012</b>
Tidelands – 2 <sup>nd</sup> Class	<b>1,083</b>
University Original	<b>501</b>
University Transferred	<b>14,016</b>
<b>Federally granted trusts (sub-total)</b>	<b>660,383</b>
State Forest Purchase	<b>80</b>
<i>Klickitat County</i>	40
<i>Stevens County</i>	40
State Forest Transfer	<b>20,257</b>
<i>Klickitat County</i>	19,305
<i>Okanogan County</i>	10
<i>Skamania County</i>	799
<i>Stevens County</i>	144
<b>County trusts (sub-total)</b>	<b>20,337</b>
<b>Total</b>	<b>680,720</b>

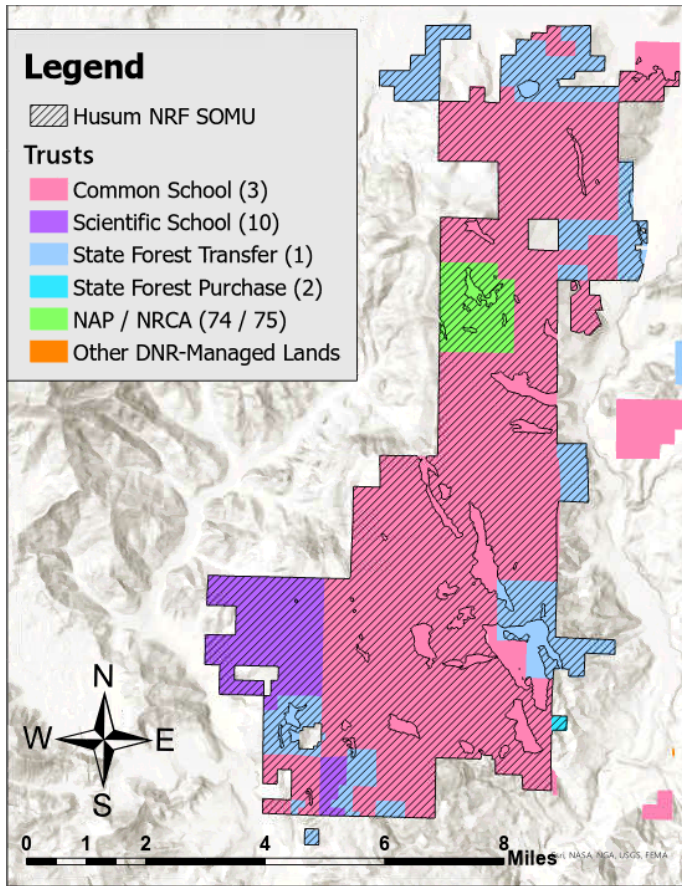
Option 3 proposes a trust-based SHU configuration in which each individual trust is managed as a separate SHU. The table above shows the breakdown of forested trust ownership acres in eastern Washington, with the State Forest Transfer and State Forest Purchase lands further broken down by individual county beneficiaries.

The vast majority of state trust lands in eastern Washington are in federally granted trusts (97%), with 82% of the total lands (557,743 acres) being part of the Common School trust. The other federally granted trusts ownerships are much smaller and vary drastically in their sizes from 501 acres to 27,266 acres. Only 20,337 total acres are located in State Forest Purchase or State Forest Transfer lands which are managed for county trust beneficiaries. Of this county trust land, 19,345 acres are located in Klickitat County, while the remainder of only 1,032 acres of county trust land are distributed across Skamania, Stevens, and Okanogan counties.

Apart from the Common School trust ownership, all other trust ownerships are relatively small to consider managing individually on a sustained yield basis. Additionally, some ownerships are extremely small, and it is likely impossible to manage these on a sustained yield basis. Using the individual trusts as SHUs would limit the flexibility of the model in identifying feasible solutions for calculating a harvest level. The model may not be able to meet harvest flow constraints or may provide solutions that are not operationally practical. This could limit forest managers in their ability to design timber sales that meet harvest objectives and optimize economic value.

It is also important to note that on DNR-managed lands, trust ownership is irregularly scattered across the landscape which makes a trust-based SHU configuration difficult for operational planning. Trusts generally follow survey boundaries (e.g., sections or quarter sections) that may be split by and/or share management areas associated with habitat and other landscape objectives with other adjacent trusts. This can make it difficult for DNR region staff to plan for multiple management objectives as the harvest activities in the remainder of the management area must be factored into harvest planning decisions (see Figure 2). In addition, the requirement that land managers must meet volume targets based on trust boundaries may force managers into poor decision-making at an operational planning level. Planning individual timber sales requires consideration of numerous factors, including: access, terrain, and ecological features which help to determine a logging plan; secondary objectives such as habitat or forest health enhancement; and financial considerations, such as designing timber sales that are large enough to attract purchasers and ultimately generate revenue for the trusts. None of these factors follow the survey lines of a trust-based map, which makes it likely that land managers will be forced to make suboptimal decisions to accommodate the trust boundaries. Additionally, strategic models cannot account for all of the operational factors listed above, and thus, the modeled targets may provide solutions that seem viable at the strategic level, but are operationally or financially infeasible. If the eastside trusts were all considered as separate SHUs, the risk of calculating harvest levels that are not operationally or financially feasible to implement would be increased.

**Figure 2:** Husum NRF (Nesting, Roosting, and Foraging) SOMU (Spotted Owl Management Unit) overlaid over trust ownership. Decisions on managing for northern spotted owl habitat in this SOMU would be complicated by trust boundaries in a trust-based SHU configuration.



**Option 4: DNR Regions (2 SHUs)**

- Northeast Region – 393,416 acres
- Southeast Region – 287,305 acres

Selecting an SHU configuration based on the two DNR Regions in eastern Washington would provide large land bases that would allow for flexibility in modeling and in implementing the sustainable harvest level. Like the option of using districts to determine SHUs, this option shares the advantage of creating large, geographically contiguous units that can be sustainably managed for ecological and habitat objectives at the landscape level while still providing a predictable flow of timber volume to the trust beneficiaries. The use of DNR Regions as SHU boundaries would also align with DNR’s business practices in much the same way that Option 2 does, since the Regions are discreetly managed administrative units. As described in the analysis of Option 2, the use of administrative units as SHUs gives staff predictability in timber sale planning and the ability to strive to meet specific, long-term objectives on a regional level.



## ***Other considerations***

Some options were excluded from consideration during initial discussion phases of this process. These options would have made it more difficult for DNR to fulfill its multiple objectives and its obligations to the trust beneficiaries.

One option that was excluded from consideration was the concept of including the entire eastside in one SHU. While this option would allow DNR flexibility in determining a solution in modeling a harvest level, it would provide little guidance for timber sale planning in individual landscapes that have distinct habitat or other landscape-level objectives and constraints.

Of course, other SHU configurations are possible, and staff could analyze additional recommendations proposed by the Steering Committee if requested.

## **Analysis for the Harvest Flow Constraint**

DNR must determine how to constrain harvest flow in the chosen SHUs across decades in the forest estate model. As described in more detail in the Background section of this document, the harvest flow constraint specifies how DNR will ensure intergenerational equity for its trust beneficiaries at the SHU scale by providing a sequential flow of harvest volume in perpetuity. The Policy for Sustainable Forests states that, "...within each sustainable harvest unit...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.

For western Washington, the Policy for Sustainable Forests specified how the harvest flow constraint was to be applied to the SHUs. Specifically, it required that the harvest flow constraint be applied to each SHU individually, except for the State Forest Transfer SHUs, which were to be treated collectively (i.e., as one SHU) when applying the constraint. For eastern Washington, the Policy for Sustainable Forests does not provide any such direction, as there are no eastern Washington SHUs stipulated in the 2006 document. The impact of a harvest flow constraint on harvest volume becomes larger as the geographic scale it is applied to becomes smaller. However, the benefit of a harvest flow constraint is that it provides more certainty in harvest volume levels over time for that planning area.

Historically staff have interpreted the flow constraint to be forward-looking, meaning the harvest volume for the current decade that has a Board approved harvest level does not constrain the upcoming planning decade and subsequent decades for the current SHC. This interpretation is based on the assertion that the agency may need to make major policy changes in subsequent SHCs (e.g., due to changes to state or federal law) that would result in volume changes greater than 25% from the current decade's level. In the case of this eastside calculation, major changes to DNR's land base, policies, land plans, inventory system, and technology have taken place since the last eastside calculation in 1996. The interpretation of this constraint as forward-looking would



provide DNR with the ability to recalculate a harvest level based on new data and technology without influence from the outdated 1996 harvest level.

## **Recommendation for Potential SHUs**

The Project Team is forwarding a recommendation of Option 2 for a determination to be made by the SHC Steering Committee on the configuration of SHUs to be used for the sustainable harvest calculation for eastern Washington.

## **Recommendation for the Harvest Flow Constraint**

The Project Team is forwarding a recommendation of using 25% as the MAXIMUM ALLOWABLE VARIATION BETWEEN DECADAL HARVEST VOLUME LEVELS for a determination to be made by the SHC Steering Committee on the harvest flow constraint to be used for the sustainable harvest calculation for eastern Washington. The Project Team recommends that this restriction only applies to the planning decade and future decades in the sustainable harvest calculation. Lastly, the Project Team recommends that the flow constraint should be applied to the adopted eastern Washington SHUs individually.

## **Review and Decision**

Document was reviewed and edited by:

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- Andrew Johnson – IT Business Analyst – FRD
- Allen Estep – Assistant Division Manager – FRD
- Larry Leach – Region Manager – Southeast Region
- Brett Walker – Assistant Region Manager – Northeast Region
- Cameron Crump – Forest Resources Division Manager
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- Sarah Ogden – Trust Outreach Specialist
- Justin Schmal – Environmental Planner – P&P

Document was reviewed by the following members of the SHC Steering Committee:

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

The Steering Committee has approved the staff recommendations as project decisions as of October 10, 2024.