STATE FOREST LAND
SEPA ENVIRONMENTAL CHECKLIST

Purpose of checklist:

Governmental agencies use this checklist to help determine whether the environmental impacts of your proposal are significant. This information is also helpful to determine if available avoidance, minimization or compensatory mitigation measures will address the probable significant impacts or if an environmental impact statement will be prepared to further analyze the proposal.

***Instructions for applicants*:**

This environmental checklist asks you to describe some basic information about your proposal. Please answer each question accurately and carefully, to the best of your knowledge. You may need to consult with an agency specialist or private consultant for some questions. You may use "not applicable" or "does not apply" only when you can explain why it does not apply and not when the answer is unknown. You may also attach or incorporate by reference additional studies reports. Complete and accurate answers to these questions often avoid delays with the SEPA process as well as later in the decision-making process.

*Questions in italics are supplemental to Ecology's standard environmental checklist. They have been added by the DNR to assist in the review of state forest land proposals. Adjacency and landscape/ watershed-administrative-unit (WAU) maps for this proposal are available on the DNR internet website at **http://www.dnr.wa.gov/sepa**. These maps may also be reviewed at the DNR regional office responsible for the proposal. This checklist is to be used for SEPA evaluation of state forest land activities.*

The checklist questions apply to all parts of your proposal, even if you plan to do them over a period of time or on different parcels of land. Attach any additional information that will help describe your proposal or its environmental effects. The agency to which you submit this checklist may ask you to explain your answers or provide additional information reasonably related to determining if there may be significant adverse impact.

Instructions for Lead Agencies:

Additional information may be necessary to evaluate the existing environment, all interrelated aspects of the proposal and an analysis of adverse impacts. The checklist is considered the first but not necessarily the only source of information needed to make an adequate threshold determination. Once a threshold determination is made, the lead agency is responsible for the completeness and accuracy of the checklist and other supporting documents.

Use of checklist for nonproject proposals:

For nonproject proposals (such as ordinances, regulations, plans and programs), complete the applicable parts of sections A and B plus the SUPPLEMENTAL SHEET FOR NONPROJECT ACTIONS (part D). Please completely answer all questions that apply and note that the words "project," "applicant," and "property or site" should be read as "proposal," "proponent," and "affected geographic area," respectively. The lead agency may exclude (for non-projects) questions in Part B - Environmental Elements –that do not contribute meaningfully to the analysis of the proposal.

A. BACKGROUND

1. Name of proposed project, if applicable:

Timber Sale Name: **SYLVAN PEARL**
Agreement # **30-103620**

2. Name of applicant: **Washington Department of Natural Resources**

3. Address and phone number of applicant and contact person:
Washington Dept. of Natural Resources
950 Farman Ave. North
Enumclaw, WA 98022
Contact: Audrey Mainwaring (360) 825-1631

4. Date checklist prepared: **05/10/2024**

5. Agency requesting checklist: **Washington Department of Natural Resources**

6. Proposed timing or schedule (including phasing, if applicable):
a. *Auction Date:*
12/17/2024

b. *Planned contract end date (but may be extended):*
10/31/2027

c. Phasing:
None

7. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain.
☐ *No, go to question 8.* ☒ *Yes, identify any plans under A-7-a through A-7-d:*

a. Site Preparation:
No

b. Regeneration Method:
Hand plant with native conifers within three years of harvest in units #1 - #7. The harvest unit will be planted at a density that meets or exceeds Forest Practices standards per WAC 222-34-010. Plantings will be supplemented by natural regeneration from adjacent conservation areas and leave trees within harvest units. Following planting, DNR will conduct surveys and additional reforestation actions as necessary based on survey results to ensure reforestation standards are met.

c. Vegetation Management:
Slashing is planned, surveys will be conducted approximately 1-10 years following harvest to assess the need for vegetation management and planned as needed. Hand application of herbicides may be used sparingly, if needed, to control competing vegetation and/or noxious weeds.

d. Other:

Pre-commercial thinning needs may be assessed at approximately 8-12 years of age. Road maintenance assessments will be conducted and may include periodic ditch and culvert cleanout, and grading as necessary. Rock may be obtained from onsite sources.

8. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal. *Note: All documents are available upon request at the DNR Region Office.*

☒ *303 (d) – listed water body in WAU*: **Green River, Gale Creek, unnamed tributary to Charley Creek**

☒ *temp*

☐ *sediment*

☒ *completed TMDL (total maximum daily load)*

☒ *Landscape plan:* **South Puget HCP Planning Unit Forest Land Plan Final EIS (2010)**

☐ *Watershed analysis:*

☐ *Interdisciplinary team (ID Team) report:*

☒ *Road design plan:* **Included in Road Plan, dated 09/01/2023**

☐ *Wildlife report:*

☐ *Geotechnical report:*

☒ *Other specialist report(s):* **Geologic Field Summary by DNR licensed geologist for the Sylvan Pearl Timber Harvest, dated 09/07/2023; Memorandum for Cliff Protection for Unit 5 by Alan Mainwaring, dated 10/05/2023**

☒ *Memorandum of understanding (sportsmen's groups, neighborhood associations, tribes, etc.):* **MOU between State of Washington and City of Tacoma**

☒ *Rock pit plan:* **Included in Road Plan, dated 09/01/2023**

☒ *Other:* **Additionally, the following was reviewed and consulted in design of this proposal:**

- **DNR Policies and Implementation**
  - **Policy for Sustainable Forests (PSF; 2006a)**
  - **Final Environmental Impact Statement on the Policy for Sustainable Forests (2006b)**
  - **Alternatives for the Establishment of a Sustainable Harvest Level for Forested State Trust Lands in Western Washington Final Environmental Impact Statement (2019)**
  - **Landscape Assessment to Identify and Manage Structurally Complex Stands to Meet Older-Forest Targets in Western Washington, May 2024 (Revised September 2024)**
  - **Identifying Mature and Old Forests in western Washington by Robert Van Pelt (2007)**
  - **Silvicultural Rotational Prescriptions**
  - **Land Resource Manager Reports, including Special Concerns Report, and associated maps**
- **DNR Trust Lands Habitat Conservation Plan and Supplemental Information**
  - **Final Habitat Conservation Plan (HCP; 1997)**
  - **Final (Merged) Environmental Impact Statement for the Habitat Conservation Plan (1998)**
  - **Long-Term Conservation Strategy for the Marbled Murrelet Final Environmental Impact Statement (2019)**

- **Final State Trust Lands Habitat Conservation Plan Amendment: Marbled Murrelet Long-term Conservation Strategy**
- **Riparian Forest Restoration Strategy (RFRS; 2006)**
- **USFWS letter to DNR, signed 10/27/2021 clarifying projections of forest types and stand structural conditions on Washington DNR State Trust Lands**
- **Spotted Owl Habitat GIS Layer**
- **Marbled Murrelet Habitat GIS Layer**
- **WAU Rain-On-Snow GIS Layer**
- **Biological Opinion on the HCP, USFWS; January 27, 1997**
- **Biological Opinion on the HCP, NMFS; January 29, 1997**
- **Biological Opinion on the HCP Marbled Murrelet Long-term Conservation Strategy Amendment, USFWS; November 7, 2019**
- **Reinitiated Biological Opinion on the Incidental Take Permit (PRT-812521), USFWS; March 21, 2024**

• Forest Practices Regulations and Compliance
- **Forest Practices Rules (Title 222 WAC)**
- **Forest Practices Board Manual**
- **Forest Practices Activity Maps**
- **Trust Lands HCP Addendum and Checklist**

• Supporting Data for Unstable Slopes Review
- **State Lands Geologist Remote Review (SLGRR)**
- **Lidar Data and Derivatives**
- **Draft Landform Remote Identification Model (LRIM) screening tool**
- **Published Landslide Inventories**
- **Historic Aerial Photographs**
- **Published Geologic Mapping**

• Supporting Data for Cultural Resources Review
- **Historical Aerial Photographs**
- **USGS and GLO maps**
- **Department of Archaeology and Historical Preservation database for architectural and archaeological resources and reports (WISAARD)**

• Additional Supporting Data for Policy Compliance
- **Weighted Old Growth Habitat Index (WOGHI)**
- **State Soil Survey**
- **DNR inventory layers, including RS_FRIS**
- **Stand Origin Assessment form for Sylvan Pearl Timber Sale**
- **Stand Development Stage Assessment form for Sylvan Pearl Timber Sale**

- **Forest Stewardship Council and Sustainable Forestry Initiative certification standards and audit reports**
- **Reviews by and communications with State Lands Geologist, State Lands Archaeologist, and Region Biologist**
- **Additional Supporting Data for Carbon Analysis of Management Alternatives (used to populate the "Analysis of Carbon Flux by Harvest Alternative" portion of Appendix B to this checklist)**

Referenced documents may be obtained at the region office responsible for this proposal.

9. Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain.
None known.

10. List any government approvals or permits that will be needed for your proposal, if known.

☒ *FPA #* **2423677** ☒ *FPHP* ☒ *Board of Natural Resources Approval*
☒ *Burning permit* ☐ *Shoreline permit* ☐ *Existing HPA*
☐ *Other:*

11. Give brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page. (Lead agencies may modify this form to include additional specific information on project description.)

a. Complete proposal description:

The Sylvan Pearl Timber Sale proposal encompasses 334 acres of forested land spanning the Howard Hanson and North Fork Green River Watershed Administrative Units on DNR managed trust land within the Tacoma Watershed. The proposal area was evaluated by the unit forester, region biologist, archaeologist, and geologist. Areas where timber harvest is inconsistent with one or more of the agency's objectives have been excluded from planned harvest and contribute to conservation areas through long-term forest cover (e.g. potentially unstable slopes, riparian and wetland buffers, old growth stands, or habitat for state or federally listed species needed to meet DNR's Habitat Conservation Plan objectives and other conservation commitments, etc.).

Having identified areas to be reserved for conservation, the final proposal design includes 164 net acres of timber harvest and 170 acres (51% of the overall proposal area) designated for conservation as long-term forest-cover to protect streams, wetlands, potentially unstable slopes, unique ecological areas, and cultural resources and will contribute to older-forests over time.

The harvest area consists of seven variable retention harvest (VRH) units, and one associated right of way (ROW) unit harvesting approximately 6,251 MBF of merchantable timber.

Each harvest unit net acreage is as follows:

Unit 1 – 24 acres
Unit 2 – 1 acre
Unit 3 – 4 acres
Unit 4 – 2 acres
Unit 5 – 23 acres
Unit 6 – 62 acres
Unit 7 – 47 Acres
Unit 8 ROW – 0.6 Acres

Roadwork associated with this timber sale consists of forest road construction and maintenance. Maintenance will consist of cleaning culverts and catch basins, reconstructing

ditches, applying rock, installing drain structures, grading, and other tasks outlined in the road plan.

DNR is directed by Washington State Legislature to manage state trust land "based on sound principles designed to achieve the maximum effective development and use of such lands and resources consistent with laws applicable thereto" (RCW 43.30.215). DNR manages nearly 3 million acres of state trust lands, which are held in trust for specific beneficiaries. Those beneficiaries include K-12 schools, public universities, counties, and local taxing districts. The term "state trust lands" refers to lands granted to the state by the federal government at statehood (RCW 79.02.010), lands transferred to Washington State from counties following tax foreclosure (RCW 79.22.010 and 79.22.040), and lands purchased by the state and managed on behalf of the beneficiaries (RCW 79.22.020). As a trust land manager, DNR's responsibility is to manage all state trust lands consistent with fiduciary principles. On forested state trust lands, revenue is primarily produced through the harvesting of trees for timber, though the agency frequently generates supplemental revenue through other means including (but not limited to) leases and permits for non-timber forest products, biomass leases, communication site leases, and road usage fees.

This proposal is located on forested state trust lands identified in DNR's sustainable harvest calculation as lands available for revenue generation for trust beneficiaries. The timber volume at this project area contributes to sustainable harvest levels for Western Washington approved and adopted by the Board of Natural Resources. The purpose of this project is to generate revenue for the beneficiaries associated with the underlying trusts through the sale and removal of valuable material—in this case timber. In addition to producing revenue for trust beneficiaries, this proposal meets conservation and long-term site productivity objectives by protecting soil health and potentially unstable slopes, protecting and restoring riparian and wetland habitat, and meeting all of the requirements of DNR's Habitat Conservation Plan. This project also supplies sustainably grown timber to local mills, which supports DNR's Policy on Local Economic Vitality, a component of the agency's Policy for Sustainable Forests.

This proposal is within the Black Diamond Spotted Owl Management Unit (SOMU) in the South Puget HCP Planning Unit. DNR's HCP requires 50 percent of the 24,137 managed acres in the Black Diamond SOMU to be maintained as suitable northern spotted owl (NSO) habitat. The Black Diamond SOMU is currently at 50.8 percent total NSO habitat across the landscape, and it therefore contains a surplus of acreage (196 acres) above the 50 percent threshold available for variable retention harvest. This proposal includes harvest of 26 acres of NSO habitat within the SOMU, leaving 170 acres remaining above the 50 percent threshold following harvest.

b. *Describe the stand of timber pre-harvest (include major timber species and origin date), type of harvest and overall unit objectives.*

Pre-harvest Stand Description:

The stands within the harvest units are comprised predominately of naturally regenerated Douglas-fir (DF) with a lesser component of western hemlock (WH), noble (NF) and silver fir, western red cedar (RC), red alder (RA), bigleaf maple (MA) and black cottonwood (BC) in the canopy. The understory vegetation is sparse, consisting primarily of sword fern,

Oregon grape, salal, vine maple and huckleberry. There is minimal presence of shade tolerant species within the lower or mid-canopy. There is also minimal structure within stands with what is presently consisting of large stumps and dispersed cull logs remaining from the previous harvest and smaller second-growth diameter competitive mortality trees. The stage of stand development for the harvest areas within this proposal on the stand level scoring using the Van Pelt guide (2007) includes Biomass Accumulation/Competitive Exclusion, Maturation I, and Maturation II. The adjacent areas conserved in RMZs and WMZs associated with this proposal are similar stand types as the adjacent harvest areas.

Unit	Origin Date	Major Timber Species	Type of Harvest
1	Post 1930	DF, WH, RC, RA, BC, MA	VRH
2	Post 1930	DF, WH, RC, RA, BC, MA	VRH
3	Post 1950	DF, WH, RC, RA, BC, MA	VRH
4	Post 1950	DF, WH, RC, RA, BC, MA	VRH
5	Post 1950	DF, WH, RC, RA, BC, MA	VRH
6	Post 1960	DF, WH, RC, RA, BC, MA, SF, NF	VRH
7	Post 1960	DF, WH, RC, RA, BC, MA, SF, NF	VRH
8	Post 1950	DF, WH, RC, RA, BC, MA, SF, NF	ROW

Origin Date derived from field sampling and a review of US Army 1942 Eagle Basin historical photo DNR GIS layer.

Proposal Objectives:

Short Term Objectives

1) **Generate non-tax revenue for the beneficiaries of the underlying trusts through harvest of the existing stand as part of DNR's sustained yield trust obligations and fiduciary requirements as trust managers per RCW 79.10.300-340 and RCW 79.15.**
2) **Protect upland soil productivity and water quality and habitat within the riparian management zones.**
3) **Retain legacy trees within the timber sale for the future stand to maintain biological and structural diversity, preserve native seed source, shade and maintain the productivity of the site and future stand, and protect water quality and wildlife habitat.**
4) **Contribute to conservation areas identified as long-term forest cover through HCP and other regulatory protection and mitigation measures.**
5) **Supply sustainably grown timber to local mills and support jobs and economic activity for local economies.**
6) **Establish a new stand of site-appropriate, native conifers through hand planting (supplemented with natural regeneration) and maintain for long-term forest management. The growth of these trees may be enhanced and managed by altering the density of the new stand through pre-commercial thinning to produce future high-quality timber and NSO dispersal habitat.**
7) **Maintain NSO habitat according to DNR's HCP commitments.**
8) **Maintain hydrologic maturity across DNR managed landscapes according to DNR procedure PR 14-004-060.**

Long Term Objectives

1) **Actively manage for long-term site productiveness for intergenerational benefit to the trust, primarily through revenue generation for trust beneficiaries through timber**

stand management. A series of silviculture activities will be scheduled as needed in the sale area as the new stands develops. The primary objective of each treatment is to ensure growth of a healthy, resilient stand of native tree species to create revenue for the trusts.

2) **Maintain current and historical uses of the site, including preservation of water quantity and quality, active forest management, and public and tribal use.**
3) **Resource protection and conservation through implementation of the HCP and DNR's regulatory and management framework.**
4) **Manage SOMU as NSO habitat per DNR's HCP commitments.**
5) **Manage hydrologic maturity across DNR managed lands according to DNR's procedure PR 14-004-060.**
6) **Balance trust income, environmental protection, and social and cultural benefits according to the DNR trust land management framework.**

c. *Describe planned road activity. Include information on any rock pits that will be used in this proposal. See associated forest practice application (FPA) for maps and more details.*

Type of Activity	How Many	Length (feet) (Estimated)	Acres (Estimated)	Fish Barrier Removals (#)
Construction		**4,464**	**0.5**	**0**
Reconstruction		**0**		**0**
Maintenance		**71,625**		**0**
Abandonment		**3,358**	**1.5**	**0**
Bridge Install/Replace	**0**			**0**
Stream Culvert Install/Replace (fish)	**0**			**0**
Stream Culvert Install/Replace (no fish)	**2**			
Cross-Drain Install/Replace	**18**			

Routine maintenance will occur on roads used throughout the life of this proposal.

12. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist *(See "WAU Map(s)" and "Timber Harvest Unit Adjacency Map(s)" as referenced on the DNR website: http://www.dnr.wa.gov/sepa. Click on the DNR region of this proposal under the Topic "Current SEPA Project Actions - Timber Sales." Proposal documents also available for review at the DNR Region Office.)*

a. *Legal description:*
T21-0N R8-0E Sections 25 and 36
T21-0N R9-0E Sections 19, 20, 29, and 30

b. *Distance and direction from nearest town:*
Approximately 16 miles east of the town of Cumberland, WA.

13. Cumulative Effects

a. *Briefly describe any known environmental concerns that exist regarding elements of the environment in the associated WAU(s). (See WAC 197-11-444 for what is considered an element of the environment).*

The Howard Hanson WAU encompasses a municipal drinking water supply for the city of Tacoma and a federal flood control reservoir and dam. The Howard Hanson WAU, as well as the adjacent North Fork Green River WAU, includes potential unstable slopes, cultural resources, Northern Spotted Owl (NSO) Dispersal Habitat, and is a 303(d) waterway.

DNR analyzed carbon sequestration and carbon emissions from projected land management activities within its Final Environmental Impact Statement (FEIS) for the 2015-2024 Sustainable Harvest Calculation and the FEIS for the 2019 HCP Long-Term Conservation Strategy for the Marbled Murrelet. At the western Washington scale, land management activities on DNR-managed lands sequester more carbon than emitted. Individual activities, such as this proposal, emit some greenhouse gases, including CO2; however, at the landscape scale, DNR's sustainable land management activities, including this proposal, sequester more carbon than they emit. Evaluating carbon sequestration at the western Washington scale is appropriate because a determination of net carbon emissions must consider both the carbon sequestered and the carbon emissions from management within the same analysis area (western Washington). However, DNR has conducted a project-specific carbon analysis as well, which is included as an appendix to this checklist (Appendix B: Climate Change Supplement to the SEPA Checklist).

Recognizing the climate and carbon benefits of working forests in Washington's Climate Commitment Act (RCW 70A.45.005), the legislature found that Washington should maintain and enhance the state's ability to continue to sequester carbon through natural and working lands and forest products. Further, "Washington's existing forest products sector, including public and private working forests and the harvesting, transportation, and manufacturing sectors that enable working forests to remain on the land and the state to be a global supplier of forest products, is, according to a University of Washington study analyzing the global warming mitigating role of wood products from Washington's private forests, an industrial sector that currently operates as a significant net sequesterer of carbon. This value, which is only provided through the maintenance of an intact and synergistic industrial sector, is an integral component of the state's contribution to the global climate response and efforts to mitigate carbon emissions." RCW 70A.45.090(1)(a).

The legislature also found that the 2019 Intergovernmental Panel on Climate Change (IPCC) report "identifies several measures where sustainable forest management and forest products may be utilized to maintain and enhance carbon sequestration. These include increasing the carbon sequestration potential of forests and forest products by maintaining and expanding the forestland base, reducing emissions from land conversion to non-forest uses, increasing forest resiliency to reduce the risk of carbon releases from disturbances such as wildfire, pest infestation, and disease, and applying sustainable forest management techniques to maintain or enhance forest carbon stocks and forest carbon sinks, including through the transference of carbon to wood products" (2020 Washington Laws Ch. 120 §1(2)).

DNR is legally required (RCW 79.10.320) to periodically calculate a sustainable harvest level and manages state trust lands sustainably. DNR has also maintained (statewide) a forest management certificate to the Sustainable Forestry Initiative standard since 2006. In managing state trust lands sustainably, DNR sequesters more carbon than it emits while conducting land management activities such as this proposal. The timber harvested from DNR-managed lands is used to produce climate-smart forest products. The climate impacts of DNR's land management are analyzed in multiple environmental impact statements that have informed the Board of Natural Resources' decisions, including Alternatives for the Establishment of a Sustainable Harvest Level Final Environmental Impact Statement (2019) and the Long-Term Conservation Strategy for the Marbled Murrelet Final Environmental Impact Statement (2019). DNR's approach is consistent with the IPCC, which states that "[m]eeting society's needs for timber through intensive management of a smaller forest area creates opportunities for enhanced forest protection and conservation in other areas, thus contributing to climate change mitigation." Project-specific potential climate impacts are further discussed in Appendix B of this SEPA checklist.

b. *Briefly describe existing plans and programs (i.e. the HCP, DNR landscape plans, retention tree plans) and current forest practice rules that provide/require mitigation to protect against potential impacts to environmental concerns listed in question A-13-a.*

The Department of Natural Resources has a multi-species Habitat Conservation Plan (HCP) with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service concerning threatened and endangered species and their habitats, which requires the Department to manage landscapes to provide and sustain long-term habitat in exchange for an Incidental Take Permit. This agreement substantially helps the Department to mitigate for cumulative effects related to management activities. The Department follows Forest Practices Rules as applicable to roads and potentially unstable slopes. The Department follows Forest Protections related to fire hazard mitigation.

The General Silviculture Strategy (policy) in the Policy for Sustainable Forests (PSF) emphasized that older-forest targets will be accomplished over time and that DNR intends to actively manage structurally complex forests to achieve older-forest structures (i.e. stands with older-forests identified by structural characteristics) across 10 to 15 percent of each western Washington HCP planning unit in 70 to 100 years from the adoption of the PSF.

In September 2024, the DNR revised a document titled '*Landscape Assessment to Identify and Manage Structurally Complex Stands to Meet Older-Forest Targets in Western Washington, May 2024*' (landscape assessment). This document describes the background, historical analyses regarding attainment of older-forest conditions in western Washington, and updated data and modeling analyses showing when the various HCP planning units across western Washington are expected to attain a level of older-forest conditions through implementation of the HCP and other conservation objectives, and outlined as targets within the PSF.

This landscape assessment identifies the existing structurally complex stands, and additional suitable stands, to be managed for older-forest targets over time. The identified stands are located in conservation areas and deferred stands unavailable for regeneration

harvest. These stands include areas identified as long-term forest cover under the marbled murrelet long-term conservation strategy, riparian areas, areas conserved under the multispecies conservation strategy, potentially unstable slopes, spotted owl nest patches, old growth, Natural Areas and Natural Resource Conservation Areas, and other conservation areas permanently deferred from regeneration harvest.

Some of these conservation areas are based on specific HCP strategies that are spatially fixed and conserved on the landscape, such as marbled murrelet occupied sites or spotted owl nest patches. However, other conservation areas are modeled and must be field verified based on HCP strategies, such as riparian areas or unstable slopes. There is naturally some adjustment to the location, absence, or presence of conservation areas upon field verification. This timber sale has been field verified for compliance with all conservation objectives and the planned harvest units are determined not to be regeneration harvest deferred and are available for harvest. These harvest areas also do not count towards the attainment of older-forests over time and have been excluded from the calculations and tables included in the landscape assessment. Conversely, when field verification identifies specific areas required for conservation, they will be protected from harvest and included in future conservation area modeling.

The landscape assessment demonstrates that while the South Puget HCP Planning Unit does not currently contain 10 to 15 percent older-forest conditions, the structurally complex and other suitable stands designated to be managed for older-forest targets are projected to develop into older-forest structure that meets or exceeds this threshold by 2090 (S. PUGET in Table A) through implementation of the HCP and other policies and laws. Stands identified to be managed toward older-forest targets, including currently older-forests and stands projected to develop older-forest structure in the future, are depicted in associated maps within the landscape assessment document for each western Washington HCP planning unit.

Table A. Percent area western Washington HCP planning units with older-forest stands in conservation areas by decade through 2120. With plot discounts and disturbance factor. Landscape Assessment to Identify and Manage Structurally Complex Stands to Meet Older-Forest Targets in Western Washington, May 2024 (Revised September 2024).

ADJUSTED QUERY OUTPUT (WITH PLOT DISCOUNT & DISTURBANCE FACTOR)											
HCP Planning Unit	**Year**										
	2021	**2030**	**2040**	**2050**	**2060**	**2070**	**2080**	**2090**	**2100**	**2110**	**2120**
COLUMBIA	1.0%	1.2%	1.4%	1.7%	2.4%	3.9%	6.2%	9.4%	**13.3%**	**16.5%**	**18.2%**
N. PUGET	3.2%	3.9%	4.9%	6.2%	7.9%	**10.2%**	**13.2%**	**16.7%**	**20.5%**	**23.9%**	**25.0%**
OESF	**10.2%**	**10.7%**	**11.0%**	**11.7%**	**12.6%**	**13.9%**	**15.9%**	**20.0%**	**24.9%**	**28.3%**	**29.5%**
S. COAST	0.2%	0.3%	0.6%	1.2%	2.1%	3.6%	5.9%	8.8%	**12.2%**	**15.9%**	**18.6%**
S. PUGET	1.7%	2.2%	2.7%	3.6%	4.6%	6.1%	8.4%	**11.3%**	**14.4%**	**17.1%**	**18.7%**
STRAITS	1.9%	2.6%	3.2%	4.3%	5.6%	7.4%	9.9%	**12.6%**	**15.1%**	**18.0%**	**19.5%**

DNR has designated forest stand acreage within regeneration harvest deferred areas in each HCP planning unit to meet or exceed the policy's 10% older-forest target. This identified acreage is designated in DNR's GIS database as the Westside Forest Cover

(Conservation Areas) and Older-Forest in Conservation Areas layers.

The Sylvan Pearl Timber Sale is not identified as one of those stands designated to meet older-forest targets over time. Following the timber sale, the variable retention harvest units will be replanted with native, conifer tree species that will be supplemented by natural regeneration expected to occur as a result of the conservation areas in and around the harvest units.

c. *Briefly describe any specific mitigation measures proposed, in addition to the mitigation provided by plans and programs listed under question A-13-b.*
Remote and field reviews were completed by a State Lands Geologist. The proposal boundary excludes all rule-identified landforms (RILs) or areas which were determined to have potential to deliver sediment or debris to public resources or to affect public safety.

Field reconnaissance was done over the proposal area to identify cultural resources.

Road construction and logging practices utilize best management practices and follow Forest Practice rules to prevent sediment delivery to surface water. Maintaining stream and wetland buffers on surface water that provide shade and future recruitment of large woody debris.

d. Based on the answers in questions A-13-a through A-13-c, is it likely potential impacts from this proposal could contribute to any environmental concerns listed in question A-13-a?
No.

e. Complete the table below with the reasonably foreseeable future activities within the associated WAU(s) (add more lines as needed). Future is generally defined as occurring within the next 7 years. This data was obtained from DNR's Land Resource Manager System on the date of processing this checklist and may be subject to change.

WAU Name	Total WAU Acres	DNR-managed WAU Acres	Acres of DNR proposed even-aged harvest in the future	Acres of DNR proposed uneven-aged harvest in the future	Acres of proposed harvest on non-DNR-managed lands currently under active FP permits
NF GREEN	18446	12372	1416	5	235
HOWARD HANSON	46483	26791	2320	677	292

Other management activities, such as stand and road maintenance, will likely occur within the associated WAU(s).

B. ENVIRONMENTAL ELEMENTS

1. Earth

a. General description of the site (check one):
☐ Flat, ☐ Rolling, ☐ Hilly, ☒ Steep Slopes, ☐ Mountainous, ☐ Other:

1. *General description of the associated WAU(s) or sub-basin(s) within the proposal (landforms, climate, elevations, and forest vegetation zone).*

WAU:	NF GREEN
WAU Acres:	18446
Elevation Range:	1145 - 4487 ft.
Mean Elevation:	2460 ft.
Average Precipitation:	88 in./year
Primary Forest Vegetation Zone:	Pacific Silver Fir

WAU:	HOWARD HANSON
WAU Acres:	46483
Elevation Range:	784 - 4758 ft.
Mean Elevation:	2305 ft.
Average Precipitation:	78 in./year
Primary Forest Vegetation Zone:	Western Hemlock

2. *Identify any difference between the proposal location and the general description of the WAU or sub-basin(s).*
   This proposal is a representative example of the WAUs at the same elevation and aspect.

b. What is the steepest slope on the site (approximate percent slope)?
96% in harvest area, 123% in RMZs.

c. What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any agricultural land of long-term commercial significance and whether the proposal results in removing any of these soils.

Note: The following table is created from state soil survey data. It is an overview of general soils information for the soils found in the sale area. The actual soil conditions in the sale area may vary considerably based on land-form shapes, presence of erosive situations, and other factors.

State Soil Survey #	Soil Texture
6153	LOAMY SAND
6137	SANDY LOAM
6152	LOAMY SAND
6149	LOAMY SAND
3822	SANDY LOAM

d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe.

☐ *No, go to question B-1-e.*

☒ *Yes, briefly describe potentially unstable slopes or landforms in or around the area of the proposal site. For further information, see question A-8 for related slope stability documents and question A-10 for the FPA number(s) associated with this proposal.*
Potentially unstable slopes and forest practices Rule Identified Landforms (RILs) around the area of the proposal site include inner gorges, bedrock hollows, an active alluvial fan, four active/recent shallow landslides, and a Category E deep seated landslide. See Geologic Field Summary for Sylvan Pearl timber sale.

1) *Does the proposal include any management activities proposed on potentially unstable slopes or landforms?*

   ☐ *No* ☒ *Yes, describe the proposed activities:*
   Cables may potentially be hung over the RILs described above, but no yarding will occur in or over these landforms.

2) *Describe any slope stability protection measures (including sale boundary location, road, and harvest system decisions) incorporated into this proposal.*
   Inner gorges, bedrock hollows, an active alluvial fan, four active/recent shallow landslides, and a Category E recent deep-seated landslide in the proposal were excluded from the harvest area by a distance of 1.5 to 2 widths of existing tree canopies to retain rooting strength. Also, tailhold restriction areas will prevent disturbance within these areas.

e. Describe the purpose, type, total area, and approximate quantities and total affected area of any filling, excavation, and grading proposed. Indicate source of fill.

Approx. acreage new roads: **2.0**
Approx. acreage new landings: **1.0**
Fill Source: **Load N Go Pit, Fir Sure Pit**

f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe.
Yes. Some erosion could occur as a result of building new roads, installing culverts, and hauling timber.

g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)? *Approximate percent of proposal in permanent road running surface (includes gravel roads):*
Approximately 1% of the site will remain as gravel roads.

h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any:
(Include protection measures for minimizing compaction or rutting.)
Forest roads are constructed, crowned, ditched, and drained to control water consistent with best management practices in the Forest Practices Rules and Board Manual. Water collected from DNR roads is discharged to the forest floor.

Regular road maintenance will help to limit erosion. Roads remaining active after the forest practice activity will be on a regular maintenance schedule including but not limited to reshaping and culvert and ditch maintenance to insure proper water flow and

redistribution to the forest floor. The residual leave trees and vegetation following harvest will prevent erosion related to runoff. Closure of skid trails with water bars and large and smaller woody debris.

Yarding restrictions are imposed based on yarding system/equipment type and slope percent to reduce impact to soils. Operations may be suspended when there is the potential of environmental damage. Operations may be suspended when excessive soil rutting occurs. On exposed soils water bars or grass seed may be placed in addition to other mitigation measures.

2. Air

a. What types of emissions to the air would result from the proposal during construction, operation, and maintenance when the project is completed? If any, generally describe and give approximate quantities if known.
Harvest operations and the removal of timber will result in minor amounts of greenhouse gas (GHG) emissions from the proposal site. Emissions directly related to this project during operations include emissions from the equipment used to conduct the harvest and emissions from trucks hauling logs to mills and then returning to the project site. Emissions onsite after project completion include the decomposition and/or burning of logging residuals (i.e. branches, tops, and other logging slash). The duration of that emitting activity is unknown, as the decision to burn piles will be made following harvest based on weather conditions, staff resources, wildfire risk, impediment of slash to regeneration efforts, and other factors that are not yet known. Burning piles would release carbon from logging residuals in a relatively short period of time (likely within a few years). Decomposition of slash piles can take decades.

See A.13.a. for details regarding completed landscape-scale analyses of carbon emissions and sequestration on DNR-managed forestlands in western Washington. A more detailed discussion of project-related emissions, and an estimated quantification of those emissions, can be found in Appendix B: Climate Change Supplement to the SEPA Checklist.

b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe.
Landscape-scale analyses of carbon dioxide emissions associated with harvested wood products from DNR forested trust lands can be found in Alternatives for the Establishment of a Sustainable Harvest Level Final Environmental Impact Statement (2019), South Puget HCP Planning Unit Forest Land Plan Final EIS, and the Long-Term Conservation Strategy for the Marbled Murrelet Final Environmental Impact Statement (2019). Estimates for GHG emissions associated with logging trucks transporting logs from this project site to nearby mills are included in Appendix B: Climate Change Supplement to the SEPA Checklist. See especially, "Emissions from Land Management Activities."

c. Proposed measures to reduce or control emissions or other impacts to air, if any:
Within three years following harvest, the project area will be reforested with native tree species at a stocking level higher than existed prior to harvest. Tree planting, along with natural seeding, will result in regeneration of the forest stand, initiating carbon sequestration through forest stand growth. DNR will conduct seedling survival surveys at the project site following planting to assure survival of the next stand to meet regulatory

standards (RCW 76.09.070; WAC 222-34-010) and protect the value of this working forest for future generations.

3. Water

a. Surface Water:

1) Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into. *(See "WAU Map(s)" and "Timber Harvest Unit Adjacency Map(s)" as referenced on the DNR website: http://www.dnr.wa.gov/sepa. Click on the DNR region of this proposal under the Topic "Current SEPA Project Actions - Timber Sales." Proposal documents also available for review at the DNR Region Office.)*

☐ *No* ☒ *Yes, describe in 3-a-1-a through 3-a-1-c below*

a. Downstream water bodies: **North Fork Green River, Boundary Creek, Gale Creek, Howard Hanson Reservoir, Green River, Duwamish River, Puget Sound**

b. *Complete the following riparian & wetland management zone table:*

Wetland, Stream, Lake, Pond, or Saltwater Name (if any)	Water Type	Number (how many?)	Avg RMZ/WMZ Width in feet (per side for streams)
Boundary Creek	**3**	**2**	**188 & 150***
Stream	**3**	**1**	**188***
Stream	**3**	**3**	**150***
Stream	**4**	**45**	**Minimum 100**
Wetland	**>1 acre**	**1**	**144***
Wetland	**<1 > 0.25 acre**	**5**	**Minimum 100**

**Type 3 stream RMZ and wetland >1 acre widths vary based on site index.*

c. List any additional RMZ/WMZ protection measures including silvicultural prescriptions, road-related RMZ/WMZ protection measures and wind buffers.
The streams within the vicinity of the proposal were identified during the initial field reconnaissance. Stream typing was determined based on physical criteria per the water typing system for Forested State Trust Lands and/or electrofishing protocol survey.

Stream and wetland buffers are applied in accordance with DNR's HCP, which exceed Forest Practice protections. Type 1-3 streams and wetlands over an acre in size are protected on both sides of the stream with a distance equal to or greater than an adjoining conifer stand is expected to reach at 100 years of age (site height). Type 4 streams and wetlands between 0.25 to 1 acre in size are protected with a 100-foot buffer. Type 5 streams do not have buffers but are protected with 30-foot equipment limitation zones and often a focus of leave tree placement for further protection, or at times excluded from the sale area.

Additional protection includes minimizing ROW clearing for forest road construction through stream RMZ and restriction of location on waste area disposal from water apply as protection measures.

2) Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans.

☐ *No*
☒ *Yes (See RMZ/WMZ table above and timber sale maps which are available on the DNR website: http://www.dnr.wa.gov/sepa. Timber sale maps are also available at the DNR region office.)*

Description (include culverts):
Harvest will occur within 200 feet, but beyond the buffer distances listed in the table above. In addition, thirty-five type 5 streams are protected by 30-foot equipment limitation zones, and some by leave trees. Wetlands less than 0.25 acres are inside RMZs.

Roadwork will occur through Type 4 RMZs and streams. This will include ditch work, culvert replacement or installation, grading, and rocking. If equipment crossings are needed across Type 5 streams, locations will be evaluated by the Contract Administrator prior to beginning work. In addition, Type 5 streams will be protected with a 30-foot equipment limitation zone or protected within leave tree clumps.

There will be culverts installed or replaced at two stream crossings for road construction and maintenance.

Buffers on all streams and wetlands in the vicinity of this proposal comply with the requirements of the DNR Habitat Conservation Plan.

3) Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material.
Potentially 100 cubic yards of native dredge material on the optional 5476-1 Road will be removed at station 14+72 associated with a type 4 stream temporary culvert installation and placed at station 11+00, if construction occurs.

4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known. *(Include diversions for fish-passage culvert installation.)*

☐ *No* ☒ *Yes, description:*
During pre-haul maintenance and road construction there will be a temporary diversion of Type 4 water, if water is present at the time of culvert replacement.

5) Does the proposal lie within a 100-year floodplain? If so, note location on the site plan.

☐ *No* ☒ *Yes, describe activity and location:*
Culvert replacements will occur at station 10+80 on the 5477 Road and at station 14+27 on the 5476-1 Road. All culvert specifications were designed to meet 100-year flow level, consistent with WAC 222-24-042(2) and Forest Practices Board Manual Section 5.

6) Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge.
It is not likely that any waste materials will be discharged into the surface water(s). However, minor amounts of oil, fuel, and other lubricants may inadvertently be discharged to the adjacent surface water(s) as a result of heavy equipment use or mechanical failure. No lubricants will be disposed of on-site.

7) Is there a potential for eroded material to enter surface water as a result of the proposal considering the protection measures incorporated into the proposal's design?

☐ *No* ☒ *Yes, describe:*
Soils and terrain susceptible to surface erosion are generally located on slopes steeper than 70%. The potential for eroded material to enter surface water is minimized due to the erosion control measures and operational procedures outlined in B-1-h.

8) What are the approximate road miles per square mile in the associated WAU(s)?
NF GREEN = 5.5 (mi./sq. mi.), HOWARD HANSON = 5.6 (mi./sq. mi.)

9) Are there forest roads or ditches within the associated WAU(s) that deliver surface water to streams, rather than back to the forest floor?

☐ *No* ☒ *Yes, describe:*
It is likely some roads or road ditches within the WAU(s) intercept sub-surface flow and deliver surface water to streams. However current road work standards will be applied to the roads in this project that address this issue by installing cross-drains to deliver ditch water to stable forest floors.

10) Is there evidence of changes to channels associated with peak flows in the proposal area (accelerated aggradations, surface erosion, mass wasting, decrease in large organic debris (LOD), change in channel dimensions)?

☐ *No* ☒ *Yes, describe observations:*
There is evidence of changes to channels across the WAU(s). These changes are a result of natural events such as spring runoff from snowmelt and significant storm events. Channel migration, scouring, and deposition of material can be seen in channels across the WAU(s); this indicates those channels historically experience higher water levels and peak flows.

11) Describe any anticipated contributions to peak flows resulting from this proposal's activities which could impact areas <u>downstream or downslope of the proposal area.</u>

It is not likely the proposed activity will change the timing, duration, or volume of water during a peak flow event.

12) *Is there a water resource (public, domestic, agricultural, hatchery, etc.), or area of slope instability, downstream or downslope of the proposed activity?*

☐ *No* ☒ *Yes, describe the water resource(s):*
Streams downslope of the activity flow into the Green River/Howard Hanson Reservoir that provides a water source for the City of Tacoma and local water districts.

a. Is it likely a water resource or an area of slope instability listed in B-3-12 (above) will be affected by changes in amounts, quality or movements of surface water as a result of this proposal?

☒ *No* ☐ *Yes, describe possible impacts:*

13) *Describe any protection measures, in addition to those required by other existing plans and programs (i.e. the HCP, DNR landscape plans) and current forest practice rules included in this proposal that mitigate potential negative effects on water quality and peak flow impacts.*
This proposal limits harvest unit size and proximity to other recent harvests, retains hydrologic mature thresholds in sub-basins per DNR procedure PR14-004-060, minimizes the extent of the road network, incorporates road drainage disconnected from stream networks, and implements no-entry riparian buffers that exceed Forest Practices minimum requirements, all which have mitigating effects on the potential for this proposal to increase peak flows that could impact areas downstream or downslope of the proposal area. DNR staff will monitor roads, streams, and harvest area throughout the project.

b. Ground Water:

1) Will groundwater be withdrawn from a well for drinking water or other purposes? If so, give a general description of the well, proposed uses and approximate quantities withdrawn from the well. Will water be discharged to groundwater? Give general description, purpose, and approximate quantities if known.
No water will be withdrawn or discharged.

2) Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: Domestic sewage; industrial, containing the following chemicals; agricultural; etc.). Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve.
Minor amounts of oil, fuel, and other lubricants may inadvertently be discharged to the ground as a result of heavy equipment use or mechanical failure. No lubricants will be disposed of on-site. All spills are required to be contained and cleaned-up. This proposal is expected to have no impact on ground water.

3) *Is there a water resource use (public, domestic, agricultural, hatchery, etc.), or area of slope instability, downstream or downslope of the proposed activity?*

☐ *No* ☒ *Yes, describe:*
As noted above, the City of Tacoma draws water from surface waters from the Howard Hanson Reservoir, however there are no known water users directly drawing ground water from sources near this site.

a. Is it likely a water resource or an area of slope instability listed in B-3-b-3 (above) could be affected by changes in amounts, timing, or movements of groundwater as a result this proposal?

☒ *No* ☐ *Yes, describe possible impacts:*

Note protection measures, if any:

c. Water runoff (including stormwater):

1) Describe the source of runoff (including storm water) and method of collection and disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into other waters? If so, describe.
Water runoff, including storm water, from road surfaces will be collected by roadside ditches and diverted onto the forest floor via ditch-outs and cross drain culverts.

2) Could waste materials enter ground or surface waters? If so, generally describe.

☐ *No* ☒ *Yes, describe:*
Waste materials, such as sediment or slash, may enter surface water.

Note protection measures, if any:
No additional protection measures will be necessary to protect these resources beyond those described in B-1-d-2, B-1-h, B-3-a-2, and B-3-a-13.

3) Does the proposal alter or otherwise affect drainage patterns in the vicinity of the site? If so, describe.
No changes to drainage patterns are expected.

d. Proposed measures to reduce or control surface, ground, and runoff water, and drainage pattern impacts, if any:
See surface water, ground water, and water runoff sections above, questions B-3-a-1-c, B-3-a-13, B-3-b-3, and B-3-c-2.

4. Plants

a. Check the types of vegetation found on the site:
☒ Deciduous tree:
☒ Alder ☐ Aspen ☐ *Birch* ☒ *Cottonwood* ☒ Maple ☐ *Western Larch*

☐ Other:

☒ Evergreen tree:

☒ *Douglas-Fir* ☐ *Engelmann Spruce* ☐ *Grand Fir* ☐ *Lodgepole Pine*
☐ *Mountain Hemlock* ☒ *Noble Fir* ☒ *Pacific Silver Fir* ☐ *Ponderosa Pine*
☒ *Sitka Spruce* ☒ *Western Hemlock* ☒ *Western Redcedar* ☐ *Yellow Cedar*
☐ Other:

☒ Shrubs:

☒ *Huckleberry* ☐ *Rhododendron* ☒ *Salmonberry* ☒ *Salal*
☐ *Other:* Oregon Grape

☒ *Ferns*

☒ Grass

☐ Pasture

☐ Crop or Grain

☐ *Orchards* ☐ *Vineyard* ☐ *Other Permanent Crops*

☒ Wet Soil Plants:

☐ Bullrush ☐ Buttercup ☒ Cattail ☒ *Devil's Club* ☒ Skunk Cabbage
☐ Other:

☐ Water plants:

☐ Eelgrass ☐ Milfoil ☐ Water Lily
☐ Other:

☐ Other types of vegetation:

☐ *Plant communities of concern:*

b. What kind and amount of vegetation will be removed or altered? *(Also see answers to questions A-11-a, A-11-b and B-3-a-2).*

1) *Describe the species, age, and structural diversity of the timber types immediately adjacent to the removal area. (See "WAU Map(s)" and "Timber Harvest Unit Adjacency Map(s)" on the DNR website: http://www.dnr.wa.gov/sepa. Click on the DNR region of this proposal under the Topic "Current SEPA Project Actions - Timber Sales." Proposal documents also available for review at the DNR Region Office.)*

Unit 1: To the north, south, east and west, a 90-100 year old Douglas-fir and western hemlock stand, to the north and west a 70-year-old Douglas-fir stand, to the west and south a 25-year-old Douglas-fir stand.

Unit 2: To the north, south, east, and west a 70-year-old Douglas-fir stand and 90-100 year old Douglas-fir stand.

Unit 3: To the north, south, east, and west a 70-year-old Douglas-fir stand. To the south, east and west a 90-100 year old Douglas-fir stand.

Unit 4: To the north, south, east, and west a 70-year-old Douglas-fir stand.

Unit 5: To the north, south, east, and west a 70-year-old Douglas-fir stand.

Unit 6: To the north, south, east, and west a 65–70-year-old Douglas-fir, western hemlock, and noble fir stand.

Unit 7: To the north and west 65–70-year-old Douglas-fir, western hemlock, and noble fir stand, to the south 55-65 Douglas-fir stand, to the east 12-year-old noble fir stand.

Unit 8: To the north, south, east, and west 55–65-year-old Douglas-fir, western hemlock, and noble fir stand.

c. List threatened and endangered *plant* species known to be on or near the site.
None found in DNR's database and DNR's Special Concerns Report, which includes data from Washington Department of Ecology, Washington Fish and Wildlife and Washington Natural Heritage Program.

d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any:
This proposal includes protection of existing stands within RMZs and WMZs and leave tree areas within the harvest units that include remnant trees from the previous stand. Following harvest, the variable retention harvest units will be replanted with native conifer species that will be supplemented by natural regeneration expected to occur as a result of the conservation areas in and around the harvest units.

Leave tree placement within the harvest units were designed to protect multiple ecological features and exceed HCP minimum requirements. Leave trees are wind firm and well-formed dominant and co-dominant trees representing the original diversity of species. Older legacy trees were favored for leave tree selection. In addition, individual species and tree types known to have high wildlife use have been retrained. Trees with unique characteristics (such as, forked or damaged tops) have been incorporated within many of the groups, and individually selected throughout the sale to provide current and future habitat for a variety of wildlife species including woodpeckers, sapsuckers, and cavity dwellers. Large hard snags and large soft snags with high evident use and cavities retained where possible. Leave tree areas also were located to provide additional protection for unique or sensitive features. Unit 1 has two bedrock hollows in close proximity to each other on the same stream, and an alluvial fan with hardwood trees and brush habitat in and around the bedrock hollow feature. This entire area is protected by a non-tradeable leave tree clump, which completely contains the features by a buffer of 1.5-2 canopy widths away from the landform's edge. Unit 5 has 12 leave trees per acre with many these leave trees providing protection of cliffs and talus slopes in a non-tradeable leave tree clump. Unit 6 has 13 leave trees per acre that includes a large leave tree area to protect a hydrological sensitive area that contains a Type 5 stream, wetlands smaller than 0.25 acre, and an adjacent inner gorge. The large leave areas also create horizontal stand variation with pockets of large undisturbed forest, plus provide additional protection from local east wind events in more wind prone areas.

e. List all noxious weeds and invasive species known to be on or near the site.
Scotch broom, woodland groundsel, Himalayan blackberry, and evergreen blackberry.

5. Animals

a. List any birds and other animals *or unique habitats* which have been observed on or near the site or are known to be on or near the site. Examples include:
birds:
☐ eagle ☒ hawk ☐ heron ☒ *owls* ☒ songbirds
☐ other:
mammals:
☒ bear ☐beaver ☒ *coyote* ☒ *cougar* ☒ deer ☒ elk
☒ other: bobcat
fish:
☐ bass ☐ herring ☐ salmon ☐ shellfish ☐ trout
☐ other:
*amphibians/reptiles***:**
☒ *frog* ☐ *lizard* ☒ *salamander* ☒ *snake* ☐ *turtle*
☐ *other*:
unique habitats:
☐ *balds* ☐ *caves* ☒ *cliffs* ☐ *mineral springs* ☐ *oak woodlands* ☒ *talus slopes*
☐ other:

b. List any threatened and endangered species known to be on or near the site (*include federal- and state-listed species)*.
None found in DNR's database and DNR's Special Concerns Report, which includes data from Washington Fish and Wildlife.

c. Is the site part of a migration route? If so, explain.
☒*Pacific flyway* ☐*Other migration route:*
Explain:
All of Washington State is considered part of the Pacific Flyway. No impacts are anticipated as a result of this proposal.

d. Proposed measures to preserve or enhance wildlife, if any:

1) *Note existing or proposed protection measures, if any, for the complete proposal described in question A-11.*

Species /Habitat: **Aquatic Habitat**
Protection Measures: **Per the HCP, DNR's riparian buffers are based on the average height an adjoining conifer stand would be expected to reach at 100 years of age using the site index. Site height (150-188 foot) average RMZs protect Type 3 streams. Site height buffers (144 foot) average WMZ protect forested wetland greater than 1 acre in size. 100-foot minimum RMZs protect Type 4 streams. 100 foot no-harvest WMZs protect forested wetlands greater than 0.25 acre in size but less than 1 acre.**

Species /Habitat: **Upland and Leave Trees**
Protection Measures: **Retained trees are dispersed throughout the units at an average of 8-13 trees per acre to provide a legacy component and retain biodiversity as the next stand develops as well as provide additional protection for unique or sensitive areas within the units.**

Species /Habitat: **Northern Spotted Owl**
Protection Measures: **This proposal overlaps the Black Diamond Spotted Owl Management Unit (SOMU) which is managed for dispersal habitat. DNR's HCP requires 50 percent of the 24,137 managed acres in the SOMU to be maintained as suitable NSO habitat. The Black Diamond SOMU is currently at 50.8 percent total NSO habitat across the landscape, therefore contains a surplus of 196 acres above the 50 percent threshold available for variable retention harvest. This proposal includes harvest of 26 acres of habitat within the SOMU, leaving 170 acres remaining above the 50 percent threshold following harvest.**

Species /Habitat: **Cliffs and Talus Slopes**
Protection Measures: **A series of cliffs and talus slopes are present near the center and eastern boundary of Unit 5. Cliff faces are between 30-70 feet tall. Talus slopes in total are 1/2 acre in size, forest canopy closure is over 50% in talus areas. To further protect cliffs and talus slopes, Unit 5 has an average of 12 leave trees per acre. This includes fully protecting the cliff and talus areas with a large non-tradeable leave tree clump that surrounds the features 50 to 100 feet from the edge of the habitat characteristics.**

e. List any invasive animal species known to be on or near the site.
Barred Owl

6. Energy and natural resources

a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc.
Petroleum fuel (diesel or gasoline) will be used for heavy equipment during active road building, timber harvest operations, and for transportation. No energy sources will be needed following project completion.

b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe.
No.

c. What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any:
None.

7. Environmental health

a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste that could occur as a result of this proposal? If so, describe.

1) Describe any known or possible contamination at the site from present or past uses.
None known.

2) Describe existing hazardous chemicals/conditions that might affect project development and design. This includes underground hazardous liquid and gas transmission pipelines located within the project area and in the vicinity.
None known.

3) Describe any toxic or hazardous chemicals that might be stored, used, or produced during the project's development or construction, or at any time during the operating life of the project.
Petroleum-based fuel and lubricants may be used and stored on site during the operating life of this project.

4) Describe special emergency services that might be required.
The Department of Natural Resources, private, and fire protection district suppression crews may be needed in case of wildfire. In the event of personal injuries, emergency medical services may be required. Hazardous material spills may require Department of Ecology and/or county assistance.

5) Proposed measures to reduce or control environmental health hazards, if any:
No petroleum-based products will be disposed of on site. If a spill occurs, containment and cleanup will be required. Spill kits are required to be onsite during all heavy equipment operations. The cessation of operations may occur during periods of increased fire risk. Fire tools and equipment, including pump trucks and/or pump trailers, will be required on site during fire season.

NOTE: If contamination of the environment is suspected, the proponent must contact the Department of Ecology.

b. Noise

1) What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)?
None.

2) What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, operation, other)? Indicate what hours noise would come from the site.
There will be short term, low level and high level noise created by the use of harvesting equipment and hauling operations within the proposal area. This type of noise has been historically present in this geographical area.

3) Proposed measures to reduce or control noise impacts, if any:
None.

8. Land and shoreline use

a. What is the current use of the site and adjacent properties? Will the proposal affect current land uses on nearby or adjacent properties? If so, describe. *(Site includes the complete proposal, e.g. rock pits and access roads.)*
Current use of site and adjacent land types: Proposal site and adjacent lands used for commercial timber production. Municipal water supply in watershed.

This proposal will not change the use of or affect the current/long term land use of areas associated with this sale.

b. Has the project site been used as working farmlands or working forest lands? If so, describe. How much agricultural or forest land of long-term commercial significance will be converted to other uses as a result of the proposal, if any? If resource lands have not been designated, how many acres in farmland or forest land tax status will be converted to nonfarm or nonforest use?
This proposal site has been used as working forest lands. This proposal will retain the site in working forest lands.

1) Will the proposal affect or be affected by surrounding working farm or forest land normal business operations, such as oversize equipment access, the application of pesticides, tilling, and harvesting? If so, how:
No.

c. Describe any structures on the site.
None.

d. Will any structures be demolished? If so, what?
No.

e. What is the current zoning classification of the site?
Forestland.

f. What is the current comprehensive plan designation of the site?
Forestry.

g. If applicable, what is the current shoreline master program designation of the site?
Not applicable.

h. Has any part of the site been classified as a critical area by the city or county? If so, specify.
No.

i. Approximately how many people would reside or work in the completed project?
None.

j. Approximately how many people would the completed project displace?
None.

k. Proposed measures to avoid or reduce displacement impacts, if any:
Does not apply.

l. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any:
This project is consistent with current comprehensive plans and zoning classifications.

m. Proposed measures to ensure the proposal is compatible with nearby agricultural and forest lands of long-term commercial significance, if any:
None.

9. Housing

a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing.
Does not apply.

b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing.
Does not apply.

c. Proposed measures to reduce or control housing impacts, if any:
None.

10. Aesthetics

a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed?
Does not apply.

b. What views in the immediate vicinity would be altered or obstructed?

1) *Is this proposal visible from a residential area, town, city, recreation site, major transportation route or designated scenic corridor (e.g., county road, state or interstate highway, US route, river or Columbia Gorge SMA)?*

☒ *No* ☐ *Yes, name of the location, transportation route or scenic corridor:*

2) *How will this proposal affect any views described above?*
Does not apply.

c. Proposed measures to reduce or control aesthetic impacts, if any:
Leave trees placed interior of the harvest.

11. Light and glare

a. What type of light or glare will the proposal produce? What time of day would it mainly occur?
None.

b. Could light or glare from the finished project be a safety hazard or interfere with views?
No.

c. What existing off-site sources of light or glare may affect your proposal?
None.

d. Proposed measures to reduce or control light and glare impacts, if any:
None.

12. Recreation

a. What designated and informal recreational opportunities are in the immediate vicinity?
There is limited hunting access to this watershed since it is a municipal watershed with controlled access. There is no designated public recreation in the watershed.

b. Would the proposed project displace any existing recreational uses? If so, describe.
There may be some disruptions to recreational use during periods of harvesting and hauling.

c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any:
None.

13. Historic and cultural preservation

a. Are there any buildings, structures, or sites, located on or near the site that are over 45 years old listed in or eligible for listing in national, state, or local preservation registers? If so, specifically describe.
Some potential areas were identified but were well outside the proposed harvest area and will not be impacted with this proposal.

b. Are there any landmarks, features, or other evidence of Indian or historic use or occupation? This may include human burials or old cemeteries. Are there any material evidence, artifacts, or areas of cultural importance on or near the site? Please list any professional studies conducted at the site to identify such resources.
No.

c. Describe the methods used to assess the potential impacts to cultural and historic resources on or near the project site. Examples include consultation with tribes and the department of archeology and historic preservation, archaeological surveys, historic maps, GIS data, etc.
Review of GIS data, historical and GLO maps, plus field surveys and consultations with DNR cultural resources technician and archaeologist were used to identify and assess potential impacts to potential cultural resources.

d. Proposed measures to avoid, minimize, or compensate for loss, changes to, and disturbance to resources. Please include plans for the above and any permits that may be required.
The proposal is avoiding sites. If presently-unknown skeletal remains, cultural resources, or both become known during project operations, DNR will comply with the Discovery of Skeletal Remains or Cultural Resources procedure.

14. Transportation

a. Identify public streets and highways serving the site or affected geographic area and describe proposed access to the existing street system. Show on site plans, if any.
This proposal is accessed by Cumberland Kanasket Road and forest roads.

b. Is the site or affected geographic area currently served by public transit? If so, generally describe. If not, what is the approximate distance to the nearest transit stop?
No. Nearest transit spot is approximately 24 miles away.

c. Will the proposal require any new or improvements to existing roads, streets, pedestrian, bicycle or state transportation facilities, not including driveways? If so, generally describe (indicate whether public or private).
Yes, see A-11-c.

1) *How does this proposal impact the overall transportation system/circulation in the surrounding area and any existing safety problem(s), if at all?*
This project will have minimal to no additional impacts on the overall transportation system in the area.

d. Will the project or proposal use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe.
No.

e. How many vehicular trips per day would be generated by the completed project or proposal? If known, indicate when peak volumes would occur and what percentage of the volume would be trucks (such as commercial and non-passenger vehicles). What data or transportation models were used to make these estimates?
Approximately 10 to 15 truck trips per day while the operation is active. Peak volumes would occur during the yarding and loading activities between 4:00 a.m. and 4:00 p.m. of the operating period. The completed project will generate less than one vehicular trip per day. Estimates are based on the observed harvest traffic of past projects.

f. Will the proposal interfere with, affect or be affected by the movement of agricultural and forest products on roads or streets in the area? If so, generally describe.
No.

g. Proposed measures to reduce or control transportation impacts, if any:
None.

15. Public services

a. Would the project result in an increased need for public services (for example: fire protection, police protection, public transit, health care, schools, other)? If so, generally describe.
No.

b. Proposed measures to reduce or control direct impacts on public services, if any.
None.

16. **Utilities**

a. Check utilities currently available at the site:
☐ electricity ☐ natural gas ☐ water ☐ refuse service ☐ telephone ☐ sanitary sewer ☐ septic system ☐ other**:**

b. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed.
None.

<u>Unresolved conflicts analysis</u>

RCW 43.21C.030(2)(e) requires an analysis of whether the proposal involves "unresolved conflicts concerning the alternative uses of available resources," and if so, to discuss alternatives. Here, DNR proposes managing state trust lands consistent with statutory provisions to sell timber from DNR-managed lands on a sustainable basis (RCW 79.10.340), and its fiduciary responsibility as a trust manager to "make the trust lands productive." ***Conservation Nw v. Franz*****, 199 Wn.2d 813, 829-30 (2022). DNR also gives priority to income-producing uses of lands, over other uses of this property, in accordance with RCW 79.10.120 (uses not compatible with financial management associated with trust lands "may be permitted only if there is compensation from such uses satisfying the financial obligations.").**

At this site, no other, significant, income-producing use of these lands exists, consistent with the provisions above. The uses at this site are consistent with the lands surrounding the site, and do not affect those uses. Timber harvest is consistent with historic use of this site, dating back to the 1930s. While recreational uses will be temporarily displaced, such displacement is consistent with RCW 79.10.120. For these reasons, DNR does not believe there are unresolved conflicts concerning alternative uses of the site.

Despite the fact that DNR has identified no unresolved conflicts over the use of this land, we have considered three alternatives for this project site (Appendix A): a no harvest alternative, a thinning alternative which would remove one-third of standing live timber volume, and the project as proposed (the "preferred alternative" as outlined in the checklist above).

C. SIGNATURE

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Signature: Brandon Mohler

Name of signee **Brandon Mohler**

Position and Agency/Organization **State Lands Assistant Region Manager/DNR**

Date Submitted: 9/13/2024

AEM 9/6/2024

Alternatives Comparison

	No Action (Alt A)	33% Thinning (Alt B)	Project as Proposed - VRH (Alt C)
Natural Environment			
Earth	No change to existing conditions	Harvest and forest road operations are in proximity to the same potentially unstable slopes described in the checklist. Management associated with potentially unstable slopes is designed to minimize the impacts of activities. Higher retention of existing stand is anticipated to result in lower potential instability due to higher retention of rooting strength. Compaction from harvest operations would be focused to fewer skid trails although higher concentration of use on those fewer skid trails. Same new forest road construction as described in checklist. Erosion potential same as described in checklist. Impacts associated with potential sediment delivery to typed waters mitigated by buffers, leave tree areas, and road best management practices.	All Earth impacts and mitigation were fully described in the checklist. Overall environmental impacts to Earth elements are very similar to the thinning option. There may be a slightly higher risk of soil disturbance due to activity associated with the higher level of tree removals, but no significant impacts are present in the proposal under any alternative due to the care taken in laying out the harvest units to avoid potentially unstable landforms, and the buffers protecting those landforms and riparian areas.

	No Action (Alt A)	33% Thinning (Alt B)	Project as Proposed - VRH (Alt C)
Air & Climate	Existing carbon will remain onsite and additional carbon will continue to accumulate with forest growth until next stand-replacing disturbance resets the forest successional cycle.	Estimated emissions from timber harvesting operations, hauling, and decay of harvest residuals: 7,143 metric tons of CO2 equivalents. (See Appendix B: Climate Change Supplement to the SEPA Checklist) Slightly lower emissions in the transportation and manufacturing process due to harvest of less timber products. Existing carbon will remain onsite and additional carbon will continue to accumulate with forest growth until next stand-replacing disturbance resets the forest successional cycle. Potentially lower risk of stand-replacing fire due to lower tree density.	Estimated emissions from timber harvesting operations, hauling, and decay of harvest residuals: 20,286 metric tons of CO2 equivalents. (See Appendix B: Climate Change Supplement to the SEPA Checklist) Cumulative effects on climate change of timber harvest across DNR managed lands are assessed in the 2019 FEIS for the SHC. When all of these emission and sequestration factors are considered together, it is estimated that the volume of carbon stored at the Sylvan Pearl site, combined with carbon stored offsite in wood harvested from the project area in harvested wood products, will equal pre-harvest levels in 29 years. DNR-managed forestlands across DNR's South Puget Sound Region are expected to recover the emissions associated with the Sylvan Pearl timber sale in 5.3 days, and DNR-managed forestlands across western Washington will absorb enough carbon within 1.2 days to offset the immediate emissions associated with this project.

	No Action (Alt A)	33% Thinning (Alt B)	Project as Proposed - VRH (Alt C)
Water	No change to existing conditions. Existing road maintenance, including culvert cleaning would not occur, except for emergency road repairs.	Road work associated impacts to streams mitigated by best management practices and removal of new stream culvert, if installed. Potential for sediment delivery to streams and wetlands mitigated through riparian and wetland buffers and higher retention of existing stand. Lower impact to peak flows with greater retention of existing hydrologic mature stand.	Road work associated impacts to streams mitigated by best management practices and removal of new stream culvert, if installed. Potential for sediment delivery to streams and wetlands mitigated through riparian and wetland buffers. Potential peak flow impacts mitigated by maintaining as described in the checklist.
Plants & Animals	Existing species use would likely continue, until trees die, blow down, or burn. Potential increase in root rot that currently exists in the stand, resulting in reduced stand resiliency. Improvement of habitat to species dependent on older forest conditions and stand development continues.	Proposal site prone to strong east winds. Initial moderate impact to existing stand through retention of majority of existing overstory and less disturbance to understory vegetation may experience a much higher level of impact due to wind damage. Potential increase in root rot that currently exists in the stand that could spread to unharvested areas, resulting in lower stand resiliency. Potential accelerated improvement of habitat to species dependent on older forest conditions.	Higher level of existing stand impact, mitigated by leave tree retention and long-term forest cover areas providing habitat. Creates mosaic of habitat types on landscape with gaps providing forage habitat for large ungulates.

	No Action (Alt A)	33% Thinning (Alt B)	Project as Proposed - VRH (Alt C)
Energy & Natural Resources	No change	Petroleum fuel used during active operations only. This use would be somewhat less usage than project as proposed.	Petroleum fuel used during active operations only.
Built Environment			
Environmental Health	No change	Minor fire hazard and petroleum-based product spill during active operations mitigated as described in checklist. Moderate-to-high risk to worker's safety due to working around higher retainage of leave trees during active operations.	Minor fire hazard and petroleum-based product spill during active operations mitigated as described in checklist. Moderate risk to worker's safety during active operations.
Land/Shoreline Use	No change	No change	No change
Transportation	No change	Minimal impact. Road work as described in the checklist, including maintenance improving existing forest road.	Minimal impact. Road work as described in the checklist, including maintenance improving existing forest road.
Public Svcs/Utils.	No change	No change	No change

	No Action (Alt A)	33% Thinning (Alt B)	Project as Proposed - VRH (Alt C)
Project Objectives	Does not meet fiduciary objective for revenue and making the trust property productive for beneficiaries. Does not meet wood product supply objectives. Existing forest health issues may continue to increase, reducing site productivity. Greatest retention of hydrologic mature stands and contribution to long-term forest cover. No anticipated environmental impacts.	Potential minimal trust productivity, and marginal contribution towards revenue production objective. Provides protections to environmental resources through mitigation. Potential minimal contribution to local wood supply and local economies. Maintains hydrologic maturity and contributes to long-term forest cover.	Greatest achievement of meeting trust productivity objective and producing revenue for trust beneficiaries. Provides protections to environmental resources through mitigation. Greatest contribution to local wood supply and local economies. Maintains hydrologic maturity and contributes to long-term forest cover.

Alternative comparison and preferred alternative selection

Earth: The direct impacts on soil productivity such as compaction, erosion and displacement are expected to be higher for Alternative C than Alternative A and to a lesser degree higher than Alternative B. All types of harvesting can result in short-term surface erosion until the site is re-vegetated. Likelihood of compaction varies based on harvest systems. Ground based systems generally have the greatest potential to impact soils adversely because of the weight of the machinery and distribution of the weight. The difference between Alternatives B and C regarding these impacts vary based on harvest system; they are similar in areas of cable harvest methods (30% of the proposed sale area) and differ more in areas of ground-based harvest methods (70% of the proposed sale area) due to the percentage of the site where ground-based equipment operates. Due to soil type at proposal site, which has a low susceptibility to compaction, there is little difference between Alternatives B and C and no impact under Alternative A. These observations are all on a relative basis – because of the buffering systems and other mitigation, such as unstable slope avoidance, none of the alternatives would create significant impacts to earth/soils.

Air: Comparison of emissions and air pollutants across the three scenarios shows that emissions increase as the intensity of harvest increases. The no-harvest alternative would result in no short-term emissions, while Alternatives B and C are net emitters of GHGs from fossil fuel and biogenic sources in the short term. Alternative B is expected to result in fewer emissions than Alternative C, as Alternative B would require less fuel from harvesting equipment and would result in fewer trips by logging trucks to mills and less logging residuals. However, emissions from Alternative C will be mitigated and offset by a number of DNR's management practices at both the landscape and project scale. On westside forested trust lands, conservation strategies established in DNR's HCP create, protect, and enhance habitat for multiple riparian and upland species. As a result of these strategies, DNR leaves more carbon on the landscape when compared to even-age forest management that follows only forest practices rules. Examples include larger wetland and riparian buffers, more and larger leave trees, down wood in riparian management zones, conservation of tens of thousands of acres of NSO and marbled murrelet habitat, management for other federal and state listed and candidate species, and protection of less common habitat elements such as caves and oak woodlands. In areas where DNR does manage for timber revenue, DNR tends to employ longer rotation ages than the industry standard, which results in greater carbon sequestration. DNR has deferred from harvest old-growth stands and retains very large diameter and structurally unique trees on trust lands. Across western Washington, DNR conserves more than 120,000 acres of lands in natural areas. All of these conservation measures, combined with prompt reforestation following the harvest described in Alternative C, result in carbon sequestration and storage across DNR lands that rapidly offset project emissions. It is estimated that DNR-managed forests across western Washington will draw in enough CO2 to offset emissions from Alternative C in 1.2 days.

Water: Comparison of water impacts considers the potential for surface erosion delivery, and effects to riparian function including water quality and peak flows. The potential impacts to water quality are anticipated to be low for Alternative B and mitigated by the implementation of unmanaged riparian buffers. The potential impacts to water quality is

also anticipated to be low for Alternative C, and will be mitigated by unmanaged riparian buffers. DNR's policy of maintaining significant canopy cover and structure within stream and wetland buffers is a means of ameliorating harvest effects on the sub-basin and watershed level considering that the largest, direct contributor to riparian function is from mature trees providing shade, large woody debris, leaf and needle litter, and retained root structure. While Alternatives A and B have no to low expected impacts to water quantity due to retention levels of hydrologically mature conditions, Alternative C is not anticipated to have significant changes in peak flows due to DNR's hydrologic maturity management in sub-basins and other mitigation measures outlined in the checklist.

Potential environmental impacts due to roads resulting from increased sedimentation affect both water quality and fish habitat. Alternative A has no added riparian impacts with no associated roadwork although no maintenance of roads and drainage structures would be performed under this alternative. Alternatives B and C have the same road work, therefore are viewed as equivalent for road-related impacts, including maintenance of existing roads and drainage structures to reduce potential sedimentation. These observations are all on a relative basis – because of the buffering systems and other required regulation and mitigation in riparian areas discussed above, none of the alternatives would create significant impacts to waters or fish.

Plants/Animals: **The higher level of harvest in Alternative C is mitigated through stream and wetland buffers which maintain riparian function and provide intact habitat corridor connectivity for other wildlife. Alternative A will have little to no impact on vegetation. Alternative C has the greatest impact due to the highest level of harvest with Alternative B impact in the range between Alternatives A and C. Expectations of negative impacts are on a relative basis – because of the buffering systems and other mitigation incorporated into the proposal from DNR's Habitat Conservation Plan and other regulatory compliance discussed above, none of the alternatives would create significant impacts to vegetation and wildlife. A broader discussion of the expected impacts of Alternative C on riparian function, habitat for listed species, plant species, and forest biodiversity can be found in Appendix B, along with management strategies to mitigate those impacts.**

Built Environment Elements: **No meaningful differences in environmental impacts among alternatives emerge from the built environmental elements.**

Project Objective: **Alternative A does not meet the project objective of to make the trust land productive by generating income for the trusts. It is not a "reasonable alternative" under SEPA. WAC 197-11-786. The expected revenue generated from Alternative B is very low, with financial viability tentative based on current market conditions. In other words, it may not produce sufficient income to off-set the expenses of harvest. Alternative C clearly provides the greatest revenue to the trusts, and is most consistent with the Legislature's directives to DNR to manage forest lands sustainably, including offering the sustainable harvest level of timber for sale. RCW 79.10.300 - .340.**

CLIMATE CHANGE SUPPLEMENT FOR THE SYLVAN PEARL TIMBER SALE

This project-level analysis provides information concerning the proposed project's expected impact on climate change, as well as discussion of how a changing climate may potentially impact the project site. This information is intended to inform the Responsible Official and the public. This analysis builds on earlier work that analyzes the impacts of the Department of Natural Resources' (DNR) land management practices in western Washington upon climate-related factors such as carbon emissions and sequestration, increased risk of wildfire, and wildlife habitat. Those analyses include:

- Alternatives for the Establishment of a Sustainable Harvest Level for Forested State Trust Lands in Western Washington, Final Environmental Impact Statement (FEIS), 2019 (see pp. 4-6 through 4-17) (https://www.dnr.wa.gov/publications/amp_sepa_nonpro_shc_feis_entire.pdf?uzo06i)
- Long-Term Conservation Strategy for the Marbled Murrelet, Final Environmental Impact Statement (FEIS), 2019 (see pp. 4-6 through 4-14) (https://www.dnr.wa.gov/publications/amp_sepa_nonpro_mmltcs_feis_entire.pdf)
- Washington Forest Ecosystem Carbon Inventory: 2002–2016, 2020 (https://www.dnr.wa.gov/publications/em_wa_carbon_inventory_final_111220.pdf)

These studies provide different perspectives. The 2019 analyses are forward-looking projections of sequestration across DNR-managed forestlands in western Washington. Each management alternative and harvest scenario considered in those reports was expected to increase the total amount of carbon stored over time by DNR-managed forestlands in western Washington (see figures 4.2.1 and 4.2.2 in the Sustainable Harvest Level FEIS, for example).

The 2020 carbon inventory is a historical analysis of sequestration and storage across federal, state, and private forestlands in Washington. It is particularly useful for estimating rates of carbon sequestration for DNR-managed forestlands based on past management. The 2020 carbon inventory relied upon data from 9,978 forested plots throughout Washington in 2002–2011 and 2012–2016. The number of plots on DNR-managed forestlands was relatively small, which resulted in large margins of error (or confidence intervals) for carbon flux projections on DNR-managed forestlands (see Figure 4.9).

According to the United Nations' Intergovernmental Panel on Climate Change (IPCC), carbon in forestry is best understood through a landscape-level analysis of management practices. "While individual stands in a forest may be either sources or sinks, the forest carbon balance is determined by the sum of the net balance of all stands" (Nabuurs et al. 2007). While DNR concurs, a project-level carbon flux analysis for the Sylvan Pearl timber sale provides a complimentary datapoint. The following carbon analysis is an opportunity to better understand and communicate the carbon impacts of a single project within the broader context of DNR's land management. The methods used in this analysis are described in depth in the "Methodology for Carbon Analysis of Management Alternatives" section of this document. DNR anticipates revisiting this methodology over time as tools are refined and scientific understanding of these processes improves.

Sylvan Pearl Timber Sale, South Puget Sound Region
Analysis of Carbon Flux by Harvest Alternative

Unless otherwise specified, all carbon flux data in this report were calculated using the VERSION 1.0 Excel Workbook to Support 'Level I' Quantification Approaches for the Managed Forest Systems Chapter within the 2024 update to the USDA Publication Quantifying Greenhouse Gas Fluxes in Agriculture and Forestry: Methods for Entity-Scale Inventory. This tool was developed by the US Forest Service to support users in quantifying projected greenhouse gas flux from a range of forest management activities within the continental U.S. and is publicly available on the USDA website (https://www.usda.gov/oce/entity-scale-ghg-methods/download). Positive carbon flux numbers represent emissions to the atmosphere. Negative carbon flux numbers represent sequestration of carbon from the atmosphere in terrestrial carbon pools.

Estimated in-forest carbon at the project site before harvest[1]:	64,784	tCO_2e

Alternative 1: No Harvest

Estimated in-forest carbon at the project site in 50 years:	131,270	tCO_2e
Estimated net flux to the atmosphere after 50 years:	**-66,486**	**tCO2e**

Alternative 2: Commercial Thinning (Harvest of 33% Volume)

Estimated in-forest carbon + harvested wood products (HWP) immediately following harvest:	58,224	tCO_2e
Estimated in-forest carbon + HWP through year 50 following harvest:	101,105	tCO_2e
Estimated net flux from initial emissions to the atmosphere at harvest[2]: *(sum of initial harvest effects + hauling emissions)*	**7,143**	**tCO_2e**
Estimated net flux from project area to the atmosphere through year 50 after harvest: *(initial emissions + subsequent changes in forest biomass and HWP)*	**-35,648**	**tCO_2e**

Alternative 3: Variable Retention Harvest (Preferred Alternative)

Estimated in-forest carbon + HWP immediately following harvest:	45,081	tCO_2e
Estimated in-forest carbon + HWP through year 50 following harvest:	80,722	tCO_2e
Estimated net flux from initial emissions to the atmosphere at harvest: *(sum of initial harvest effects + hauling emissions)*	**20,286**	**tCO_2e**
Estimated net flux from project area to the atmosphere through year 50 after harvest: *(initial emissions + subsequent changes in forest biomass and HWP)*	**-15,355**	**tCO_2e**

Carbon Impacts Contextualized

Estimated time following harvest (preferred alternative) at which total timber sale system carbon (on-site + HWP from the project area) will reach pre-harvest levels:	**29**	**years**
Estimated time following harvest (preferred alternative) at which forestlands in the DNR region will sequester an amount of carbon equivalent to initial harvest effects and hauling emissions[3, 4]:	**5.3**	**days**
Estimated time following harvest (preferred alternative) at which all westside DNR forestlands will sequester an amount of carbon equivalent to initial harvest effects and hauling emissions[3, 4]:	**1.2**	**days**

Climate Impact: Carbon Flux

The proposed Sylvan Pearl timber sale project is generally a net emitter of greenhouse gasses from fossil fuel and biogenic sources in the short term. Fossil-fuel emissions from harvest equipment and log trucks represent an immediate flux of carbon into the atmosphere. The estimated emissions from those activities are relatively small compared to the total biogenic carbon stored in the sawlogs and pulpwood. Emissions from harvest activity and log hauling are not included in the tool developed by the US Forest Service. DNR has added these values to provide a more complete understanding of harvest-related emissions. The agency's approach to estimating those fossil fuel emissions is described in the "Methodology for Carbon Analysis of Management Alternatives" section of this document.

Biogenic emissions from harvest include the burning or decay of logging residues (i.e., logging slash). The US Forest Service carbon calculation tool used in this analysis assumes that all emissions from logging slash are released in year zero. This is not factually accurate unless piles are immediately burned following harvest. DNR frequently burns piles, but piles are often left to decay and/or the agency makes post-harvest areas available to the public for firewood gathering for personal use. The decision to burn piles is site specific and is based on wildfire risk, habitat and replanting considerations, weather, operational capacity, and proximity to human population centers. Unburned slash piles may take decades to completely decompose. However, since the tool includes all carbon released from harvest residues as part of the "initial emissions" of the harvest, calculations in this report reflect the immediate release of carbon from onsite logging residuals.

Wood removed from the project site will be used in an array of Harvested Wood Products (HWP), and different products emit carbon dioxide back to the atmosphere at different rates. For example, mills use sawdust, bark, chips, and other milling residuals as biofuels to generate electricity. (The Washington State Legislature has found electricity generated from woody biomass to be carbon neutral [RCW 19.285]). Some chips and bark may be sold as landscaping material. Pulpwood from the Sylvan Pearl project will likely be used to manufacture relatively short-lived products such as paper and cardboard. The carbon calculator developed by the US Forest Service assumes unlimited paper recycling with a 68% recycling rate and 70% efficiency (Murray 2024). Recycling delays the transfer of carbon back to the atmosphere and decreases market demand for fresh pulpwood. The vast majority of on-site carbon is stored in the wood of sawlogs, most of which will likely be used in long-lived construction and infrastructure projects (e.g. dimensional lumber, beams, flooring, siding, utility poles, and engineered wood products such as mass timber and plywood). Once those materials reach the end of their useful lives, most of that wood will be added to landfills where it will decompose very slowly due to anaerobic conditions (O'Dwyer et al. 2018).

Following harvest, carbon sequestration and storage will occur on-site in the form of trees growing within the Sylvan Pearl project area. In accordance with Forest Practices Rules, all even-age harvest units will be reforested within three years of completion of harvest (WAC 223-34-010).

Emissions from harvest operations, log hauling, on-site decay of logging residues, and offsite decay of HWP are included in DNR's Analysis of Carbon Flux by Harvest Alternative. Likewise, carbon storage in HWP and in trees planted on-site following harvest are also included. A thorough description of the agency's process for conducting this analysis can be found in the "Methodology for Carbon Analysis of Management Alternatives" section of this document.

Mitigating Carbon Flux

DNR's forest management practices mitigate carbon emissions at both the landscape and project scale. On western Washington forested trust lands, conservation strategies established in DNR's Habitat Conservation Plan (HCP) (1997) create, protect, and enhance habitat for multiple riparian and upland species. As a result of these strategies, DNR leaves more carbon on the landscape when compared to even-age forest management that follows only forest practices rules. Examples include larger wetland and riparian buffers, more and larger leave trees, down wood in riparian management zones, conservation of tens of thousands of acres of northern spotted owl (*Strix occidentalis caurina*) and marbled murrelet (*Brachyramphus marmoratus*) habitat, management for other federal and state listed and candidate species, and protection of less common habitat elements such as caves and oak woodlands. In areas where DNR does manage timber for revenue, DNR tends to employ longer rotation ages than the industry standard, which produces stands that store more carbon and yield more timber (Carlisle et al. 2023).

In terms of stand-level carbon density in the Pacific Northwest, old-growth stands are important carbon sinks, even as their rate of carbon accumulation is lower when compared to stands in younger age classes (Gray 2016). In 2006, the Board of Natural Resources adopted the Policy for Sustainable Forests (PSF). The PSF includes a policy on old-growth stands in western Washington, which directs DNR to defer from harvest old-growth stands and to retain very large diameter and structurally unique trees on trust lands. In addition to helping the agency meet its conservation objectives, this policy protects the ecological and social benefits of old-growth stands and preserves these important carbon sinks. The Sylvan Pearl project does not include any harvest of old-growth stands.

Additional mitigation for harvest-related carbon emissions takes place on DNR's network of natural areas, where the agency permanently preserves some of the most carbon-dense natural landscapes in western Washington, including large patches of old-growth and mature second-growth stands. Natural areas are not trust lands, and they are not managed for revenue. However, most of the lands that DNR now manages as natural areas are former trust lands that the agency has transferred into permanent conservation status. Across western Washington, DNR conserves more than 120,000 acres of lands across an expanding network of Natural Area Preserves and Natural Resource Conservation Areas. DNR manages this system of forests, prairies, bogs, marshes, estuaries, and other exceptional sites for restoration, conservation, preservation, education, research, some recreation, and other non-extractive objectives.

Prompt, successful reforestation following harvest is a critical on-site activity that mitigates the carbon emissions associated with harvest. DNR replants using native seedlings grown from seed stock that matches the current seed zone of each unit. Planting site-appropriate tree species that are genotypically suited to the project site (i.e., elevation, aspect, soil type, moisture regime, etc.) improves the likelihood of a healthy, thriving new cohort. Following even-age harvest, DNR typically replants at a density of at least 300 trees per acre to ensure the legal minimum seedling survival of an average of at least 190 trees per acre in each unit. Where appropriate, the agency may opt to reforest through natural regeneration. The reforestation plan for the Sylvan Pearl timber sale includes planting seedlings at 360–400 trees per acre.

When all of these emission and sequestration factors are considered together, it is estimated that the volume of carbon stored at the Sylvan Pearl site, combined with carbon stored offsite in wood harvested from the project area in HWP, will equal pre-harvest levels in 29 years. DNR-managed forestlands across DNR's South Puget Sound Region are expected to recover the emissions associated with the Sylvan Pearl timber sale in 5.3 days, and DNR-managed forestlands across western Washington will absorb enough

carbon within 1.2 days to offset the immediate emissions associated with this project. For these reasons, along with the mitigation measures enumerated throughout this document, the department considers the Sylvan Pearl timber sale to be an example of climate-smart forestry that aligns with legislative policy (specifically RCW 70A.45.090, which recognizes a sustainable forest products sector as an integral component of Washington's contribution to the global climate response and efforts to mitigate carbon emissions). While the Sylvan Pearl timber sale will temporarily decrease the level of carbon stored at the site, the project will have a minimal impact to the overall volume of carbon stored in DNR-managed forestlands in western Washington as well as the ability of DNR's forestlands to continue to sequester atmospheric carbon.

Methodology for Carbon Analysis of Management Alternatives

This section describes the methods used to estimate carbon storage and emissions resulting from proposed timber sales on DNR-managed forestlands in western Washington. The document's audience is the SEPA Responsible Official and parties interested in understanding the context for and assumptions behind chosen methods. As such, the agency assumes some knowledge of terminology and principles. DNR anticipates the accounting methodologies described herein will change over time as carbon assessment approaches are updated to reflect new knowledge, methods, tools, and/or datasets.

The USFS Carbon Accounting Spreadsheet Tool

While many carbon accounting tools exist (Zald et al. 2016), DNR requires a robust and vetted approach that is transparent, repeatable, and capable of using data already collected by the agency. Based on these criteria, DNR has selected a USDA Forest Service (USFS) carbon accounting spreadsheet tool ("tool" hereafter; Murray et al. 2024) to quantify greenhouse gas sources and sinks within managed forests and HWP pools. The tool is consistent with IPCC Tier 2 approaches due to the level of methodological complexity and because the tool utilizes region-specific data (Murray et al. 2024).

The USFS tool estimates net carbon emissions by tracking changes in forest biomass and harvest-related carbon fluxes, both initially and over 50 years following timber harvest and reforestation. The tool's in-forest carbon estimates are derived from Forest Inventory and Analysis (FIA) data, a national network of permanent forest plots distributed in a statistically robust fashion and remeasured on a decadal basis. Plot measurements include a broad suite of forest metrics that can be used to estimate carbon stocks (standing biomass) and fluxes (changes in biomass). The tool includes all forest carbon pools other than soil carbon, which is not collected as part of the FIA protocol. While soil carbon is the single largest carbon pool in many forests, soil carbon is rarely measured in protocols for two reasons. First, soil carbon data is difficult, time-intensive, and costly to collect. Second, mineral soil carbon changes very slowly and is thus often excluded from project assessments. The Forest Service provides more information on the national field data collection program, as well as specific field protocols, here: https://www.fs.usda.gov/research/programs/fia.

For HWP, the USFS tool "applies the IPCC-guided production approach of HWP carbon accounting, in which carbon contained in wood and wood products remains in the account of the producing entity regardless of where the wood or wood product is used (Brown et al. 1998)" (cited in Murray et al. 2024). Consistent with IPCC guidance, HWP are therefore considered part of the DNR carbon analysis. The tool estimates HWP in different end-use pools (e.g., paper, lumber, landfill) as well as their decay over time based on either lookup tables developed by Smith et al. (2006) or the "chi-square, gamma" function (Murray et al. 2024).

The USFS tool does have an option to include estimated substitution effects (the potential carbon benefit of using wood products in lieu of other, more carbon-intensive products). The carbon impact of using

wood products in place of non-wood building materials such as steel, concrete, and plastic is likely substantial. Franklin et al. (2018) calculated that when substitution is included, sustainably managing a stand to produce wood products for two 70-year rotations could exceed the total carbon benefits of letting the stand grow for that same period. However, the carbon analysis in this report excludes substitution because assumptions around substitution vary widely and can have a large influence on whether, and by how much, the impact of an activity is a net carbon source or sink (Harmon 2019).

Leakage (the potential that unharvested wood from one area will be replaced in the market with wood cut from another location) is also excluded from this analysis. Leakage is not estimated in the USFS tool. In general, excluding both substitution and leakage considerations from this analysis results in a lower estimate of stored carbon under active management when compared to not harvesting. Although minimizing both leakage and substitution can potentially result in substantial positive climate effects, DNR's current inability to reliably predict how outside market forces would lead to increased harvests elsewhere or substitution of more carbon-intensive building materials leads us to exclude those factors per WAC 197-11-080.

The tool requires a minimal set of inputs to produce estimates of carbon storage and flux for a suite of possible management treatments (i.e., harvest, reforestation, and extended rotation). The basic tool inputs include the management treatment, acreage of activity, forest type group, forest origin (natural or planted), and forest age class. For any active management, the tool uses estimated harvest volumes and log types (sawlog, pulpwood, fuelwood) when known. If unknown, it will generate results based on estimates specific to the region and forest type. DNR sources for the required inputs to the tool are further described below.

Alternatives and Data Sources

For the current carbon alternatives analysis, DNR used the USFS tool to examine three different alternatives: no harvest, thinning only, and a variable retention harvest (VRH). The no-harvest alternative leaves all units within the proposed timber sale (that would otherwise be harvested) to grow without management intervention. The thinning scenario projects ~33% of the standing tree volume in each harvest unit is harvested and ~67% continues to grow in place. The VRH alternative assumes 100% of the volume outside of protected areas and leave trees/clumps is harvested and then replanted following harvest. All three alternatives are further discussed below.

Most of the data used to compare the three alternatives originates from DNR's timber sale cruise report. Each timber sale is divided into units, and the report includes the cruise acres, species, timber volume, and timber grade for each unit. The total area analyzed is held constant across alternatives and comes directly from each unit's "cruise acres" value in the cruise report. The term "cruise acres" refers to the area that is designated for harvest activities and excludes areas that store carbon but are set aside for ecological reasons through existing policies, procedures, and laws, such as old-growth stands, northern spotted owl and marbled murrelet habitat, leave trees, potentially unstable slopes, wetland management zones, and riparian management zones. Excluding these areas from this analysis results in lower carbon storage estimates for VRH and thinning management alternatives relative to the no harvest scenario.

To determine the unit's forest type group and ensure consistency between data sources and the USFS tool, we followed the FIA field protocol (Burrill et al. 2024) to assign each unit to one of several forest groups (i.e., Douglas-fir, fir/spruce/mountain hemlock, hardwood group, or hemlock/sitka spruce). Forest group designation was based on identifying the individual species in the cruise data with the plurality of the timber volume. The USFS tool requires the user to identify forest group because carbon storage potential and rate of carbon sequestration differ by forest group. DNR developed the following ruleset,

which may be modified over time as new species appear in the cruise data, or as methods and/or data sources change:

- Hardwood group – Alder, big leaf maple, and other hardwood species collectively comprise the majority of the volume
- Fir/spruce/mountain hemlock group – Silver fir, mountain hemlock, noble fir, or other higher elevation cold species individually comprise a plurality of the volume
- Hemlock/sitka spruce group – Sitka spruce or western hemlock comprise a plurality of the volume
- Douglas-fir group – Douglas-fir comprises a plurality of the volume

The general age of the unit, called "age class," is a required tool input that is not found in the cruise report. Rather, age class is determined from either a stand origin assessment form associated with the proposed timber sale, or, if the stand origin assessment form is unavailable, the "Combined Origin Year" layer which is included as part of DNR's remotely sensed inventory (called RS-FRIS). Stand origin data is included in section 11.b. of the SEPA checklist associated with each timber harvest project.

Timber volume is used for the VRH and thinning alternatives. For each unit, timber volume is separated into pulpwood and sawlogs. DNR's cruise data uses different categories for logs compared to the tool. Since the USFS tool does not enable a finer differentiation than saw logs and pulpwood, for now DNR has counted all "4 Saw" as pulpwood. While it is a near certainty that a significant portion of "4 Saw" logs will be utilized to manufacture dimensional lumber, some portion of it will also be used as pulp. This decision results in lower carbon storage estimates for VRH and thinning management alternatives.

Differentiating volume into pulpwood and sawlogs provides more realistic HWP pathways and associated carbon storage, decay rates, and carbon emissions. The agency may adjust this approach in the future to more accurately estimate the lifecycle of the logs at the project site. While total volume estimates from the cruise report are used for the VRH alternative, timber harvest volume for the thinning alternative is assumed to be ~33% of the VRH volume.

Emissions from Land Management Activities

Aside from carbon fluxes associated with changes in biomass over time, two additional sources of emissions associated with a timber sale include the fuel used for the harvest operation itself (harvest operation emissions), and the fuel consumed by the trucks driving harvested logs to domestic mills for further processing (hauling emissions). Neither harvest operation nor hauling emissions is part of the USFS tool, but DNR is interested in capturing these emissions in its analysis nonetheless.

DNR uses a number developed by Sonne (2006) to estimate per-area harvest operation emissions, which the author derived as part of a carbon lifecycle analysis of privately managed Douglas-fir forests in western Oregon and Washington. Survey results suggested that harvesting activities emitted an average of 5.9 metric tons of CO_2e per hectare, which represents various combinations of pre-commercial thinning, commercial thinning, and commercial harvests (Sonne 2006). While it is uncertain if DNR-specific harvesting activities are greater or less than this value, both the study geography and focus on Douglas-fir provide a reasonable region-specific approximation of harvest operation emissions from harvest activities.

Hauling emissions require estimates of mill distance(s), the amount of volume carried by a typical logging truck, the average logging truck miles per gallon (both loaded with timber and unloaded), and the amount of carbon emitted for each gallon of diesel fuel used. Although this carbon calculation worksheet is completed as part of the SEPA process, the auction has yet to occur and the apparent

purchaser is yet unknown. This means that the destination for the logs from a given project is unknown at the time of calculation. To address this unknown value, DNR examined the distance from each DNR planning unit to the nearest and second-nearest major conifer mill. DNR planning units are nested within larger DNR districts, which are themselves nested within DNR regions. To estimate carbon emissions associated with hauling, DNR staff developed region-specific haul distances by averaging the distance to the nearest and second-nearest mill across all DNR planning units and districts within the timber sale region (Table 1). DNR used the average distance to the nearest and second-nearest mills, rather than only the distance to the nearest mill, in recognition that some volume is likely to travel further distances during some timber sales. Averaging multiple mill distances likely results in an overestimation of hauling distance and therefore assumes greater carbon emissions.

Table 1: Haul distances (in miles) to the two closest conifer mills within each DNR district, which are collectively averaged across the region.

DNR Region	DNR District	Haul Miles to Nearest Major Conifer Mill	Haul Miles to Second-Nearest Major Conifer Mill	Region Average (in Miles)
South Puget Sound	Black Hills	23.0	31.5	**35.9**
	Hood Canal	33.0	51.5	
	Rainier	33.5	43.0	
Pacific Cascade	Lewis	35.0	46.0	**40.6**
	St. Helens	32.7	46.0	
	Yacolt	33.0	51.0	
Olympic	Coast	74.8	96.6	**80.2**
	Ozette	55.5	127.0	
	Straits	32.6	94.6	
Northwest	Baker	37.5	62.5	**50.8**
	Cascade	63.0	66.5	
	Clear Lake	30.0	45.0	

DNR used an average haul volume of 4,667 board feet, based on a 2017 internal study evaluating data from ~7,000 individual truckloads in western Washington. DNR also assumed an average miles per gallon (mpg) value of 5.1, based on a log trucking cost analysis by Mason et al. (2008). Five and one tenth mpg is an average across a loaded and unloaded truck, which is the proper way to estimate miles per gallon, as each load is a round trip into (unloaded) and out of (loaded) the project area. Lastly, DNR used the United States Environmental Protection Agency's "Greenhouse Gases Equivalencies Calculator – Calculations and References" to estimate how much carbon is emitted when one gallon of diesel fuel is consumed. That value is 0.01018 metric tons of CO_2e per gallon. With all these values, DNR can estimate the number of loads required for a given timber sale volume, the total round-trip haul distance, total fuel consumed, and thus the total haul emissions for a timber sale.

Calculations

No harvest alternative

For this calculation, the tool is run under the "Basic projection under forest maintenance" scenario in the USFS tool, using cruise acres, forest group, and stand age information associated with the proposed timber sale and/or RS-FRIS. The tool is run for each harvest unit in the timber sale because different units may be associated with different attributes such as forest group and stand age.

Thinning alternative

Under the thinning alternative, the tool is run twice for each timber sale unit. In one instance the tool is run assuming 33.33% of the pulpwood and saw logs for the unit in the timber sale packet will be immediately harvested. The tool applies default values for how much harvested tree mass becomes HWP (parsed into lumber and pulp based on unit-specific cruise data), fuelwood, and harvest residue that decays on-site. The remaining 66.67% of the volume continues to grow under the "Basic projection under forest maintenance" scenario. As a final step, values from both instances of the tool are then combined, and harvest operation and hauling emissions are added (assumed to be 33.33% of the emissions found under the VRH alternative described below).

Because the USFS tool is not specifically designed to address forest thinning, DNR's approach to model a thinning alternative does not spatially represent a thinning on the ground. Where an actual thinning would space harvested trees throughout the unit until 33.33% of the volume is removed, this analysis effectively assumes all trees within a third of the total cruise area are harvested (and that the harvested volume represents 33.33% of the total unit volume). In terms of volumes of carbon stored and emitted, this approach results in values similar to a typically implemented thinning.

This approach does not capture future carbon storage resulting from increased understory recruitment and overstory tree growth stimulated by canopy opening, which over time can make up for a portion of the reduced overstory biomass, rendering thinned mature stands of statistically similar carbon storage when compared to unharvested mature stands (Williams and Powers 2019). A final aspect not captured by the thinning scenario is any additional roads that might be built in this scenario for equipment to feasibly access interior portions of a thinned unit. Overall, projections of carbon growth for the analysis of a thinning alternative are likely conservative.

DNR staff consulted with the developers of the USFS tool in the Spring of 2024 and confirmed the validity of the above approach to represent a thinning alternative.

Variable Retention Harvest Alternative

Like the thinning alternative, the tool is run twice for each timber sale unit under the VRH alternative. First, 100% of the pulpwood and sawlogs are harvested from the cruise unit area. The tool applies default values for how much harvested tree mass becomes HWP (parsed into lumber and pulp based on unit-specific cruise data), fuelwood, and harvest residue that decays on-site. Next, 100% of the harvested area is then reforested with planted seedlings. Harvest operation and hauling emissions are then calculated and added, based on the harvested volume and timber sale location.

Recording Carbon Stock and Flux Outcomes

For each alternative, carbon stocks and fluxes are summed across all proposed timber sale units, and the resulting values are recorded in the timber sale "Analysis of Carbon Flux by Harvest Alternative" worksheet. Within the worksheet, DNR also records values under "Carbon Impacts Contextualized" to place all harvest-related emissions, including harvest operation and hauling emissions, along with carbon storage in live trees and the HWP pool, within a context of forest growth and carbon sequestration across three different spatial scales: harvested area, the administrative region where the sale occurs, and all DNR-managed forestlands in western Washington (i.e., the broader landscape). While the finest scale of analysis may be of interest to some, it is the agency's position that analyzing carbon at the scale of an individual project is inconsistent with IPCC best practices (Nabuurs et al. 2007). Indeed, no DNR timber sale is developed in isolation. Rather, each project is developed while considering forest growth across DNR-managed forestlands across the DNR region and across western Washington (see, for example, Alternatives for the Establishment of a Sustainable Harvest Level for Forested State Trust Lands in

Western Washington, FEIS). For this reason, DNR compares emissions from a single project against forest growth at the region and westside scales.

At the timber sale scale, the time for the system to recover to pre-harvest carbon storage is computed based on the tool's outputs for forest growth and decay of various components, including HWP, and accounting for harvest operation and haul emissions (see below). DNR first calculates an annual rate of change by subtracting the total carbon stock at year zero from the total carbon stock at year 50 (the analysis window for the no harvest, thinning, and VRH alternatives). The total carbon stock at year zero includes the stocks of all in-forest pools that are not harvested timber volume (Box H in the tool results tab), plus HWP. The total carbon stock at year 50 includes the stocks of all in-forest pools that were not harvested timber volume (including the decay of dead components left behind), plus 50 years of net stand growth following reforestation, plus the remaining carbon estimated to still be stored in HWP. This differenced value is then divided by 50 to estimate an annual rate of carbon change between the two time periods. The annual rate of change assumes linear growth, rather than a perhaps more realistic geometric curve, because it is simpler to calculate and provides a reasonable approximation of actual carbon sequestration rates over time. This annual rate of change is iteratively added to the total carbon stock at year zero under the VRH alternative until the sum equals the pre-harvest carbon stock (plus harvest operation and hauling emission). The time at which this occurs is rounded up to the nearest full year.

At the broader scales (and consistent with IPCC principles), DNR also demonstrates the time it takes for forest growth across a given landscape to equal/offset all initial harvest-related emissions for a timber sale. Carbon flux values for the DNR region and broader westside DNR landscape are derived from the FIA carbon inventory report developed for DNR (Christensen et al. 2020). When examining only growth and natural mortality, Christensen et al. (2020) estimated the total westside DNR carbon flux to be 6.14×10^6 metric tons of CO_2e per year. Dividing the total harvest emissions at year zero under the VRH alternative by 6.14×10^6 results in an estimated duration necessary for the landscape to sequester the amount of carbon lost due to harvest (plus emissions from harvest operations and hauling).

To estimate how long a specific DNR region requires to sequester the initial carbon emissions from a timber sale, the same analysis is repeated, but 6.14×10^6 is first multiplied by the percentage of forestland within the DNR region of interest relative to all DNR-managed forestlands in western Washington. Acreage values listed in Table 2 were downloaded from DNR's data cubes. The results of these comparisons are presented in days rather than a decimal fraction of a year. These latter two calculations do not include factors to account for other simultaneously occurring harvests, planned or sold timber sales that have been delayed, or any additional biomass that accumulates at project sites during a typical 2- or 3-year contract period. Very small harvest units designed to daylight roads or clear areas for rights of way are also not included as they will not be replanted and will instead be managed for vehicle access.

Table 2: Forested acres and percent of all western Washington DNR-managed forestlands located within each DNR region. Data is accurate as of July 12, 2024.

Region	Forested Area (in Acres)	Percent of Total Area
Northwest	359,433	24.2%
Olympic	364,061	24.5%
Pacific Cascades	424,230	28.6%
South Puget Sound	337,414	22.7%
Total	**1,485,138**	**100%**

Impacts to the Sylvan Pearl Project Site from Climate Change

As DNR manages its portfolio of lands into the future, the impacts of anthropogenic climate change will gradually introduce new management challenges. Estimating the future impacts of climate change upon a specific project area is a speculative endeavor. DNR's Sylvan Pearl timber sale project operations will last a few years, from timber harvest to reforestation. This analysis focuses on potential impacts to the project area resulting from climate change and the steps DNR is taking to mitigate the impacts of climate change and/or better understand the relationship between DNR's forest management and climate impacts.

Climate Impact: Reforestation

Compared to mature, established stands, young stands are less resilient to stressors such as heat and drought. Young trees store less water and have shallower root systems. While it is not possible to accurately predict the frequency, location, or intensity of future droughts and other climatic events that may impact seedling survival, DNR expects climate change to increase summer moisture stress when compared to summers in the past. Heat-related seedling mortality at this site is one potential outcome that is more likely in the context of a changing climate. However, it is not yet possible to reliably quantify that site-specific change in likelihood—nor is it possible to quantify how the Sylvan Pearl timber sale will impact the likelihood of drought in western Washington.

Mitigating Impacts to Reforestation

The Sylvan Pearl Timber Sale project was designed to mitigate potential challenges to reforestation. It consists of 164 acres of variable retention harvest (VRH). VRH techniques remove timber while sustaining important ecological functions, legacy trees, and structural elements from the previous dominant cohort such as snags, old and structurally unique trees, leave trees of various species and age classes, down wood, and significant logging slash (Franklin and Donato 2020).

In addition to leave trees within harvest units, mature stands located within adjacent unharvested areas (e.g. riparian and wetland management zones, potentially unstable slopes, etc.) provide some shade to the harvest areas, and they function as a natural source of site-adapted seed from hardwood and conifer species. Shade from logging slash and leave trees within harvest units helps retain soil moisture, which improves the likelihood that reforestation will be successful in the years immediately following harvest.

While some new trees will be seeded from leave tree clumps, legacy trees in adjacent stands, and riparian and wetland buffers, the primary means of reforestation at the project site will be through planting. In accordance with RCW 76.09.070 and WAC 222-34-010, all VRH units in the Sylvan Pearl area will be reforested within three years of final harvest. This area will be planted with a mix of native, climatically suitable conifer seedlings. Following the first growing season after planting, DNR foresters will conduct a survival survey at the project site to ensure an adequate number of seedlings have survived to establish a healthy, vibrant young stand. If not, foresters will prescribe interplanting to immediately address any pockets of seedling mortality.

DNR sources various species of tree seed from across the state and at various climatic zones, elevations, and soil types. Replanting with native seed acquired from similar microclimates increases the likelihood of a healthy and vibrant young stand that is suited to the project area. As climate change creates stress and variable adaptation conditions, it is important to evaluate seed sources that have evolved in climatic conditions similar to what is expected in the near future at the planting site. In May of 2022, DNR's

forest geneticists and silviculture scientists initiated a seed source trial to explore how various seed sources perform in changing conditions within Washington. That study is ongoing. The results of this study will inform DNR's reforestation and forest resilience programs into the future.

DNR is also working closely with the USFS to rehabilitate 25 seed orchards on USFS land. These seed orchards (along with DNR's Meridian Seed Orchard and dozens of gene pool reserves on DNR trust lands across western Washington) are repositories of vital genetic diversity that will enable DNR and other forest managers to source seed and seedlings with the right adaptive characteristics for a changing climate. Maintaining these seed sources mitigates against the potential negative impacts that climate change may have on reforestation efforts following harvest by ensuring a biologically diverse stock of seeds that are adapted to various climates and sites across the region. This diverse seed stock also positions DNR to match genotypes to sites based on anticipated changes to climate.

Climate Impact: Changes in Precipitation and Hydrology

Climate models project warmer air temperatures in the Pacific Northwest, with increases in winter precipitation and decreases in summer precipitation (Dalton et al. 2013; Mauger et al. 2015). Overall, precipitation will be more likely to fall as rain rather than snow, impacting the timing and volume of peak flows as well as other aspects of hydrology (Elsner et al. 2010). Timing, type, and volume of precipitation can impact stream hydrology. In addition to higher winter stream peak flows, decreased stream flows are projected during summer months (i.e., lower lows) as a result of climate change, which can contribute to decreases in the volume of water in streams and increases in stream temperatures, although such temperature changes will vary both within and among river networks (Isaak et al. 2017). These predicted changes in hydrology are generally expected across western Washington regardless of timber harvest patterns.

Timber harvest and road building can cause hydrologic changes. Canopy removal reduces interception of precipitation and evapotranspiration (Moore and Wondzell 2005 and Grant et al. 2008). As the amount of water reaching the soil increases, shallow subsurface flow and surface runoff increase, leading to increases in stream peak flows. In Pacific Northwest coniferous forests, the largest changes in peak flows occur during the first 2–5 years following harvest, with changes in peak flows reported to last up to 20 years (Grant et al. 2008). Flow rates that result from rain events with ≤ 6-year return intervals are affected. Flows larger than a 1.2–1.5-year event typically carry most sediment in the Pacific Northwest (Castro and Jackson 2001), so changes in peak flow rates caused by forest management can lead to increases in cumulative sediment transport from a basin.

Forest management may impact low flows. Evapotranspiration rates change as trees grow, and converting a mature stand of trees to a vigorously growing young stand can reduce the amount of water available for runoff. In small, even-aged headwater basins, once a stand is older than roughly 15 years, evapotranspiration rates increase and eventually exceed evapotranspiration rates typical of an older forest (Perry and Jones 2017). Perry and Jones (2017) compared stream flow from four small, homogenous headwater basins comprised of 34–43-year-old forests to stream flow from eight small homogenous headwater basins of 150–500-year-old forests. In contrast, DNR typically operates in large watersheds comprised of structurally heterogenous and variable-aged stands that are shared with other landowners with different forest management plans. Perry and Jones (2017) acknowledge that "[c]ontinued research is needed using long-term paired-basin studies and process studies to determine the effects of forest management on streamflow deficits in a variety of forest types and forest management systems."

Mitigating Impacts of Changes in Precipitation and Hydrology

DNR's State Lands HCP includes several management restrictions that mitigate the impacts of timber harvest on stream hydrology and riparian habitat (see section 13). For example, DNR manages for hydrologic maturity in the rain-on-snow zone (1,200–4,000 feet in elevation). Hydrologic maturity is the degree to which hydrologic processes (e.g. interception, evapotranspiration, snow accumulation, snowmelt, infiltration, runoff) and outputs (e.g. water yield and peak discharge) in a particular forest stand approach those expected in a mature stand under the same climatic and site conditions. A hydrologically mature forest with respect to rain-on-snow runoff is a well-stocked conifer stand that is at least 25 years old. The objective when managing for the amount of hydrologically mature forest within a given subbasin is to limit damage to salmonid habitat during peak flows associated with rain-on-snow events. For the purposes of evaluating hydrologic maturity, a subbasin is the area of a watershed that encompasses and drains into a type-3 stream (a type-3 stream being the smallest fish-bearing stream classification). Small subbasins are combined to create subbasins that are at least 1,000 acres. Where DNR manages most of a subbasin and at least one third of that subbasin is in the rain-on-snow zone, the agency mitigates the potential for increases in peak flows by ensuring that at least 67% of DNR-managed forestlands within the rain-on-snow zone of the subbasin are maintained in a hydrologically mature condition. Maintaining at least two-thirds of the acres of DNR-managed forestlands within the rain-on-snow zone of each subbasin in a hydrologically mature condition mitigates damage from peak flow during rain-on-snow events.

The Sylvan Pearl project lies within the North Fork Green River subbasin #5 and Howard Hanson subbasin #3 and partially inside the rain-on-snow zones in each of these subbasins. Currently, 80% of DNR-managed forestlands within the rain-on-snow zone of the North Fork Green subbasin #5 and 76% of DNR-managed forestlands within the rain-on-snow zone of the Howard Hanson subbasin #3 Subbasin are estimated to be hydrologically mature.

DNR mitigates the potential for increases in stream temperature by applying contiguous stream buffers that are wider than what is required under forest practices rules. These buffers, which lie between the harvest unit and the stream channel, are called riparian management zones (RMZs). Compared to the minimum standards required by state law, wider riparian buffers (such as those described in the State Lands HCP) provide more protection from the potential impacts that harvests and forest roads can have on hydrology. RMZs intercept overland flow before it reaches the stream, provide shade (which cools flowing water), stabilize stream banks (which mitigates delivery of sediment to the stream and the channel aggradation), recruit instream wood (which alters channel hydrology and sediment transport and creates deeper, cooler pools that can moderate stream temperatures during warmer months and provide refugia for fish and other species), and maintain riparian microclimates. DNR's Riparian Forest Restoration Strategy guides foresters in the application of riparian enhancements to accelerate restoration of riparian habitat, including thinnings and the placement of large wood in streams, among other habitat enhancements (Bigley and Deisenhofer 2006).

As part of DNR's Adaptive Management program (described in the HCP), DNR scientists are conducting extensive, long-term research and monitoring in the Olympic Experimental State Forest (OESF) to better understand the relationships between DNR's timber management practices, riparian habitat, and stream conditions. The purpose of adaptive management is to collect and use scientific information to improve land management practices across DNR's forested trust lands. DNR's Status and Trends Monitoring of Riparian and Aquatic Habitat project is an ongoing effort to monitor the effectiveness of the HCP's Riparian Conservation Strategy, which aims to maintain and improve habitat for salmonids and other

species. This project includes ongoing monitoring of 50 DNR-managed watersheds in the OESF for nine indicators of habitat quality, including water temperature and stream flow.

In the 2013–2020 report for the Status and Trends Monitoring of Riparian and Aquatic Habitat in the Olympic Experimental State Forest, Devine et al. (2022) found that, in all sampled streams, riparian buffers have produced multiple habitat benefits including stream temperatures and riparian microclimates that remained cool during the summer. It remains difficult to quantify the relationship between DNR timber harvest and stream flow, as the water feeding any given stream typically comes from a large landscape managed by multiple landowners following different rulesets. Rarely is the majority of a given landscape predominantly young forest. This is especially true in scenarios where DNR manages a majority of a basin. For example, in the OESF, only about 10 percent of each type-3 watershed is typically harvested in a given decade. This is roughly the case for DNR-managed forestlands across western Washington.

Finally, to limit the negative impacts of DNR's activities on watershed systems, the agency's Policy for Sustainable Forests includes a Policy on Watershed Systems that generally limits the size of even-age harvest units to 100 contiguous acres, even though forest practices rules allow individual units of up to 240 contiguous acres. Exceptions to DNR's 100-acre limit are rare and include situations where a larger harvest unit size would have an ecological benefit (e.g. less road construction), or the agency needs to address a forest health-related issue such as damage by fire, insect, disease, or windthrow. The even-age units of the Sylvan Pearl timber sale are all ≤ 100 acres in size.

Climate Impact: Invasive Plant Species

It is possible that a changing climate will increase the likelihood that invasive plants will take root in timber sale units where variable retention harvests have occurred. Invasive plants compete for resources against native plant species, including tree seedlings and native understory species.

Mitigating Impacts of Invasive Plant Species

DNR mitigates against the impacts of invasive plant species. Following harvest and prior to replanting, foresters will inventory the site and develop prescriptions for herbicide application. These applications are typically done by hand on DNR-managed forestlands, rather than by aerial means. Contracts for both methods of application are designed to ensure a maximum degree of control and reduce adverse impacts associated with inaccurate spray delivery. When DNR staff determine that an aerial application is better suited to the site, staff employ contract clauses that require GPS tracking to quickly identify any potential overspray into habitat areas.

Throughout the Howard Hanson watershed, and areas within the Green River watershed below the municipal water supply intake, the South Puget Sound Region engineering program proactively and regularly surveys the forest road network—including any newly constructed roads associated with the Sylvan Pearl project—and treats weeds along roadsides using herbicide. In addition to regular surveys, herbicide application in this area is responsive to the requests of, and compliant with the priorities established by, the King County Noxious Weed Control Board. Roadside herbicide application is not conducted within the Green River watershed above the municipal water supply intake.

DNR follows integrated pest management principles when controlling invasive plant species—a combination of chemical, mechanical, and cultural techniques to control the spread of harmful plant species and fungal pathogens. The agency's control of invasive species begins at the nursery where soil pathogens are carefully monitored and eliminated. Chemical herbicide prescriptions in the forest are

developed to apply the least amount of the narrowest spectrum and least persistent chemicals to feasibly and efficiently achieve prompt reforestation. DNR maintains compliance with third-party sustainable forestry standards that describe current best management practices for reforestation and invasive species control in the Pacific Northwest. All herbicide applicators are trained and licensed in accordance with state and federal laws.

Climate Impact: Wildfire Risk

Wildfire is a natural disturbance to forests in western Washington (Agee 1993, Van Pelt 2007). Climate change may bring warmer, drier summers to westside forests which will foster conditions more conducive to wildfire. While area burned may increase (Rogers et al. 2011, Halofsky et al. 2018), there is no evidence that east winds, a key ingredient associated with the largest wildfires west of the Cascade crest (e.g., the 1902 Yacolt fire and 2020 Labor Day fires), will increase (Mass et al. 2022). Nonetheless, an increase in warmer and drier conditions and a likely seasonal expansion of those conditions increases the chance of overlap with east wind events, and this increases wildfire danger for all stands, regardless of age class. While stand structure and age do not appear to influence wildfire severity during wind-driven events (Reilly et al. 2022), there is some evidence to suggest younger dense stands may be likelier to severely burn when winds are absent (Busby et al. 2023).

Mitigating Impacts of Wildfire

While it is possible that harvest activities can ignite fires, DNR uses Industrial Fire Precaution Levels (WAC 332-24-301) to limit or shut down activities such as harvest operations during periods of high fire danger (i.e., high temperature, low humidity, high winds, etc.). During periods of elevated fire risk when harvest operations are allowed, the timber harvester will be required to provide a fully functional pump truck or pump trailer to meet the specifications of WAC 332-24-005 and WAC 332-24-405. All timber harvest activity during the summer fire season will follow site-specific equipment restrictions appropriate for the Industrial Fire Precaution Level. This system helps prevent human-caused wildfires by regulating work in the woods.

Fuel reduction measures at the project site can include locating piles of logging residues away from structures on adjacent private lands. Harvest units of the Sylvan Pearl project area are not adjacent to homes or other developed lands. Piles of logging slash at the Sylvan Pearl project area may be burned based on wildfire risk, habitat and replanting considerations, weather conditions, and operational capacity.

DNR is legally obliged to actively suppress all wildfires on state trust lands. Active forest management for timber production can play a role in the agency's ability to fight wildfire, especially as new or improved forest roads are built to access project sites. The Sylvan Pearl project includes 13.5 miles of pre-haul road maintenance and 0.8 miles of new road. All of DNR's active forest roads are maintained to Forest Practices standards. Forest roads enable wildland firefighters to better access the harvest area to conduct fire suppression activities should a fire occur, and they may function as fuel breaks in the event of a fire.

Following a wildfire event on forested DNR trust land, DNR staff conduct an investigation to determine how the fire started. This information can be used to refine best management practices and decrease the risk of future wildfires. Foresters also survey the post-wildfire landscape to assess stand survival and determine appropriate next steps to achieve a healthy stand. Next steps can include a range of options from no action up to salvage harvest and/or replanting. Post-fire silviculture prescriptions are site

specific and responsive to factors including, but not limited to, location, stand age, fire severity, seedling availability, habitat objectives, and whether and how the recreating public use the area.

Notes

1 Carbon stores and fluxes are expressed in metric tons of carbon dioxide equivalents (tCO_2e). A CO_2e is a unit of measurement that standardizes the climate effects of various greenhouse gasses. It allows users to express the global warming potential of different pollutants using a common unit. One tCO_2e is the total greenhouse gas emissions with the equivalent radiative forcing, over a given time horizon, as one metric ton of carbon dioxide. Positive carbon flux numbers represent emissions to the atmosphere. Negative carbon flux numbers represent sequestration of carbon from the atmosphere in terrestrial carbon pools.

2 Emission factors considered in this analysis include plant decay, decay of harvested wood products (both in use and in landfills), harvest activity, and transportation of logs. Carbon storage factors include plant growth and carbon in harvested wood products (both in use and in landfills). The "Methodology for Carbon Analysis of Management Alternatives" section of this document contains a thorough discussion of DNR's approach to estimating emissions associated with harvest operations and hauling.

3 "Terrestrial carbon dynamics are characterized by long periods of small rates of carbon uptake, interrupted by short periods of rapid and large carbon releases during disturbances or harvest. Depending on the stage of stand development, individual stands are either carbon sources or carbon sinks […] For most immature and mature stages of stand development, [forest] stands are carbon sinks. At very old ages, ecosystem carbon will either decrease or continue to increase slowly with accumulations mostly in dead organic matter and soil carbon pools. In the years following major disturbances, the losses from decay of residual dead organic matter exceed the carbon uptake by regrowth. While individual stands in a forest may be either sources or sinks, the forest carbon balance is determined by the sum of the net balance of all stands." (Nabuurs et al., 2007)

4 Future forest carbon stocks on DNR-managed forestlands are estimated using the Growth, Removals, and Mortality (GRM) methods described in the Christensen et al (2020) carbon inventory.

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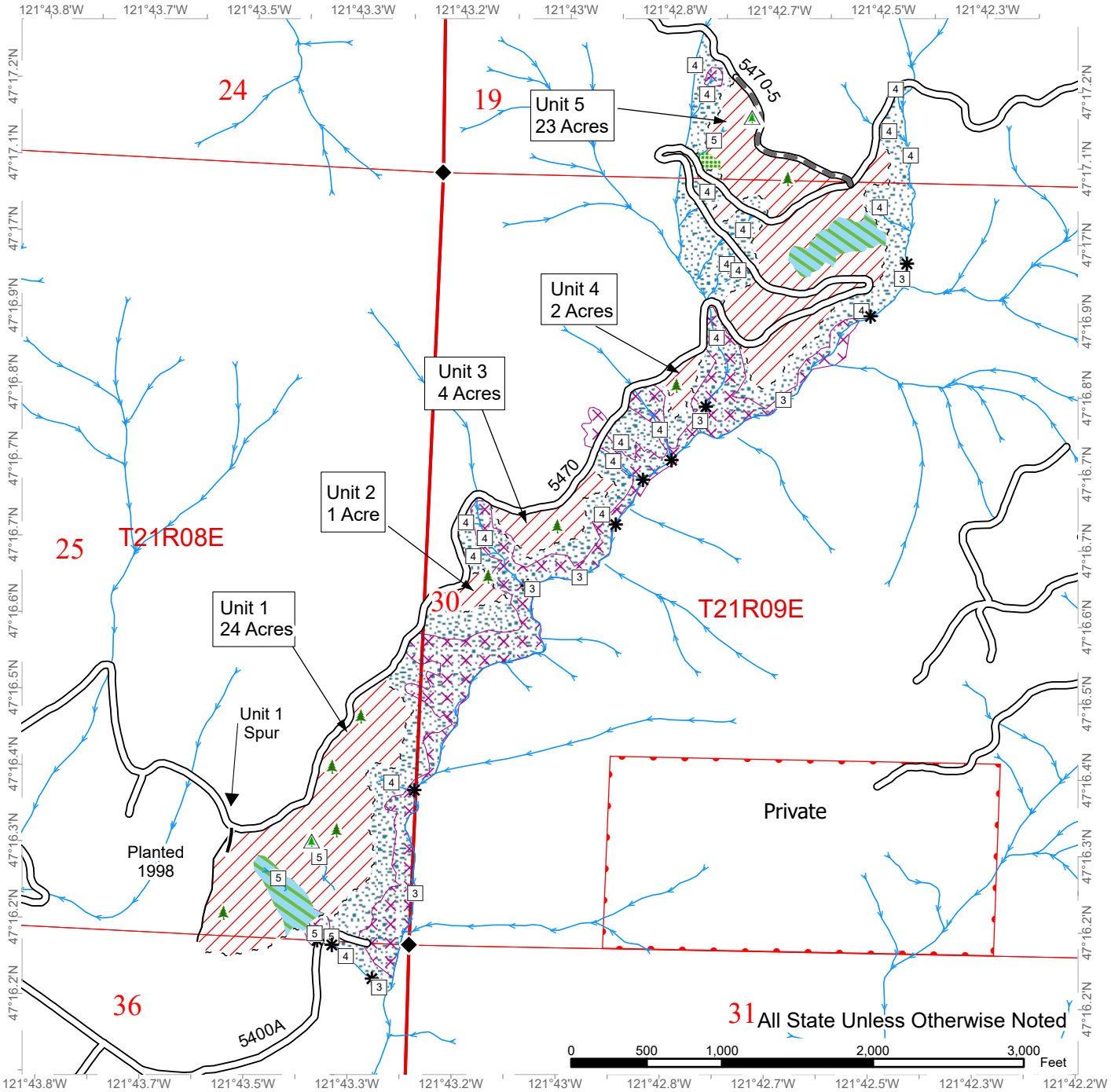
TIMBER SALE MAP

SALE NAME: SYLVAN PEARL
AGREEMENT #: 30-103620
TOWNSHIP(S): T21R8E, T21R9E
TRUST(S): Common School and Indemnity (3), State Forest Transfer (1)

REGION: South Puget Sound Region
COUNTY(S): King
ELEVATION RGE: 1320-3280



- Sale Area
- Sale Boundary Tags
- Timber Type Change
- Tailhold Restriction Area
- Non-Tradeable Leave Tree Area
- Leave Tree Area
- Riparian Mgt Zone
- Existing Roads
- Required Pre-Haul Maintenance
- Optional Construction
- Leave Tree Area <1/4-acre
- Non-Tradeable Leave Trees
- Streams
- Stream Type
- Stream Type Break
- Survey Monument
- Property Line

N

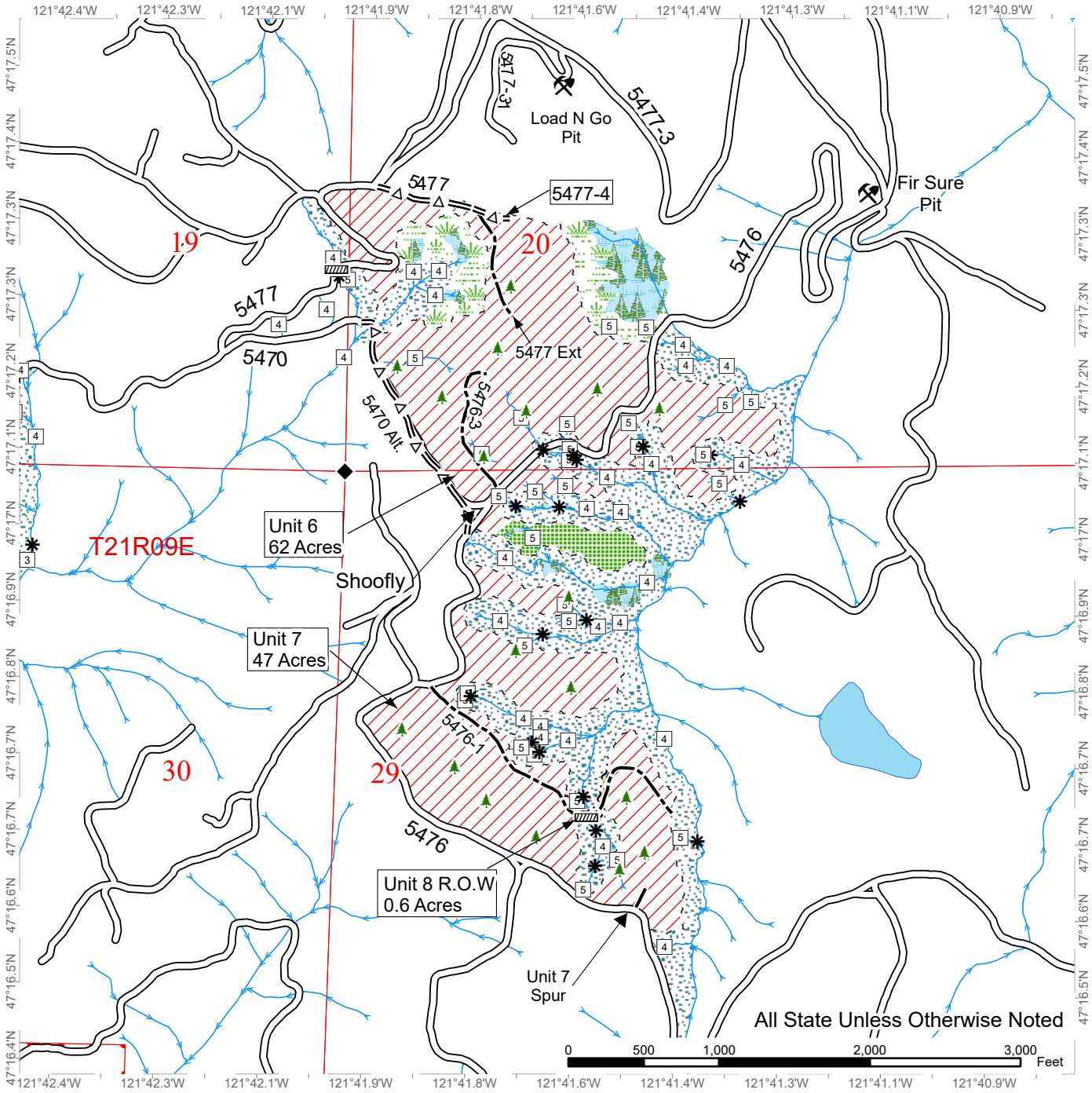
Prepared By: nvon490

Modification Date: kfry490 4/4/2024

TIMBER SALE MAP

SALE NAME: SYLVAN PEARL
AGREEMENT #: 30-103620
TOWNSHIP(S): T21R8E, T21R9E
TRUST(S): Common School and Indemnity (3), State Forest Transfer (1)

REGION: South Puget Sound Region
COUNTY(S): King
ELEVATION RGE: 1320-3280



- Sale Area
- Right Of Way
- Sale Boundary Tags
- Right of Way Tags
- Timber Type Change
- Non-Tradeable Leave Tree Area
- Leave Tree Area
- Riparian Mgt Zone
- Forested Wetland
- Wetland Mgt Zone
- Existing Roads
- Optional Pre-Haul Maintenance
- Optional Construction
- Culvert
- Leave Tree Area <1/4-acre
- Rock Pit
- Streams
- Stream Type
- Stream Type Break
- Survey Monument
- Property Line

N

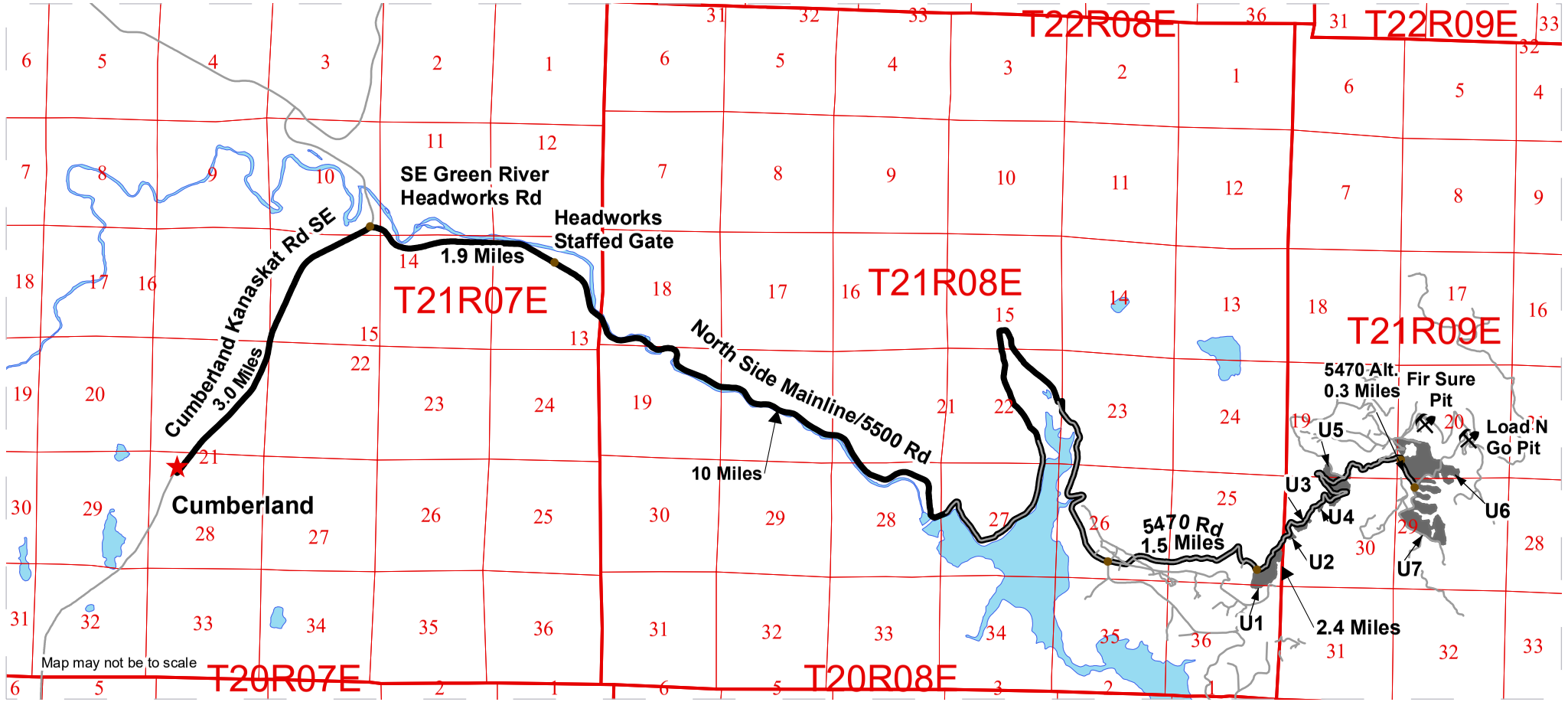
Prepared By: nvon490

Modification Date: kfry490 4/4/2024

DRIVING MAP

SALE NAME: SYLVAN PEARL
AGREEMENT#: 30-103620
TOWNSHIP(S): T21R8E, T21R9E
TRUST(S): Common School and Indemnity (3), State Forest Transfer (1)

REGION: South Puget Sound Region
COUNTY(S): King
ELEVATION RGE: 1320-3280



Page 3 of 3

- Sale Area
- Haul Route
- County Road
- Town
- Distance Indicator
- Rock Pit

From Cumberland, go north approximately 3 miles then turn right on the SE Green River Headworks Road for 1.9 miles. After passing through the staffed Headworks gate, continue on the North Side Mainline/5500 Road for 10 miles. Veer left onto the 5470 Road for 1.5 miles to reach Unit 1. Continue another 2.4 miles down the 5470 Road to reach Units 2, 3, 4, 5, and 6. Continue on the 5470 Alternate Road for 0.3 miles to reach Unit 7.

N

Prepared By: nvon490

Modification Date: kfry490 4/4/2024