October 16, 2024

VIA Email

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Commissioner Hilary Franz
Board of Natural Resources
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Re: Letter in Opposition to and Comments on Tree Well (FPA #2618493/SEPA #30-104820) timber sale in the Elwha River Watershed

Dear Commissioner Franz, Members of the Board of Natural Resources, and Mr. Wells:

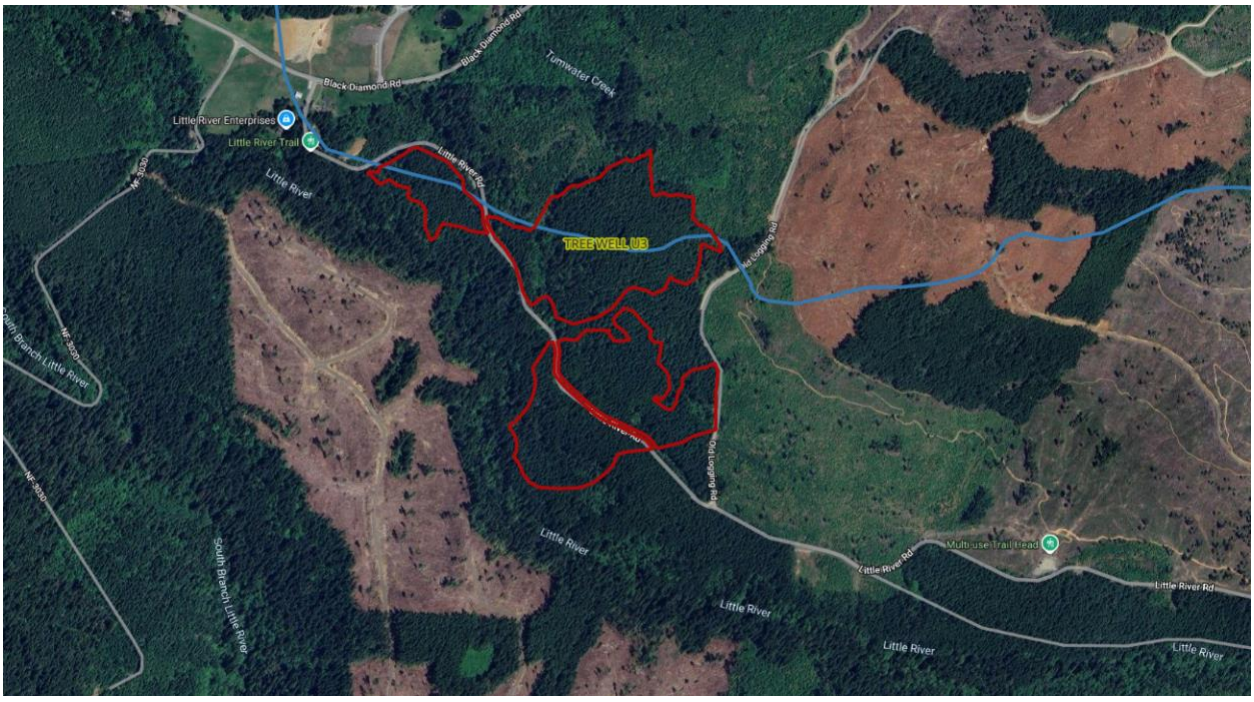
This is an historic moment. We have an opportunity to protect the remaining mature, structurally complex forests in the Elwha River Watershed and truly restore the watershed. The federal and state government have spent over $338 million on Elwha River restoration. That includes $11 million by the Washington State Office of Recreation and Conservation. It does not make sense to spend this money while destroying forest lands that are critical to stream flows and the watershed's overall health.

We greatly appreciate DNR's decision to cancel the "Power Plant" timber sale last year and to protect 69 acres of critical forest along the Elwha River. We ask that DNR pause any further logging of mature, structurally complex forests in the Elwha Watershed while we work toward longer term solutions. For over two years, both the City of Port Angeles and thousands of residents have asked DNR for such a pause. Meantime, we ask that DNR locate replacement sales in less critical areas.

DNR did not adequately review the environmental impacts of the Tree Well timber sale. The SEPA review gives origin dates of 1929-1931 and for Unit 3 indicates slopes of 75%. We do not believe DNR has adequately assessed the impacts of this proposed sale in light of the forest age, location, and steep slopes.

Unit 3 of the Tree Well timber sale would log 55 acres next to Little River, a major tributary to the Elwha River. Tree Well, along with three additional proposed sales for 2024 (totaling 555 acres), would destroy nearly 50 percent of the remaining Elwha legacy forests. This would have detrimental effects on watershed hydrology and ecosystem integrity. Slope stability is of particular concern as discussed in the Geotechnical Review prepared by Glen Wade, attached hereto, and submitted in response to the Forest Practices Application for Tree Well.

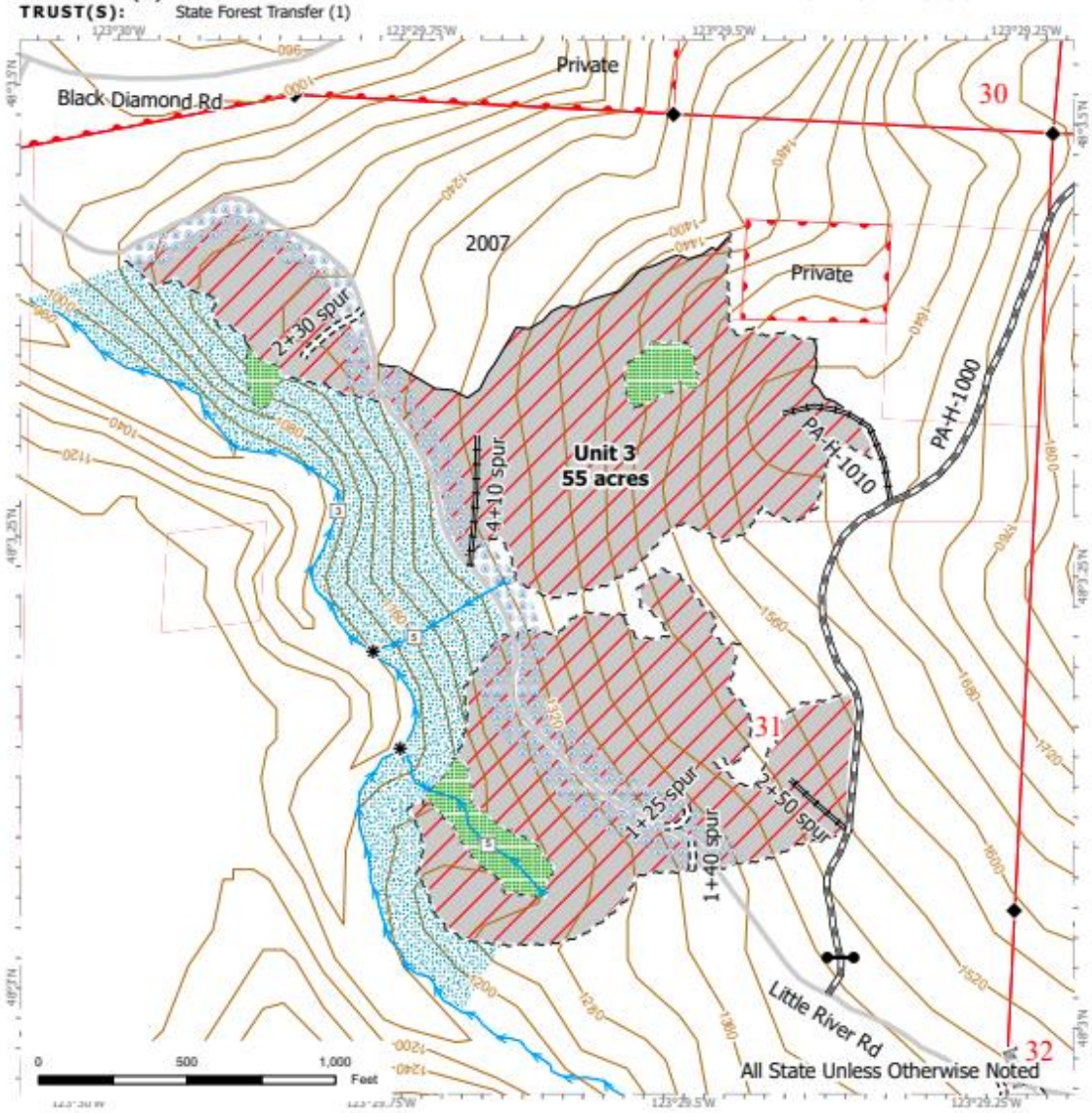
Tree Well U3. In the image below the Elwha watershed boundary is blue. You can see this is a significant stretch of mature, structurally complex forest within an area impacted by clearcut logging, making the protection of this forest all the more critical.



LOGGING PLAN MAP

SALE NAME: TREE WELL
AGREEMENT#: 30-104820
TOWNSHIP(S): T30R6W
TRUST(S): State Forest Transfer (1)

REGION: Olympic Region
COUNTY(S): Clallam
ELEVATION RGE: 1120-2040



Western Red Cedar in Tree Well Unit 3 (Credit: @Forest2Sea)

Large Douglas-Fir in Tree Well Unit 3 (Credit: @Forest2Sea)

Commenters

The Earth Law Center (ELC) is a non-profit organization whose mission is to align our laws with Nature's laws. ELC advocates for new laws and policies to promote resilience, reciprocity, and holistic ecosystem restoration for the well-being of all life on this planet.

The Center for Whale Research (CWR) is dedicated to the study and conservation of the Southern Resident killer whale (orca) population in the Pacific Northwest. In October 2020, the Center for Whale Research took a leap into conservation to preserve salmon habitat by purchasing a ranch (named Balcomb Big Salmon Ranch after world renowned orca researcher Ken Balcomb) bordering both sides of the Elwha River, in a stretch of the mainstream river where most of the remnant native Chinook salmon now spawn. In doing so, it recognized that the Chinook salmon abundance from the Elwha River ecosystem can provide a healthy food source for the critically endangered Southern Resident Orca Whales and a sustainable, nearshore artisanal fishery.

The Orca Network is a Washington based non-profit that connects people with whales of the Pacific Northwest. The Orca Network advocates for river restoration. As Executive Director, Susan Berta explains on its website: "We are all intricately connected, from tiny plankton to forage fish. Salmon, orcas, tall firs and cedars. Mountains. Rivers and the ocean. It is time to reflect, to reconnect. And to respond as better caretakers of our planet."

We have a substantial interest in enhancing salmon habitat by protecting watershed health of which healthy forests are integral. The Indigenous-led movement to create Salmon parks (salmonparks.ca) highlights the importance of managing forests to enhance salmon health.

The effects of this sale must be examined extensively and cumulatively, for the overall health of the watershed and the last remaining legacy forests**.** We submit the following comments in opposition to, and regarding the SEPA for, the Tree Well timber sale in the Elwha River Watershed. Our general comments followed by our more specific comments are below.

DNR Has Not Met its Duty to Future Generations or its Duty to Respect and Advance the Right to a Healthful Environment

The Washington State Legislature, when it enacted SEPA, recognized that "each person has a fundamental and inalienable right to a healthful environment and that each person has a responsibility to contribute to the preservation and enhancement of the environment." Consistent with this, SEPA states that agencies, including DNR, have the responsibility "to use all practicable means" so that the state and its people may:

> (a) Fulfill the responsibilities of each generation as trustee of the environment for succeeding generations;

> (b) Assure for all people of Washington safe, healthful, productive, and aesthetically and culturally pleasing surroundings;
> (c) Attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences;
> (d) Preserve important historic, cultural, and natural aspects of our national heritage;
> (e) Maintain, wherever possible, an environment which supports diversity and variety of individual choice;
> (f) Achieve a balance between population and resource use which will permit high standards of living and a wide sharing of life's amenities; and
> (g) Enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

To realize these responsibilities, under SEPA,

> (1) The policies, regulations, and laws of the state of Washington shall be interpreted and administered in accordance with the policies set forth in this chapter, and (2) all branches of government of this state, including state agencies, municipal and public corporations, and counties shall: (a) Utilize a systematic, interdisciplinary approach which will insure the integrated use of the natural and social sciences and the environmental design arts in planning and in decision making which may have an impact on the environment . . . (d) Preserve important historic, cultural, and natural aspects of our national heritage; [and] (h) Initiate and utilize ecological information in the planning and development of natural resource-oriented projects.

This means that SEPA's substantive and procedural mandates overlay all regulatory and nonregulatory activities of Washington's governmental entities, including its agencies.

These mandates touch on all aspects of the environment, including the management of the state's trust lands. Although DNR must consistently provide some support to beneficiaries, it does not have a duty to maximize revenue from logging, or even rely on extractive sources of funding at all. Instead, it must manage to ensure this support while serving all the people of the state at the same time. It must implement these duties consistent with its duties under SEPA as trustee of these lands for future generations and the right of the people of the state to a healthy environment. DNR should have, but has not, considered alternatives to extractive, industrial-style logging at this site.

Extractive Logging in Elwha River Watershed Forests is Incompatible with Elwha River Restoration

We urge the DNR to work with the larger scale restoration effort rather than at cross-purposes by destroying critical forest habitat. The Washington Supreme Court has made clear that DNR has wide discretion to determine how best to manage, make productive, and generate revenue from the approximately 2 million acres of forests it currently manages.

An integrated approach that accounts for the health and well-being of all species is compatible with the State Environmental Policy Act (SEPA) which identifies the following purposes: "(1) To declare a state policy which will encourage productive and enjoyable harmony between humankind and the environment; (2) to promote efforts which will prevent or eliminate damage to the environment and biosphere; (3) and [to] stimulate the health and welfare of human beings; and (4) to enrich the understanding of the ecological systems and natural resources important to the state and nation." RCW § 43.21C.010.

The City of Port Angeles and many community members have expressed concerns about logging, particularly of older, structurally complex forests, in the Elwha River Watershed. The growing movement to protect Elwha Forests was sparked by DNR's decision to log a forest by the sale name "Aldwell." On March 5, 2023, many people gathered to support the City's request for a pause on logging in the Elwha Watershed as covered by the Peninsula Daily News in "Protesters Rally Against Aldwell Logging", by public news service "Post-dam Elwha Thriving, but Logging Threatens Gains", and other media outlets. Although Aldwell was logged, opposition continued with regard to the very next timber sale in the Elwha Watershed called "Power Plant" (*see* Controversial WA timber sale near Elwha River rankles conservationists, Port Angeles leaders), which DNR eventually cancelled. Cancellation of the "Power Plant" timber sale was widely celebrated by the community along side local and state elected officials and politicians, including Rep. Mike Chapman, City Councilmember Latrisha Suggs, and Republican politician Bill Bryant. (*see* Cancellation of power plant timber sale celebrated).

DNR has failed to consider the adverse hydrological impacts of industrial logging

A science synthesis produced by the US Forest Service Pacific Northwest Research Station provides perhaps the most comprehensive compendium of how industrial logging practices contribute to hydrologic impairments in the region (Grant et al. 2008). The synthesis surveys over 100 peer-reviewed scientific studies spanning the last five decades and identifies a direct correlation between industrial logging and increases in peak flows. Peak flows—a term to describe the maximum rate of water discharge in rivers and streams during storms—are associated with landslides, mass wasting, channelization, streambed scour, and other forms of erosion and deposition that detrimentally affect fish. By causing water to move faster through the hydrologic system, industrial logging practices not only can contribute to the degradation of salmonid habitat, but also can endanger communities downstream by elevating the risks of floods and landslides. Increasing the "flashiness" of the hydrograph should be seen as a high priority to public agencies, especially in the aftermath of the unprecedented flood event of November 2021, which displaced hundreds of people, resulted in loss of life, and contributed to over $50 million in damages.

Additionally, recent research has found clearcut-plantation silviculture reduces summer streamflows when compared to adjacent unlogged forests. Recently, researchers at Oregon State University published a study that drew conclusions about the role forest management plays in streamflow levels in summer months (Segura et al. 2020). Dr. Catalina Segura and her colleagues analyzed 60 years of data collected on paired stream basins in the Alsea Watershed, in Oregon's Coast Range. Some basins were logged according to the rules laid

out by Oregon's current forestry regulations, while others were left standing and allowed to mature to over 100 years of age. The researchers found that streams in logged basins produced 50% less water during summer months than streams in unlogged basins. These streamflow deficits persisted for more than half of the year, being most pronounced in late summer. The researchers suggest that the high evapotranspiration rate of young Douglas-fir plantations is the primary cause of this deficit. In other words, younger trees use water less efficiently than older forests, which means young timber plantations draw more water out of the system and release it to the atmosphere, thereby contributing to less water flowing in streams and rivers.

Another related study conducted by Dr. Julia Jones and her colleague Timothy Perry studied data collected in eight paired basins over a six decade period to inquire into the streamflow consequences of industrial forest practices (Perry & Jones 2016). The researchers studied forestlands that were set aside over 70 years ago for the purpose of research located within the H.J. Andrews Experimental Forest (east of Eugene, Oregon) and the South Umpqua Experimental Forest (east of Roseburg, Oregon). Half of the basins studied were clearcut according to current legal standards, while the others were left standing.

The research produced a clear and powerful conclusion that young Douglas-fir plantations diminish summer streamflow by 50%, a finding corroborated by Segura et al. 2020. Perhaps more importantly, these streamflow deficits caused by industrial logging practices lasted for long periods of time. According to the six decades of data, low flows in clearcut and-replanted basins persisted and intensified for over a half century after the initial harvest of the basin. This means that clearcutting today will produce diminished water levels well into the late-21st century. Notably, scientists predict that climate change will dramatically alter hydrologic systems and lead to a water shortage crisis in the Pacific Northwest during the latter half of this century (Climate Impacts Group, University of Washington 2015). While the study did not research forests in Washington, the findings linking tree plantations to diminished summer streamflows are highly applicable to our state's productive westside forests (Frissell 2017).

Similar research regarding the impact of industrial forest practices in the Nooksak Watershed in WA have also been documented in research by Oliver Grah, Nooksak Indian Tribe's water resources program manager (now retired), using computer simulations developed in partnership with Western Washington University professor Bob Mitchell and Washington-based environmental engineering firm Natural Systems Design. (*see Logging forests takes this toll on already-strained Nooksack River, new research suggests*. These studies have important implications for forest management in Washington because they suggest that industrial forest practices—especially when conducted on a watershed-scale—can greatly diminish water quantity in the summer months, when farmers and salmon need it most.

The attached Declaration from hydrologist Matt Rosener, MS, PE illustrates the importance of considering the cumulative effects of logging in the watershed. Mr. Rosener's Declaration states in part:

> (11) Based on my professional experience and as is standard in advising local governments or other entities about the impacts of certain activities on watershed health, it is best practices to avoid or defer activities that may have a measurable impact on in-stream flows until there is an acceptable degree of certainty that such activities will not have an unacceptable impact. This is particularly important as climate change introduces greater uncertainty as to our ability to predict the severity of impacts and availability and reliability of fresh water sources are expected to be greatly compromised.
> (12) It is important to consider the cumulative effects of past, present, and future planned logging, both on public and private land, in the Elwha River Watershed.
> (13) It is also important to consider the recent dramatic changes to the Elwha River that have occurred as a result of dam removal, including the effects such changes have had on the river channel, sedimentation, high flow events, and slope stability of the river bluffs.
> (14) Based on my professional experience and review of the above cited studies, it is my opinion that industrial logging poses a threat to the health of the Elwha River Watershed, and, in particular, will reduce in-stream summer flows to at least some degree and in a potentially significant amount. Logging also presents other hazards to the River such as landslides and erosion.

The precautionary principle applies here, particularly given the fact that DNR has not done any studies to determine the impacts of its logging activities on the Elwha Watershed. When DNR has previously responded to concerns regarding hydrological impacts of other timber harvests (not within the Elwha Watershed), DNR has:

- admitted that it does not know what the impacts of industrial logging on watershed health are and has said only that it will respond to new science if/when it comes out;

- is not able to cite any scientific basis for whether its current forest practices remedy the findings of the Segura and Perry/Jones findings (summarized in Matt Rosener's Declaration); and

- has not expressed any commitment to doing the research/studies necessary to see if DNR forest practices will not negatively impact summer streamflow, as it is hoping might be the case.

We have also attached the Declaration of Adelaide C. Johnson, a hydrologist and climate change vulnerability specialist, submitted in the appeal of Sure Wood and Plumb Bob timber sales in Mason County. Ms. Johnson points out inadequacies in the SEPA checklist of general applicability – including the failure to consider cumulative watershed impacts.

Extractive Logging in the Elwha River Watershed Threatens the Well-being of its Non-Human Inhabitants

DNR relies heavily on operating under an "Incidental Take Permit" (a permit that allows it to kill or harm endangered or threatened species) based on the idea that it is complying with its obligations under a multi-species Habitat Conservation Plan (HCP) with the US Fish and Wildlife and the National Marine Fisheries service concerning threatened and endangered species and their habitats. (SEPA checklist p. 8). Under that plan DNR is obligated to set aside a certain amount of forest to meet its older-forest targets (those forests being recognized as critical habitat for endangered species).

DNR has been sued over its failure to comply with its own policies and the HCP and lost in court. DNR states that as of September 2024, it has revised a document titled "Landscape Assessment to Identity and Manage Structurally Complex Stands to Meet Older-Forest Targets in Western Washington, May 2024". (p. 9). DNR admits, as it must, that the Straits HCP Planning Unit does not currently contain 10 to 15 percent older-forest conditions. Indeed, there is evidence based on data obtained from DNR's Public Disclosure Office that DNR has only set aside 5,846 acres of structurally complex forests in the Straits HCP planning unit for conservation, which represents less than 5% of the Straits HCP planning unit that has protected, structurally complex forests that are excluded from commercial timber harvest. DNR appears to justify logging the older, structurally complex forests that are part of Tree Well on the grounds that it is managing other stands "projected to develop into older-forest structure that meets or exceeds [the 10 to 15 percent] threshold by 2090." (p. 9). We submit that this violates the HCP, DNR's own policies, and runs contrary to the very intent of these agreements which is to protect threatened and endangered species. From the rapid decline of endangered species, such as the marbled murrelet, we know that there is insufficient habitat to ensure their survival. Even if accurate, the creation of more structurally complex forests 66 years from now will not save the endangered species of today. This proposed harvest would result in the loss of forest that should be set aside to meet older forest targets as required by law.

DNR has failed to adequately consider impacts of extractive logging on species that depend upon the health of the Elwha River Watershed, in particular, the Southern Resident Orcas

DNR has failed to adequately consider impacts of extractive logging on the Elwha River Watershed and its inhabitants including salmon, marbled murrelet, northern spotted owl, bears and cougars. Moreover, the SEPA Checklist makes no mention of the logging activities' impact on endangered or threatened species outside the forest or the immediate vicinity thereof, in particular, on the critically endangered Southern Resident Orca population. As an apex predator in the waters, Southern Resident orcas are keystone species that indicate the ecosystem's health. Due to the failure of habitat protection, the Southern Resident orcas are now in a compromising position with insufficient prey. Southern Resident orcas feed exclusively on salmon, and prefer Chinook salmon, which makes up at least 80% of their diet. The demise of salmon in the waters negatively impacts the whales' natural cycle.

During a July 24, 2018 informational webinar, Rob Williams, PhD (Pew Fellow in Marine Conservation, Co-founder, Oceans Initiative) presented on the "*Interdisciplinary effort to rank threats to SRKW recovery: salmon availability, noise & contaminants*". Dr. Williams unequivocally stated that when looking at the three threats to SRKW, recovering Chinook salmon will have the greatest single impact on recovering SRKW.

Research shows Southern Resident Orcas consume a portfolio of Chinook salmon that originate from many watersheds along the California coast to British Columbia, Canada. Chinook runs from Puget Sound/Salish Sea (which themselves are listed as threatened) are in the Southern Resident Orcas' critical habitat. A Southern Resident Killer Whale Priority Chinook Stocks Report by NOAA Fisheries West Coast Region and WA Department of Fish and Wildlife, recognizes the Salish Sea and coastal WA as areas of highest use by the Southern Resident Orcas. "In summer, the whales feed mainly on Chinook salmon returning to the Fraser River in British Columbia and Puget Sound." Research shows that the death rate for the Southern Resident Orcas correlates with coast-wide Chinook salmon abundance. Salmon deficiency reduces females' ability to carry a fetus full term or to lactate sufficiently to keep the offspring alive. "Fecundity—the ability to produce an abundance of offspring—is highly correlated with salmon availability. Currently, 69% of SRKW pregnancies end in miscarriage." These scientific studies underscore the importance of promoting Chinook salmon recovery to enhance population growth of Southern Resident killer whales. "Historically, Chinook salmon were legendary in the Elwha River." Prey from Puget Sound are an important food source for the Southern Residents, with the Elwha River's restoration and its returning fish populations, a beacon of hope for the starving whales.

Moreover, salmon and forests enjoy a symbiotic relationship. Salmon bring nutrients to the forest. On the Alaska Department of Fish and Game website you will find an article called "Why Fish Need Trees and Trees Need Fish" by biologist Anne Post that paints a vivid description of this relationship. The article describes how salmon bring nutrients to the forest and also how important trees are to salmon.

Impacts to the river and watershed from industrial logging practices, including as contemplated by the Tree Well sale, threaten salmon recovery and survival, and, in turn, threaten the Southern Resident Orcas. At the very least, DNR must study and consider such impacts, which it has failed to do. This is particularly important as recovery of the Southern Resident Orcas has been a stated priority by the executive branch including Governor Inslee, who signed the Executive Order 18-02 recognizing the urgent need to take bold action and creating the orca recovery task force.

The State's Review and Assessment of the Tree Well Sale is Wholly Inadequate

On p. 2, use of herbicides is introduced without an analysis of how their application would impact the humans, the non-human ecosystem, groundwater, etc. at this specific site. DNR does not provide any information as to how, when, what products, and to what degree herbicides will be applied. Without such information it is impossible to assess the environmental impacts of DNR's proposed herbicide application.

On p. 3, the checklist references Peabody Creek and the Elwha River as impacted water bodies, but additional environmental documentation is needed to fully assess potential risks to these sensitive waterways. A more detailed analysis of sedimentation, water quality, and habitat impacts should be provided.

Also on p. 3, the Tree Well Road Plan from 07/19/2023 lacks sufficient detail regarding the specific mitigation measures to reduce environmental impacts from road construction. A comprehensive review of the road's impact on erosion, water runoff, and habitat fragmentation is necessary.

On p. 6, the claim that forest stands will be managed to protect site productivity and water quality lacks clarity. Logging has well-documented adverse effects on streamflow and water quality, so further details on how these protections will be implemented and monitored are essential.

On p. 7, the statement that DNR-managed lands sequester more carbon than they emit on a Western Washington scale needs to be examined in context, especially due to planned timber sales in other forest areas. A detailed explanation of how emissions from this project will be offset by activities elsewhere in Western Washington should be provided.

On p. 10, the checklist states that potential impacts from the proposal are unlikely to contribute to environmental concerns due to existing mitigation strategies, but no detailed analysis of these cumulative effects is provided. Further study is needed to ensure that the combination of logging activities and ongoing environmental changes are properly mitigated.

On p. 13, the checklist acknowledges that erosion may occur due to road building, culvert installation, and timber hauling but does not provide an in-depth assessment of the potential extent of this erosion. Additional study on the long-term effects of erosion on soil stability and water quality is necessary.

On p. 15, the claim that logging activities within 200 feet of streams will comply with regulations needs a more thorough investigation. Specifically, the potential impacts of erosion, sedimentation, and changes in streamflow due to logging and road maintenance near water bodies need further exploration.

Also on p. 15, the proposal to temporarily divert water for culvert installation and road

work raises concerns about the impact on streamflow, aquatic habitats, and water quality. An in-depth study on the environmental consequences of these temporary diversions is necessary.

Further on p. 15, the potential for unintentional discharge of waste materials such as oil, fuel, and lubricants into nearby water bodies is mentioned but not sufficiently explored. A more comprehensive risk assessment and mitigation plan should be provided to address the possible contamination of surface and groundwater, even if the state deems activities 'low-risk.'

On p. 16, the checklist does not adequately address whether the proposed project could exacerbate changes to stream channels during peak flow events. Additional analysis is needed to evaluate the potential for increased flood risk, streambank erosion, and channel instability.

On p. 17, the document does not sufficiently explore the risks to groundwater resources, particularly from the use of herbicides and potential runoff. A deeper investigation into the impact on local wells and groundwater quality is needed.

On p. 20, it is concerning that no fish species are listed as being present in or near the project site, especially given the proximity to water bodies like the Elwha River and Peabody Creek. Further study should be conducted to assess potential impacts on fish populations and aquatic ecosystems.

Op. 26, the claim that there are no landmarks, evidence of Indigenous use, or areas of cultural importance near the site is highly questionable. Given the long history of Indigenous presence in the region, further professional studies and thorough consultation with local Tribes are needed to ensure cultural and historical resources are properly identified and protected.

The SEPA for Tree Well is further inadequate in a number of ways, including:

(1) The proposal involves the harvest of 83-96 year-old timber, which plays a critical role in carbon sequestration. Mature forests like those in the Tree Well area are essential for mitigating climate change by absorbing large amounts of carbon dioxide. While the SEPA checklist mentions replanting efforts, newly planted seedlings cannot match the carbon storage capacity of these older forests for many decades. Removing such vital carbon sinks undermines Washington's broader climate resilience goals, especially in light of increasing climate impacts such as wildfires, flooding, and temperature extremes. Climate change planning, including the City of Port Angeles Climate Resiliency Plan, recognizes the importance of proforestation for climate resilience, mitigation and adaptation.

(2) The proposed harvest, which will occur within 200 feet of streams and riparian

zones, threatens the health of Little River and other water bodies that ultimately flow into the Peabody Creek and Elwha River. Sediment runoff and the construction of new roads could result in long-term degradation of water quality. The SEPA document does not provide sufficient mitigation measures to protect these sensitive ecosystems, which are critical not only for local biodiversity but also for the community's access to clean water.

(3) Habitat Destruction and Biodiversity Loss: The proposed harvest area provides habitat for threatened and endangered species, including the Northern Spotted Owl and the Marbled Murrelet. The SEPA checklist fails to ensure the preservation of the complex forest structures these species require. The fragmented leave-tree strategy will not adequately protect these habitats from disruption, leading to further declines in their populations. Forest biodiversity is critical to the ecological balance of the region, and continued logging operations of this scale threaten the survival of multiple species, which undermines efforts to maintain biodiversity—a key aspect of climate resilience.

(4) The proposal also raises concerns regarding the cultural and historical significance of the region, particularly for Indigenous communities. Trees, like the Cedar, which are found in the Tree Well sale, have long been integral to the cultural heritage, spiritual practices, and livelihoods of Indigenous peoples. The SEPA checklist lacks an adequate cultural resource assessment that considers the impact of deforestation on these cultural ties. By not fully exploring the potential loss of cultural sites, traditional gathering areas, and the broader cultural landscape, the proposal ignores the profound and irreplaceable harm to the region's cultural heritage.

(5) The SEPA checklist acknowledges the intensive timber management within the Port Angeles and Sutherland-Aldwell WAUs, yet it dismisses the cumulative environmental impacts of multiple logging operations. This proposal, in conjunction with ongoing deforestation in the region, contributes to significant habitat fragmentation, increased runoff, and reduced forest regeneration rates. Without an EIS that evaluates the long-term and cumulative effects of these projects on regional climate resilience and biodiversity, this proposal risks creating irreversible damage.

(6) Forests are one of the most effective tools we have to combat the impacts of climate change. The ability of mature forests to store carbon, regulate local temperatures, and manage water resources is critical in helping communities adapt to more frequent and severe climate events. Logging the Tree Well area reduces the region's ability to serve as a natural defense against climate change. The loss of tree cover increases the risk of soil erosion, reduces the landscape's capacity to absorb heavy rainfall, and disrupts the natural cooling effect provided by dense forests, thereby leaving the surrounding communities more vulnerable to climate impacts. Washington's forest management should prioritize climate resilience, which this proposal fails to do.

(7) The mitigation measures proposed, such as limited riparian buffers and leave-tree areas, are inadequate to protect the ecological integrity of the region. The SEPA checklist does not provide sufficient protection for wildlife corridors, nor does it address the long-term carbon and climate impacts of the timber harvest. Additionally, reliance on understudied and undefined chemical herbicides for vegetation management after harvesting introduces further environmental risks, including the potential contamination of nearby water bodies and soils.

(8) There was a failure to consider the impacts the proposed logging will have on connected habitat. Tree Well is part of a larger and significant wildlife corridor that runs along the Elwha and Little Rivers. This indicates that DNR is not adequately considering the impact of its activities on the greater efforts to restore the Elwha River Watershed post-dam removal and appropriately looking at the ecosystem's health as a whole.

(9) The DNR failed to adequately discuss the cumulative effects of the Tree Well sale beyond simple carbon sequestration and emissions. The cumulative impacts of herbicide use and virtual clearcutting on watershed hydrology need to be extensively examined. With the last remaining legacy forests at hand, this could be a tipping point. It is irresponsible to continue to log legacy forests without thorough investigation into the potentially irreversible impacts on hydrology.

Regarding the need to assess the impacts of herbicides on human health and the environment, we ask that DNR consider the following studies and sources:

- https://www.epa.gov/caddis-vol2/herbicides: "herbicides may contribute to other stressors (e.g., instream habitat alteration via riparian devegetation). In such cases, herbicides can be considered as part of the pathway for the proximate cause of impairment. . .Forestry management practices, agricultural operations, and urban development and maintenance are all sources of herbicides that may enter surface waters and cause impairments. Herbicides are applied to forests after harvesting to suppress brush and noncommercial trees. For that use, the rate of application may be high and exposed streams are more likely to be of higher quality than agricultural or urban streams. . .Although herbicides in general have lower toxicity to animals than other pesticides, fish or invertebrate kills may be a sign of herbicide use. For example, acrolein has been applied to irrigation ditches at levels sufficient to be acutely lethal to fish and invertebrates (see acrolein in U.S. EPA 2009), and if not properly applied to fields it can cause kills in receiving waters. Kills also may be due to low dissolved oxygen (DO) concentrations resulting from plant materials decomposing in water. . .Herbicides may reduce taxa richness and abundance of fish and benthic macroinvertebrates due to reductions of sensitive species and increased abundance of tolerant species at high concentrations (Daam and Van den Brink 2007, Dewey 1986). . .*Increased herbicides in streams can adversely affect stream flora and fauna via several mechanisms, including reduced growth, condition, and reproduction; increased mortality; and changes in behavior. These effects can result in biologically impaired macrophyte, periphyton, phytoplankton, fish and invertebrate assemblages, which in turn can*

contribute to changes in community structure and ecosystem function. . . In some cases, herbicides may be transported atmospherically in spray drift. These applied herbicides may enter streams via stormwater runoff, groundwater discharges or direct atmospheric deposition." (emphasis added)"

- https://www.pesticideinfo.org/chemical/PRI3454, https://www.iarc.who.int/featured-news/media-centre-iarc-news-glyphosate/#:~:text=In%20March%202015%2C%20IARC%20classified,of%20%E2%80%9Cpure%E2%80%9D%20glyphosate. Listing the most commonly purchased herbicide (glyphosate) as a known carcinogen with potential for groundwater contamination.
- Exposure to glyphosate has had demonstrable negative effects on tested species, such as the American ribbed fluke snail, where "Continuous exposure across generations produced reproductive effects on the third generation including rapid embryonic development, embryonic abnormalities and increased egg laying (Tate et al. 1997)" Glyphosate: Its Environmental Persistence and Impact on Crop Health and Nutrition, states:

> Glyphosate has an affinity to bind to soil particles and thus mostly accumulates in the top-soil layers. Processes like surface runoff, drift, and vertical transport in soil may transport it to groundwater, surface water, and water sediment [19,20,21]. The mobility and leaching of glyphosate have been tested in laboratory, lysimeter, and field conditions [11]. In a study on glyphosate leaching and movement conducted in a field site in Denmark, glyphosate, despite its high binding tendency on soil, was found to transport deep into the soil and leach out with drainage water. . .some studies have also shown the toxic effects of glyphosate on soil microorganisms [34]. . .Bott and coworkers [70] demonstrated glyphosate's ability to inhibit root elongation, lateral root formation, and root biomass production in soybeans. It was even demonstrated that glyphosate released from dead weeds could be absorbed through the roots of growing citrus plants [17]. After entering the plant system, glyphosate is rapidly translocated to young growing tissues of roots, where it can accumulate and inhibit growth [71]."

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6918143/

- Furthermore, "the presence of glyphosate in the soil could change the balance of bacteria and fungi, in turn altering soil ecosystem functions and plant health. . .In laboratory studies, Argentinean researchers found that glyphosate-containing herbicides could also be toxic to earthworms, causing damage to cells and DNA at levels "close to the applied environmental concentrations'" https://www.foeeurope.org/sites/default/files/press_releases/foee_5_environmental_impacts_glyphosate.pdf
- It is commonly believed that "(b)ecause glyphosate binds tightly to most soils, it has a low potential to move through soil to contaminate groundwater" However, "long-term research in Denmark found that glyphosate could be washed down through some soil types by rain, into field drains and on to rivers and streams. . .Monitoring of Copenhagen's sewage and storm water overflows found that glyphosate was always present. . .Micro-organisms are vital to marine and freshwater ecosystems, because

they form the basis of food chains. In laboratory experiments, the growth and species composition of microbial populations from marinewaters was disturbed at levels of glyphosate typical of those caused by run-off from the land. Similar effects were found on microbial populations from freshwater systems. https://www.foeeurope.org/sites/default/files/press_releases/foee_5_environmental_impacts_glyphosate.pdf

- Recent research into glyphosate indicates that this substance is much more pervasive than previously thought: "studies have presented compelling evidence that glyphosate can be readily detected in ambient air in different geographic locations, even at considerable distances from agricultural activity (Zaller et al., 2022)."
- Another popular herbicide, Imazapyr, is generally not great at absorbing into soil and tends to runoff - Data from Grover (1977); Hay (1990); Kidd and James (1991); Pesticide Information Profiles (PIPs, http://ace.orst.edu/info/extoxnet/pips/searchindex.html).
- In one study, mice were fed very large amounts of copper sulfate before and during pregnancy. Some baby mice died during gestation or did not develop normally." Further, the US EPA considers copper sulfate to be moderately toxic to birds and highly to very highly toxic to fish and other aquatic life. http://npic.orst.edu/factsheets/cuso4gen.html
- Another popular option, Dicamba, is moderately toxic to birds in its acid form. There is also limited research on how carcinogenic this herbicide is, but one study did find a minor link between Dicamba and lung and colon cancer. Further, "Sometimes following an application, dicamba can become airborne and cause damage to nearby plants." http://npic.orst.edu/factsheets/dicamba_gen.html Additionally, " in a constructed native vegetative habitat, research showed that. . . dicamba, reduced the number of seed heads and pods per plant for several plant species11."
- In a slideshow by the EPA they stated that around 100% of forest protection products (herbicides and other pesticides) are aerially applied. https://www.epa.gov/sites/default/files/2019-04/documents/best-practices-for-aerial-application-slides.pdf Aerial application has been shown to have a risk of spray drift. "In 2017 for example, approximately 1.5 million hectares of dicamba-injured soybeans were reported in the United States12. In 2018, off-target movement of florpyrauxifen-benzyl came to the forefront in Arkansas, prompting an advisory statement from the Arkansas State Plant Board13."

Regarding the need to assess the impacts of industrial logging on soil health, we ask that DNR consider the following studies and sources:

- Logging can affect soil health in two main ways: through increased exposure to erosion and through soil compaction. According to experts, soil compaction is associated with mechanized wood harvesting and similar industrial logging processes. This compaction can cause long-lasting damage to ecosystem function and productivity. In one study, this compaction increased soil bulk density by almost 10%, and reduced the soil's porosity by up to 40% as a result. The physical variables studied did not recover to the normal level within a period of 3-6 years. (*Impact of Logging-Associated Compaction on Forest Soils: A Meta-Analysis*; Nazari et al.; 3 December 2021)

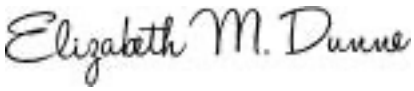
- This compaction and lack of porosity isn't just caused by the loss of trees itself– it can be compounded by the impact of road construction and the use of logging machines as well. As a result, roots are unable to penetrate soil, water cannot flow through the soil, nor can air enter or escape the compacted soil. These all have long-term effects on the organisms reliant on the area. (The Environmental Magazine)
- This lack of porosity and water filtration in turn causes an increase in erosion, which hurts future re-planting efforts. One study found that makeshift logging roads, as well as landing areas where logs were stored after cutting, were particularly prone to compaction and erosion. (*Logging can decrease water infiltration into forest soils, study finds;* U Missouri; 16 August 2016)
- In some case studies, researchers found that logging created the ideal "pre-conditions for the increase of soil erosion rates during high rainfall," a phenomenon common in the Pacific Northwest. (Sudarmadji, 2001). Studies have also found that logging and harvesting practices cause a loss of nutrients (particularly Nitrogen) and organic matter content in the soil as well. (Elliot et al.; 1999) In addition, findings have demonstrated that such disturbance associated with industrial logging can influence the regrowth of vegetation and place limits on long-term forest productivity in the future as well. (Harrington et al.; 13 June 2020) Similarly, logging has been found to have impacts on fungi regrowth– critical to ecosystem health– for decades in the future. These "legacy effects" permanently hamper the area's potential to host a number of species. (Spencer et al.; March 2023).

Regarding the need to assess the impacts of industrial logging on wildlife corridors, we ask that DNR consider the following studies and sources:

- Logging removes forests and fragment ecosystems, splitting existing forested areas into smaller and smaller pieces. Now, more than 70% of global forests are within 1 km of an "edge" – near agricultural, urban, or otherwise modified environments where wildlife is exposed to more threats. The loss of contiguous forests reduces habitat sizes for most species, curtailing access to food and water sources as well. Fragmentation as a result of logging has been found to reduce species richness of plants, arthropods, and birds by 20 to 75%. Researchers have further found that logging operations that fragment ecosystems may even have effects that are more long-term than we have been able to observe thus far. Some studies found that biological impacts of industrial logging are chronically omitted from or overlooked in environmental impact statements. Researchers recommend that biological sensitivity should be reviewed prior to permitting for industrial activities in order to minimize the amount of lines constructed that could crosscut critical wildlife corridors. Haddad, et al. (2015) ; Latham & Boutin (2015)
- Industrial logging often involves the creation of roads for the logging operations. In previous cases, like in the Sierra Nevada forests, this road construction affects ecological integrity by fragmenting and dividing the forest, barring wildlife dispersal and migration. When species were unable to cross the barriers, their range and distribution was drastically reduced. Analysis has found that there are more miles of roads in our national forest system than in the rest of the entire continent. Sierra Forest Legacy (2008).

We respectfully request that DNR consider these comments, properly assess the environmental impacts of proposed logging, cancel the Tree Well timber sale, and work with all stakeholders to protect and restore the Elwha River Watershed.

Respectfully,



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