Pilot Project: Washington State DNR's Large Wood Supply Initiative

By Kayla Seaforth

Rivers today look very different from how they did a century or more ago. While returning them to pre-settlement conditions is not feasible in most cases, many groups, often with Tribal leadership, are working hard to improve in-stream and riparian conditions to benefit salmon and other aquatic and terrestrial species. This work is complex and requires a lot of materials, including large logs and rootballs to foster high-quality salmon habitat, which can often be challenging to source, move, and store. Washington State's Department of Natural Resources is experimenting with a pilot project called the **Large Wood Supply Initiative** (LWSI) to meet this challenge and streamline wood procurement to benefit salmon, forests, and communities.

Prior to Euro-American contact in the Pacific Northwest, the landscape, and especially the river systems, looked vastly different than they do today. Influenced by factors like geomorphology, sediment, riparian vegetation communities, beaver engineering, and more, the rivers of this region were full of wood. The Puget Lowlands were a marshy network of sloughs and islands, with driftwood logjams throughout. Higher velocity streams would have had continuous inputs of wood from windthrow, bank erosion, fires, floods, and avalanches, resulting in massive logjams and channels only navigable to the wriggly bodies that can slip between messes of logs, or jump over them (Bureau of Reclamation, 2015).

Check out a recent story from the Seattle Times on the reintroduction of large wood to the Elwha River, work led by the Lower Elwha Klallam Tribe.

This complex and visually messy status quo was an impediment to logging low-elevation timber for early settlers. The disorganized pattern of waterways near their outlet to Puget Sound was

Photo Credit: Kayla Seaforth

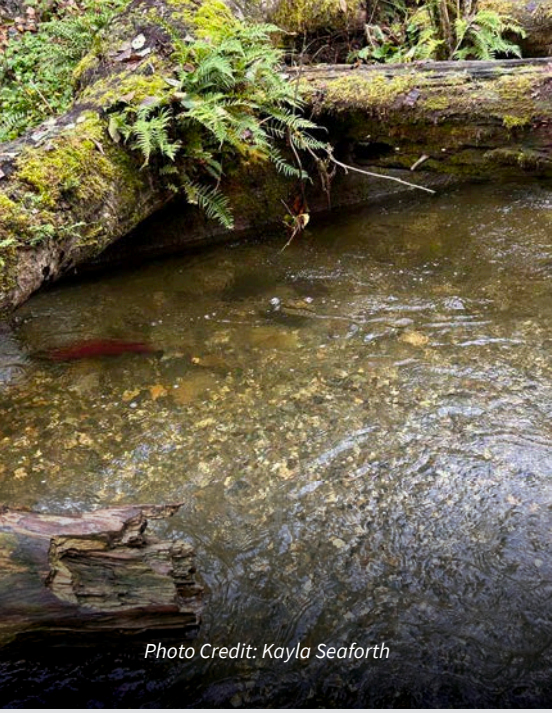


Photo Credit: Kayla Seaforth

The Function of Wood Associated with Aquatic Fluvial Ecosystems

Adapted From **Large Wood National Manual**

- Shade
- Hydraulic influence raises local water elevations, scouring pools, creating low-velocity refugia
- Channel grade control
- Retention and storage of sediment and flotsam
- Retention of nutrients
- Side channel formation
- Increased floodplain connectivity
- Maintaining biological structure
- Maintaining channel and floodplain physical complexity
- Providing complex cover for aquatic organisms
- Increased hyporheic exchange
- Improved water quality
- Increased recharge and aquifer storage
- Habitat for fish and macroinvertebrates

incompatible with the vision of many early settler farmers. Later, when fish populations began to decline, it was also thought that the proliferation of wood in streams was a barrier to fish passage. All of these desires to use the waters and lands surrounding them led to massive clearing of wood from streams of all sizes, and, in many cases, the straightening, drainage, and extreme simplification of PNW waterways. This 1988 paper by the US Forest Service provides a more detailed picture of pre-contact stream conditions and the efforts to clear them.

While enormous log jams, braided channels, and complex networks of islands and bars posed challenges to those looking to shape the land for industry and settlement, the complexity is what made these rivers so valuable to salmon. While life history varies among species, all five species of Pacific Salmon utilize rivers and streams for spawning and juvenile rearing. Estuarine habitat is similarly vital for rearing, and is also affected negatively by a lack of large wood in the system. The presence of large wood in freshwater streams creates variation in stream velocity which is important for salmon at different stages in their journeys up or downstream. Pockets of slow water created by log jams provide rest stops for salmon where they are out of sight from predators. These areas can also create deep pools that can serve as cool water refugia for juvenile fish during the summer low flow period thanks to increased hyporheic exchange, which can moderate water temperature (Hester and Gooseff 2010).

Juvenile salmonids mostly eat plankton, insects, and invertebrates while in freshwater systems. Logjams act as hotspots for these critters because of the nutrient cycling and accumulation of organic material that they facilitate (Coe, et al. 2009).

Considering the benefits that complex, wood-rich systems once provided, it is unsurprising that the removal of wood in aquatic systems coincided with the rapid decline of salmon populations. Together with overfishing, other types of channel modifications, and diminished water quality due to runoff from surrounding land use practices, the period of wood removal has had lasting impacts on salmon.

Today, tribes, governments, scientists, businesses, nonprofits, and more are working on all fronts to reverse declining salmon numbers, often by improving the habitat that they rely on. In place of the large wood that used to define Pacific Northwest rivers, these groups are deploying strategically placed engineered structures made of wood and other materials. These projects seek to restore fluvial processes through the slowing of bank erosion, recruitment of new wood, and creation of in-channel complexity that benefits fish species and the webs of life they rely on. In-stream work around the region is occurring across watersheds, however many of the riparian forests adjacent to project sites are so degraded that they are unable to supply the large wood needed to improve habitat conditions.

Some upper watershed projects are conducive to local wood sourcing. Check out this interview we ran with Cris Salazar from the Calapooia Watershed Council on their approach, dubbed ‘tree-tipping.’

Instead of relying on natural processes to deliver wood into streams, project managers must track down tree trunks and root wads, and manage the often complex and expensive transportation, storage, and sorting of these materials. “There is no typical sourcing process for large wood,” shared Luke Fisher, Geomorphologist for the Tulalip Tribes’ Timber, Fish and Wildlife Department. “Smaller wood may be purchased, but the best course of action is typically to work with the project site landowner to get wood directly from the site. Otherwise, the logistics of moving the large trees that we need can be nearly

impossible to manage." As with many practices, this process can be done more efficiently at scale. This was the rationale behind the creation of the **Large Wood Supply Initiative** (LWSI) by the Washington State Department of Natural Resources (DNR).

As the state's largest manager of timber lands, DNR is well positioned to play a connective role between supplies of wood and stream restoration sites. The initiative is a part of DNR's Watershed Resilience Action Plan (WRAP), "a tree to sea plan for landscape scale restoration and salmon recovery" in the Snohomish Watershed, which drains into Puget Sound near the city of Everett. The LWSI has been in place for just over one year, and is currently working toward three goals:

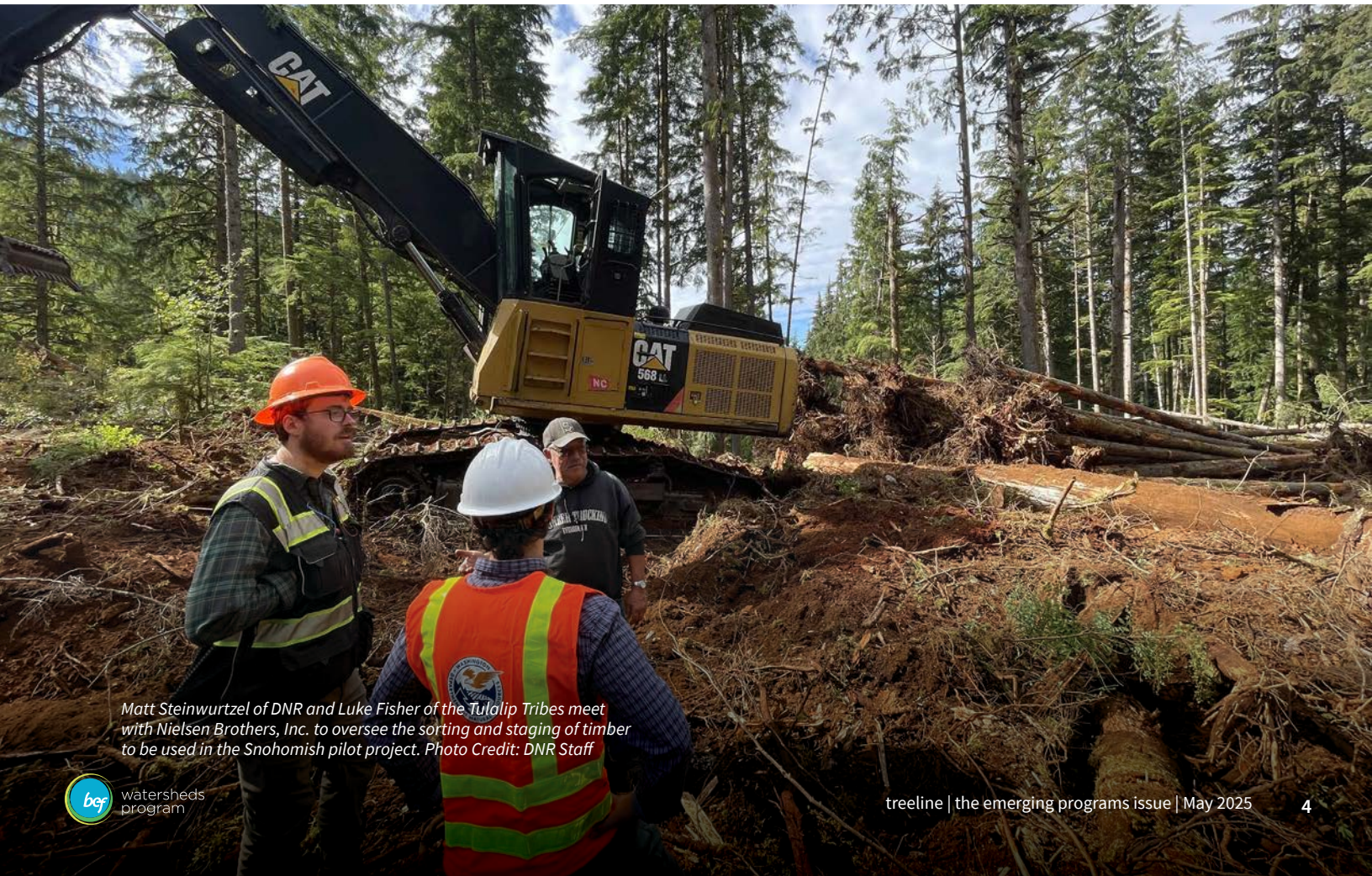
1. Implement a pilot project in the Snohomish Watershed in partnership with the Tulalip Tribes
2. Identify a sustainable mechanism for coordinated large wood distribution
3. Expand the program to operate statewide

In this early phase, the LWSI is funded by appropriations by the legislature, as well as funding from the National Fish and Wildlife Foundation's Killer Whale Research and Conservation Fund. They are testing their process through a pilot project to source wood for a stream restoration project led by the Tulalip Tribes on the upper Pilchuck River.

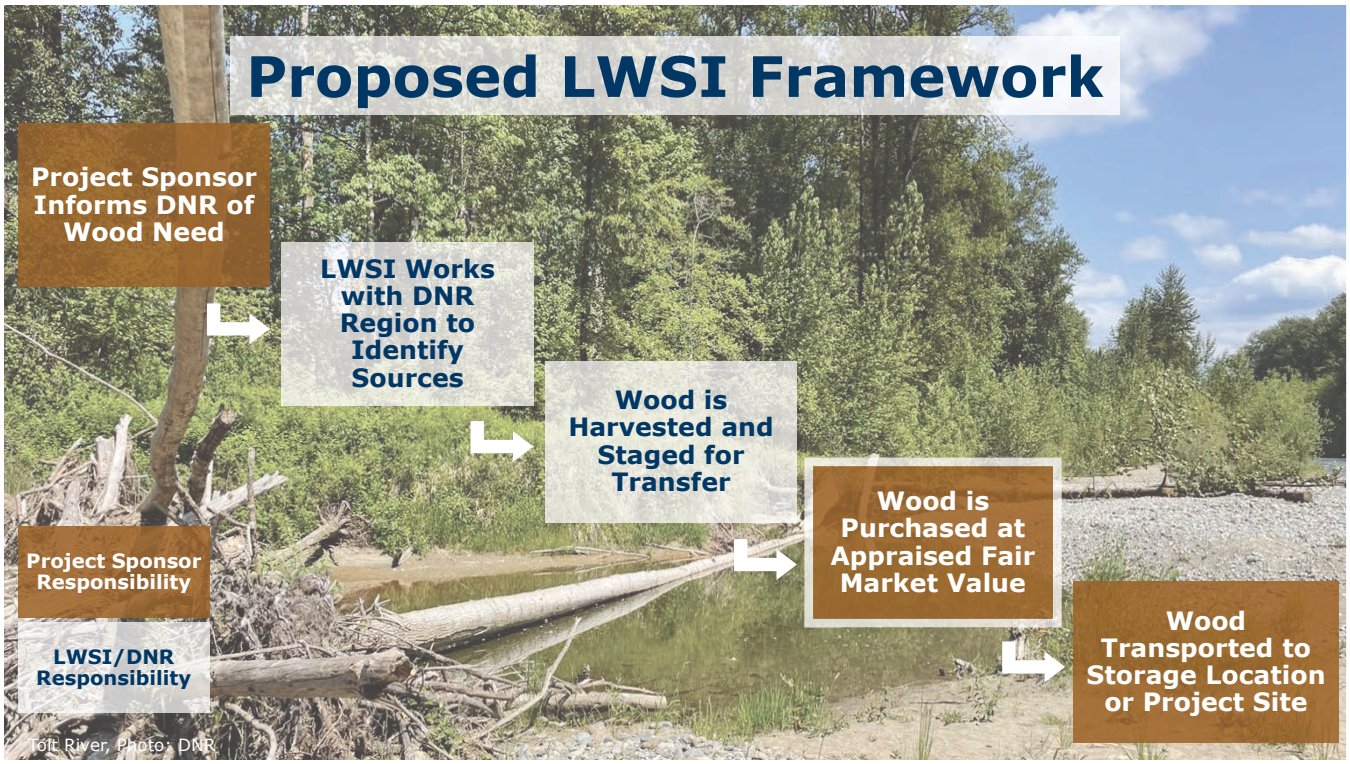
Senate Bill 5157 put forward an initiative this legislative session to raise the cap on the value of materials sold for habitat restoration projects, which will reduce constraints concerning the volume of wood that the DNR can sell through the Large Wood Supply Initiative. The bill was signed into law by Governor Ferguson on April 22, and takes effect in July 2025. Learn more about the bill **here**.

This project seeks to restore river processes to benefit the seven species of anadromous fish that use this reach during various life stages (**SWIFD**). The reach of the Upper Pilchuck where the project will take place is mostly surrounded by forestland that, up until the 1950's and 1960's, was intensely harvested. The result was the removal of large trees from the riparian zone, floodplain disconnection, and overall simplification of the river (Luke Fisher, pers. comm.). A diversion dam was also constructed on this reach in 1912, which periodically blocked fish passage during low flow periods. The dam eventually fell into disuse and **was removed in 2020** by a coalition of partners including Tulalip Tribes, the City of Snohomish, and the National Oceanic and Atmospheric Administration (NOAA). The habitat above the former dam site is the target of the large wood installation project, also funded by NOAA.

After several years spent seeking funding, permitting, and design, the Tulalip Tribes will place approximately



Matt Steinwurtzel of DNR and Luke Fisher of the Tulalip Tribes meet with Nielsen Brothers, Inc. to oversee the sorting and staging of timber to be used in the Snohomish pilot project. Photo Credit: DNR Staff



Tolt River, Photo: DNR

300 pieces of wood in 20-40 log jams over eight river miles, with construction to begin in the summer of 2025. The logs will be large in both diameter and length, necessary because the project engineering staff have elected to avoid anchoring the logjams in place using traditional methods like pilings or cables. This will allow them to place the logs using a helicopter, and avoid bringing heavy machinery into the stream. Because the project design depends on the use of long, large trees, some of which will have rootballs attached, the procurement of wood was one of the trickiest elements for project managers to figure out.

The project is taking place on a reach of the river that is surrounded by DNR managed state forest lands. The Tulalip Tribes' Timber, Fish and Wildlife program, who has planned and will implement the project, has a long history of working with DNR to review forest practices permit applications, as well as on other projects. Luke Fisher cites this partnership as one of the main reasons why this project, the largest large wood installation his department will have executed, has worked so well through the design and permitting phases. "The fact that we're working primarily adjacent to publicly managed forest land has made this process so much easier," said Fisher. "We have a great relationship with the landowner, and that foundation made things much easier when things like permit related design tweaks come up," shared Fisher of his relationship with DNR staff.

According to Matt Steinwurtzel, who oversees the Large Wood Supply Initiative, the pilot project has come together with support from other DNR programs and a little bit of luck. During a storm last fall, a large number of trees blew over in DNR managed state lands, adjacent to the Pilchuck restoration site. State foresters let Matt know about the blowdown, and he set up a contract with a local, family-owned logging company to pull and sort the trees into appropriate size classes, and stage them nearby for installation during the fish window by the Tulalip Tribes and their implementation partners. Through the collaboration of agency staff from Product Sales, State Lands, and the Large Wood Supply Initiative's lead, DNR was able to identify this opportunity as a wood source for Tulalip's project. Had the LWSI initiative not been engaged, it's likely that the blowdown would have been treated as it is in any other working forest, and this opportunity would have been missed. That is the strength of this program: connecting key individuals and programs, and capitalizing on opportunities as they emerge.

Few entities in the stream restoration space are set up to have streamlined access to so much forestland, large equipment, relationships with the logging community, and a network of staff who are regularly out surveying and noting conditions on nearly 2 million acres of forestland. With these assets, DNR is well set up to fill this role which adds capacity to salmon recovery efforts and strengthens relationships in the forestry sector.

Much of the forests that DNR owns are managed as state trust lands. The trees on them are eventually harvested and sold, which funds Washington State schools, counties, and local services. DNR manages state-owned forests in trust for Washington State schools, counties and local services. The legal obligation to manage trust lands for

sustainable revenue generation is written into the state's constitution, so the agency is bound to manage these forests in a way that fulfills their trust responsibilities. Often that revenue is generated by harvesting and selling trees from state-owned forests. For this reason, trees procured by the Large Wood Supply Initiative are sold to implementing organizations at fair market rates. This keeps revenue coming back to state trust beneficiaries the same as if the logs were processed and sold as wood products, while building synergy with salmon restoration priorities. Materials costs are built into project budgets, often funded by state and local grants, so these costs are expected by project managers. The benefit of having DNR assist with wood procurement is the integration with other program areas, and reducing the amount of time project managers have to spend tracking down materials suited to their project design.

The pilot project with the Tulalip Tribes has demonstrated how these pieces can fit together to provide benefits for salmon, professional timber workers, and the state trust lands, and now program staff are hoping to expand their work to other watersheds in Puget Sound, with a goal eventually working with project implementers across Washington State.

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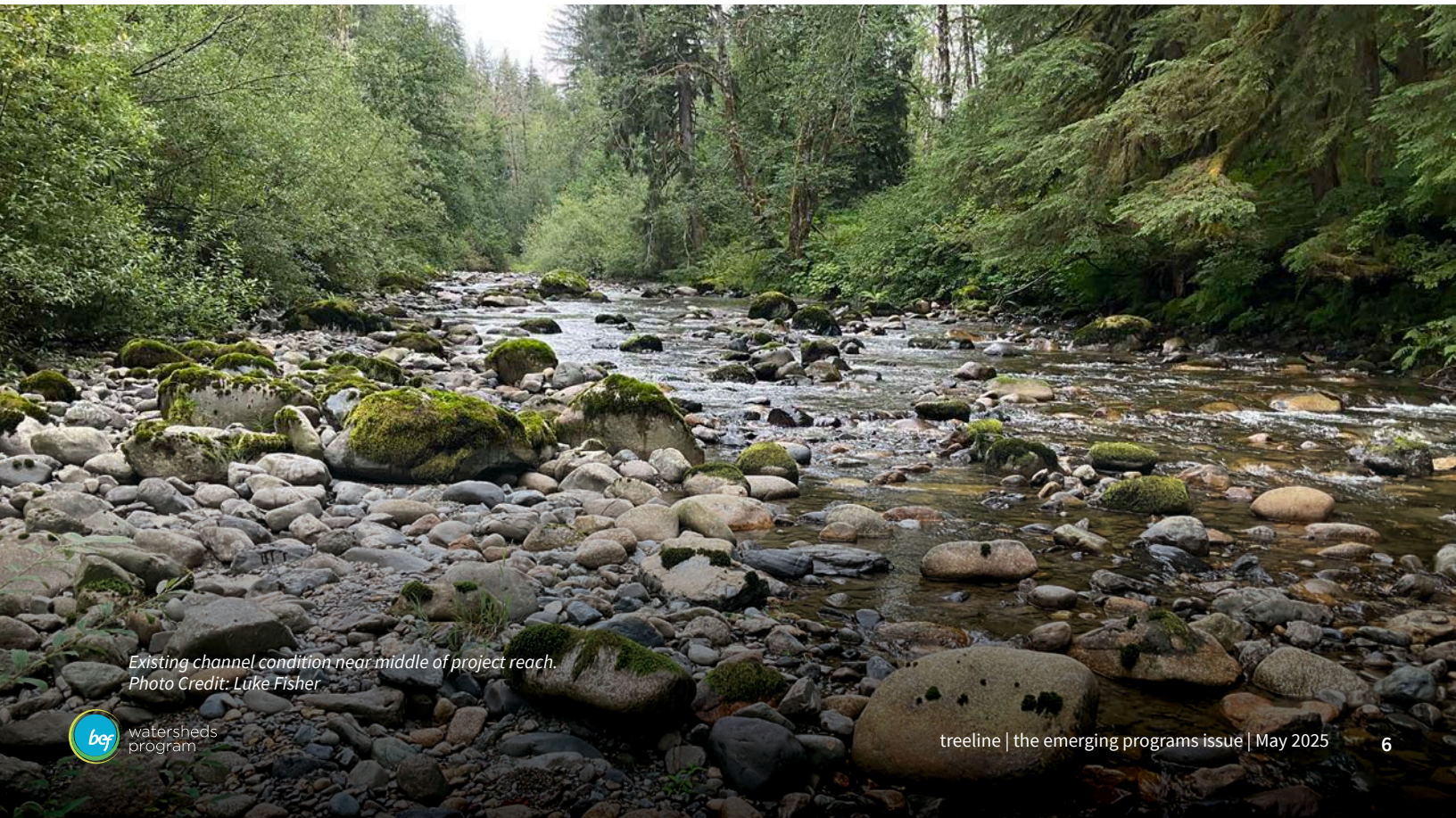
Signage depicts the intended use of the sorted and staged timber for use in the pilot project, positioned in the background. Photo Credit: DNR Staff



Existing channel condition near middle of project reach. Photo Credit: Luke Fisher