LARGE WOOD

LONG LEGACY

Ian Escher Vierck

Advisor: David Buckley Borden

INTENTIONS

To incite a curiosity that motivates visitors to learn about large wood, appreciate it in other landscapes, and advocate for its' existence in the PNW.

PROJECT METHODOLOGY

My practice explores ecological concepts through a variety of creative, educational, and experiential media.

Large Wood, Long Legacy

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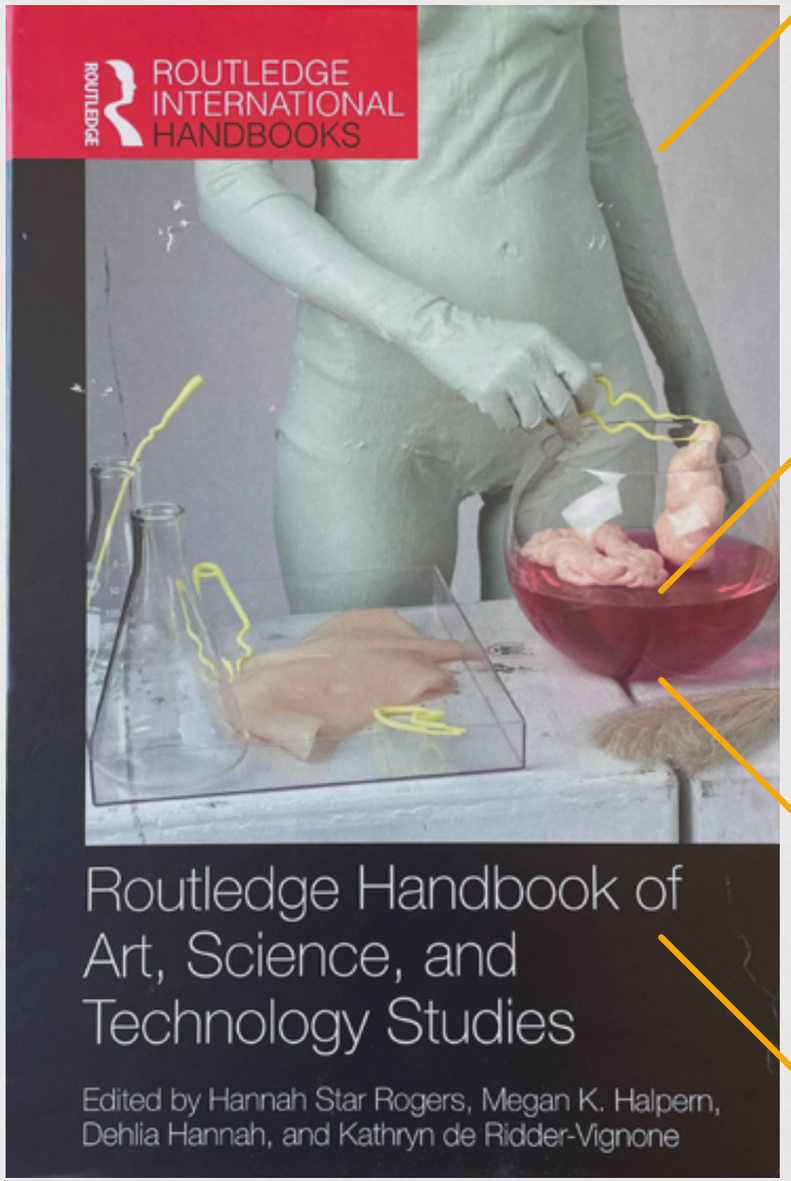


Art-science collaborations, complexities and challenges science
Megan K. Halpren and Hannah Star Rogers

Polymathic pedagogies: Creating the conditions for Interdisciplinary inquiry in art and science
Heather Barnett, Nathan Cohen, and Adrian Holme

Aesthetic strategies
Christian Nold and Karolina Sobecka

Art, artists, and the wrong kind of science education
Kathryn de Ridder-Vignone

DESIGN RESEARCH

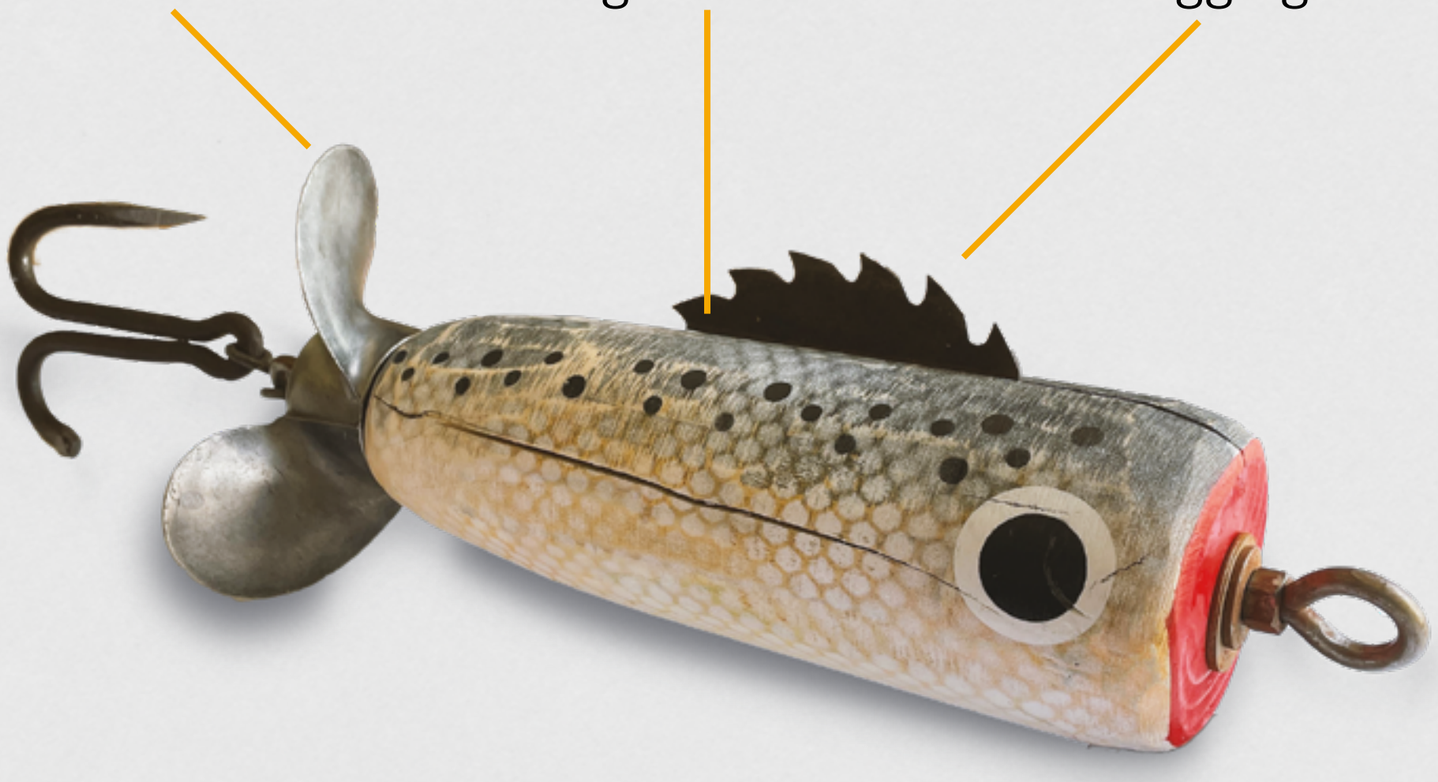
Combining the terms 'aesthetic' and 'strategy' acknowledges that aesthetics is not simply related to the judgment of appearance but can be 'instrumentalized' towards specific goals and impacts.

-Christian Nold and Karolina Sobecka

Research Tech

Angler Culture

Logging

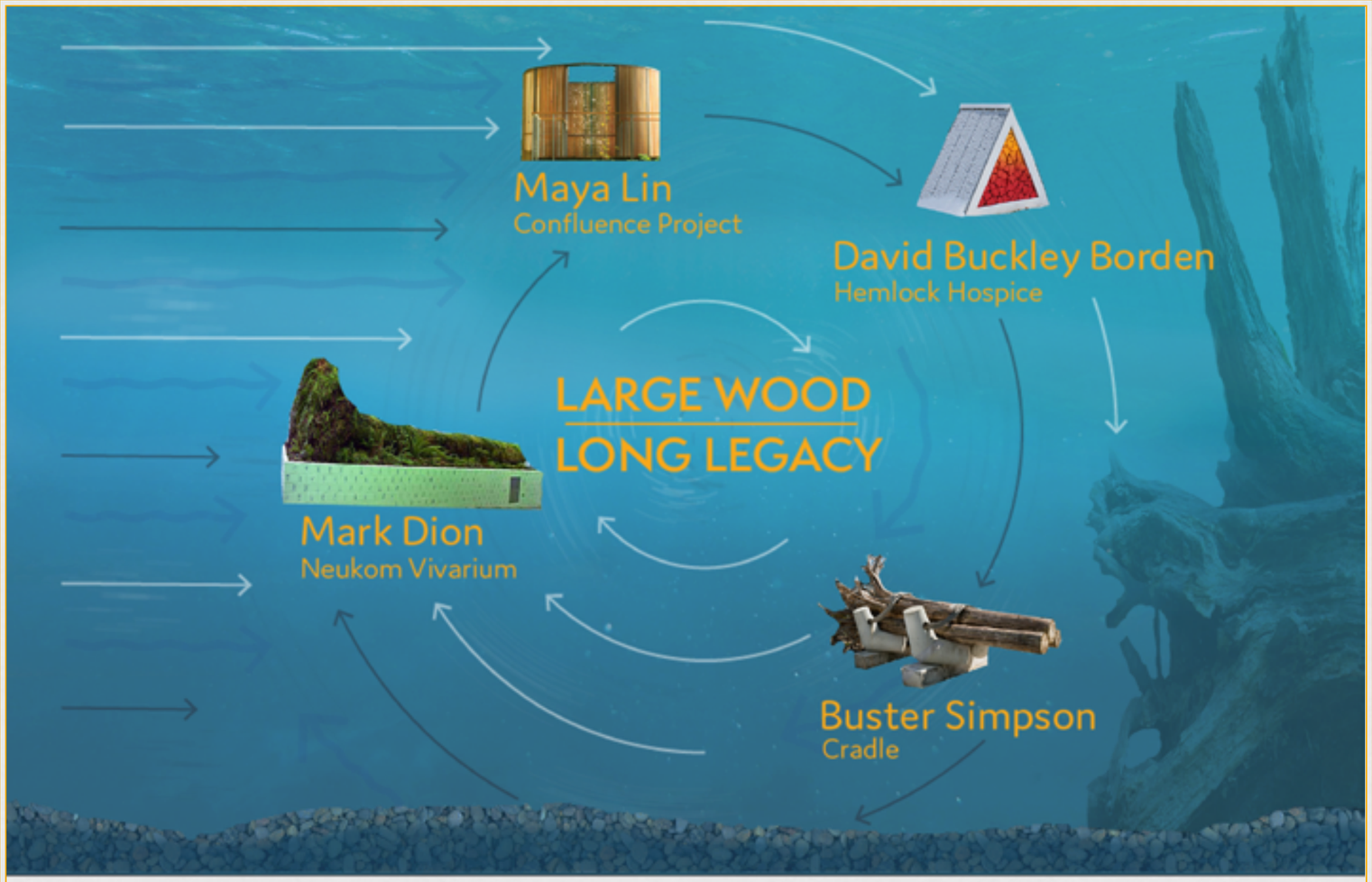


HYBRIDIZING

Driven by research and research tech from HJA, inspired by angler culture, and hooked on logging.

Friction synthesis: Merging of two categories that are usually kept apart.

Mirroring: Restaging something to highlight often unacknowledged aspects of a process or entity.



PRECEDENT	ELEMENTS	
Borden, D. B.	Enviro. Interpretation	Design Practice
Dion, M.	Contextual Aesthetic	Sci-Comm.
Lin, M.	Integrated Program	Narrative
Simpson, B.	Poetic License	Material Culture

PRECEDENTS

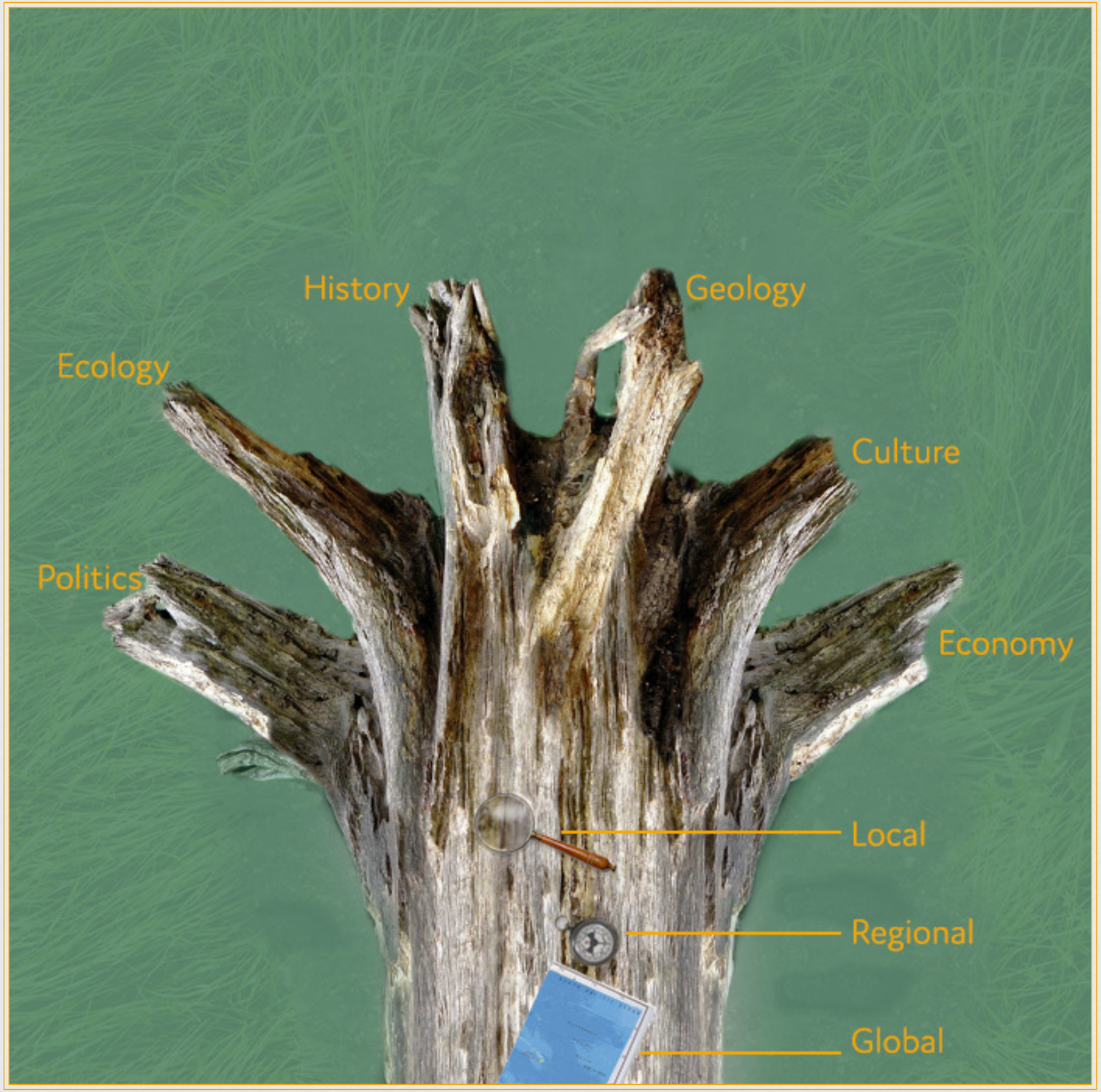
From the mixing of these precedents, Large Wood, Long Legacy sedimentates.

WHAT IS LW?

Fisheries:
Large Woody Debris or Woody Debris: Used by fishery management from 1940's to the 1970's to describe wood in rivers that they thought wood obstruct salmon migration. (Swanson et al., 2020)

Logging:
Coarse Woody Debris: Non-merchantable wood left on forest floor or burned
Mass Timber: Re-branding of old lumber
Log: Middle English/ Old Norse for felled tree, specifically for timber trade
Timber: Merchantable wood
Lumber: Milled timber

Ecology:
Large Wood(LW): Ecologists' wood larger than 10cm in diameter for more than 1m. (Swanson et al., 2020)



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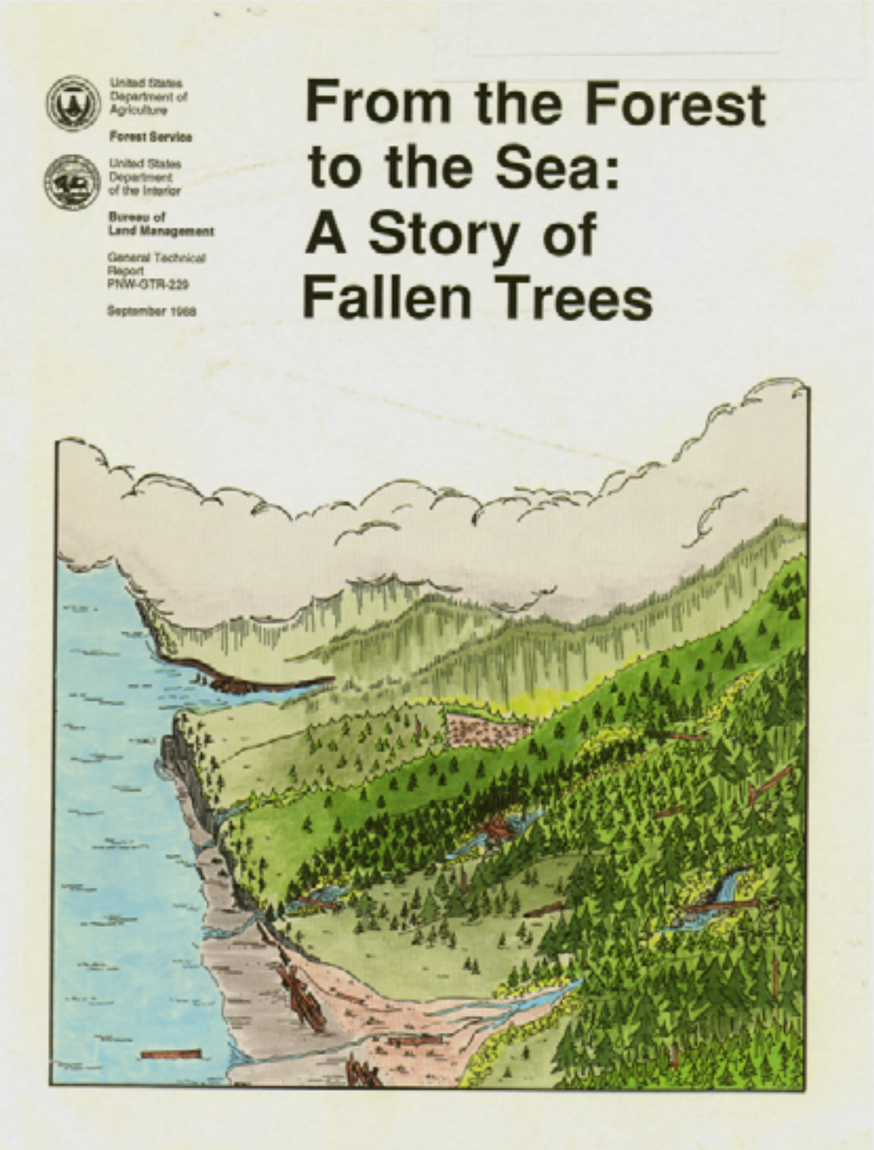
LW CONNECTIONS

This project intends on connecting the audience through different scales of the 'human' and 'natural' world.



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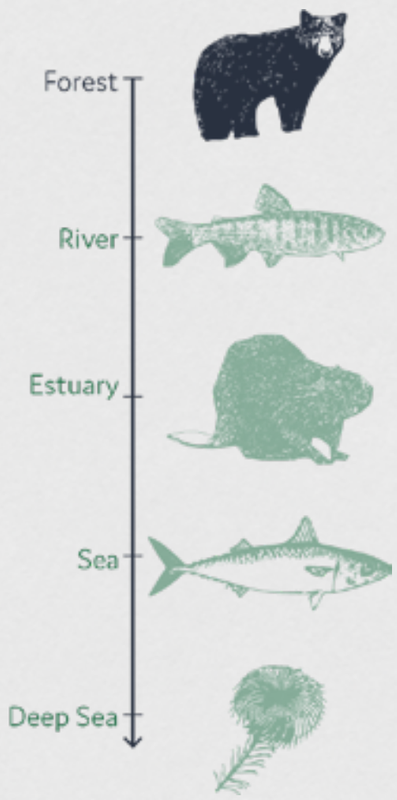
OLD GROWTH FORESTS

Large wood serves as corridors connecting habitats.



Trevarrow, E., Arismendi, I. The role of large wood in streams as ecological corridors for wildlife biodiversity. Biodivers Conserv 31, 2163–2178 (2022). https://doi.org/10.1007/s10531-022-02437-2

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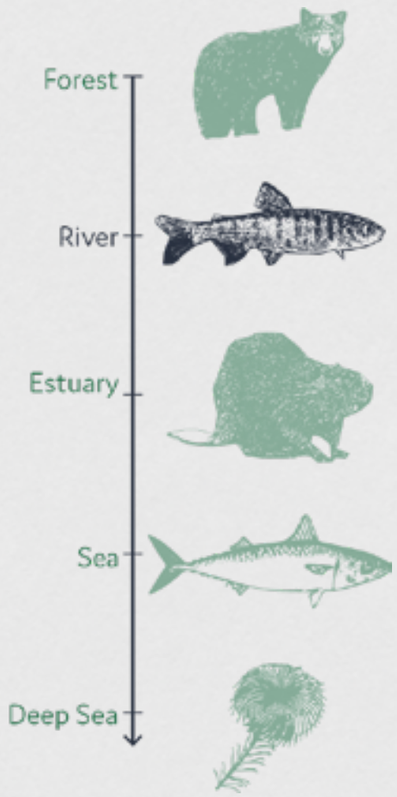
STREAMS

Wood creates pools for salmon rearing.



Sedell, James R.; Bisson, Peter A.; Swanson, Frederick J.; Gregory, Stanley V. 1988. What we know about large trees that fall into streams and rivers. In: Maser, Chris; Tarrant, Robert F.; Trappe, James M.; Franklin, Jerry F., tech. eds. From the forest to the sea: a story of fallen trees. Gen. Tech. Rep. PNW-GTR-229. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station; U.S. Department of the Interior, Bureau of Land Management: 47-81.

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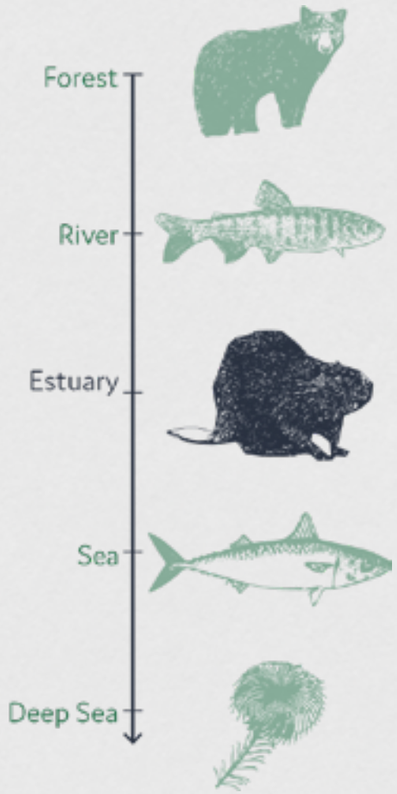
ESTUARY

Large wood provides topographical diversity in a relatively flat habitat.



Hood, Greg. (2007). Large woody debris influences vegetation zonation in an oligohaline tidal marsh. Estuaries and Coasts. 30. 441-450. 10.1007/BF02819390.

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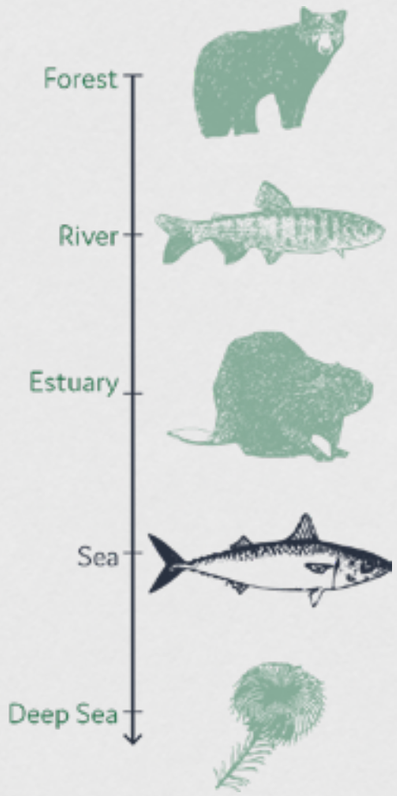
OCEAN

Entire ecosystems float below sailing driftwood.



Gonor, Jefferson J.; Sedell, James R.; Benner, Patricia, 1988. What we know about large trees in estuaries, in the sea, and on the coastal beaches. In: Maser, Chris; Tarrant, Robert F.; Trappe, James M.; Franklin, Jerry F., tech. eds. From the forest to the sea: a story of fallen trees. Gen. Tech. Rep. PNW-GTR-229. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station; U.S. Department of the Interior, Bureau of Land Management: 83-112..

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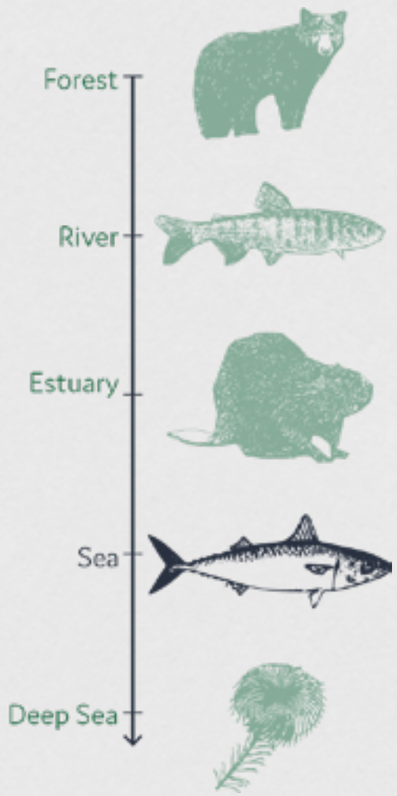
VOYAGE

Large wood from Oregon can be found on the shores of Hawaii.



Gonor, Jefferson J.; Sedell, James R.; Benner, Patricia, 1988. What we know about large trees in estuaries, in the sea, and on the coastal beaches. In: Maser, Chris; Tarrant, Robert F.; Trappe, James M.; Franklin, Jerry F., tech. eds. From the forest to the sea: a story of fallen trees. Gen. Tech. Rep. PNW-GTR-229. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station; U.S. Department of the Interior, Bureau of Land Management: 83-112..

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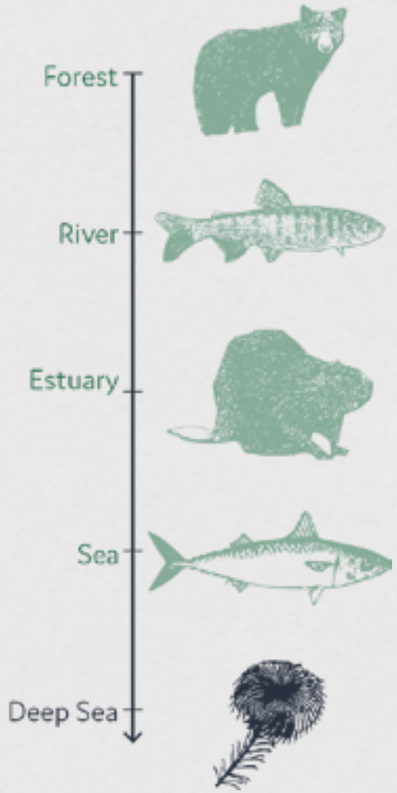
OCEAN FLOOR

During ‘woodfall’, sunken wood provides rare sources of carbon for the deep sea.



Bienhold C, Pop Ristova P, Wenzhöfer F, Dittmar T, Boetius A (2013) How Deep-Sea Wood Falls Sustain Chemosynthetic Life. PLOS ONE 8(1): e53590. https://doi.org/10.1371/journal.pone.0053590

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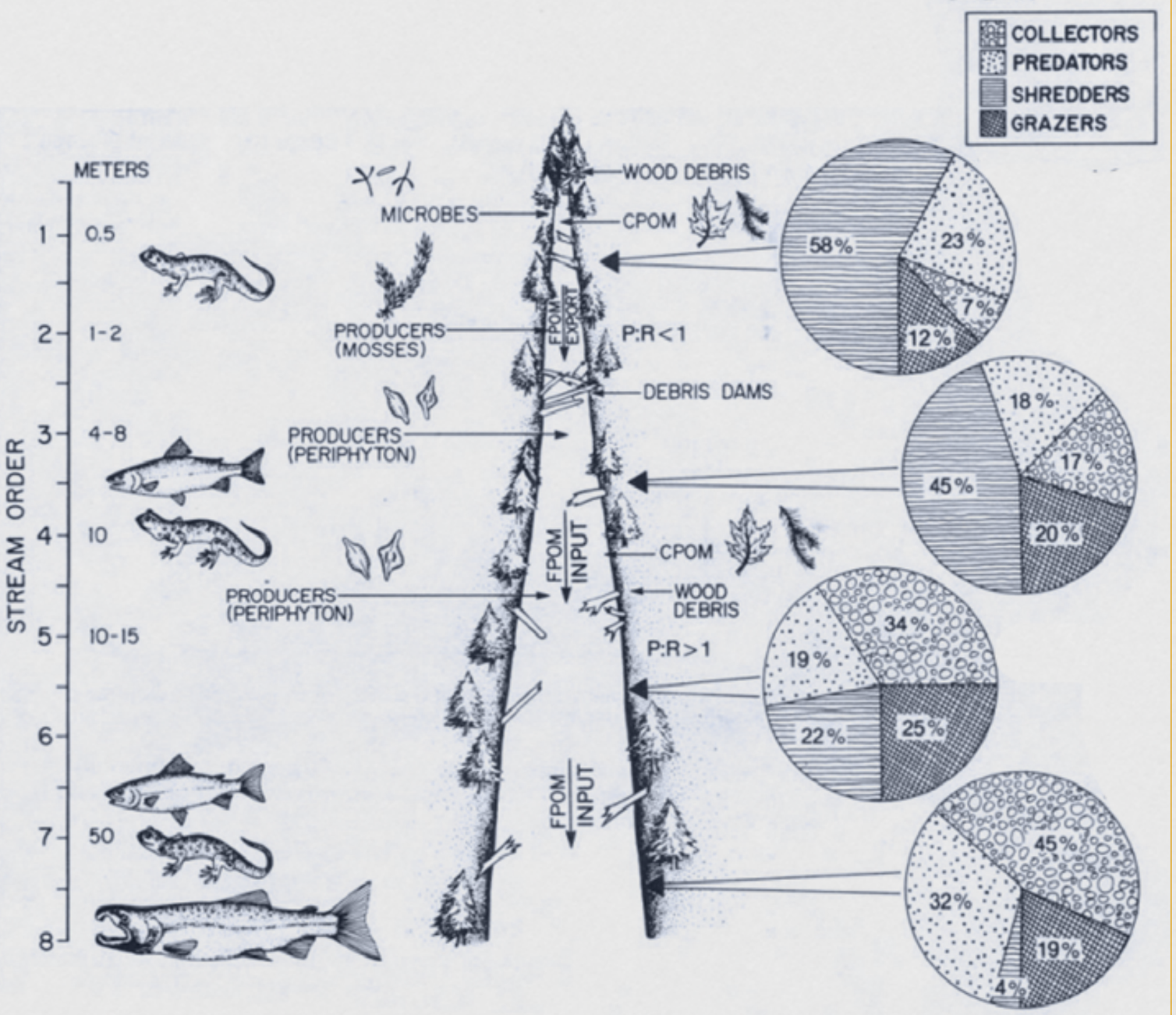

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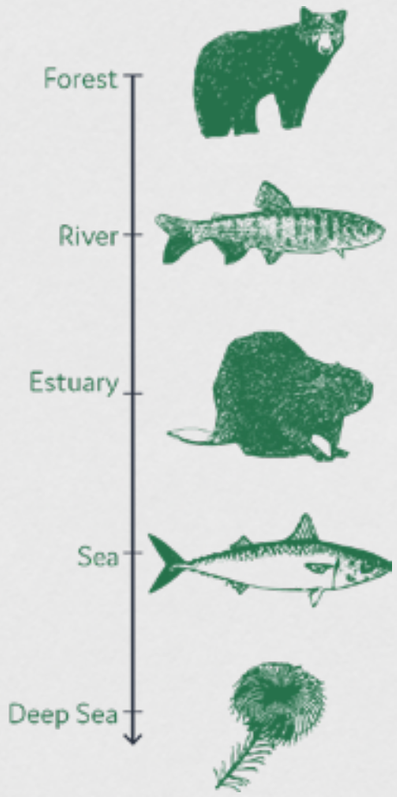
RIVER CONTINUUM

All ecosystems are a gradient of conditions impacted by eachother.



Vannote, R.L.; Minshall, G.W.; Cummins, K.W. [and others]. 1980. The river continuum concept. Canadian Journal of Fisheries and Aquatic Science. 37: 130-137.

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HISTORICAL COND.

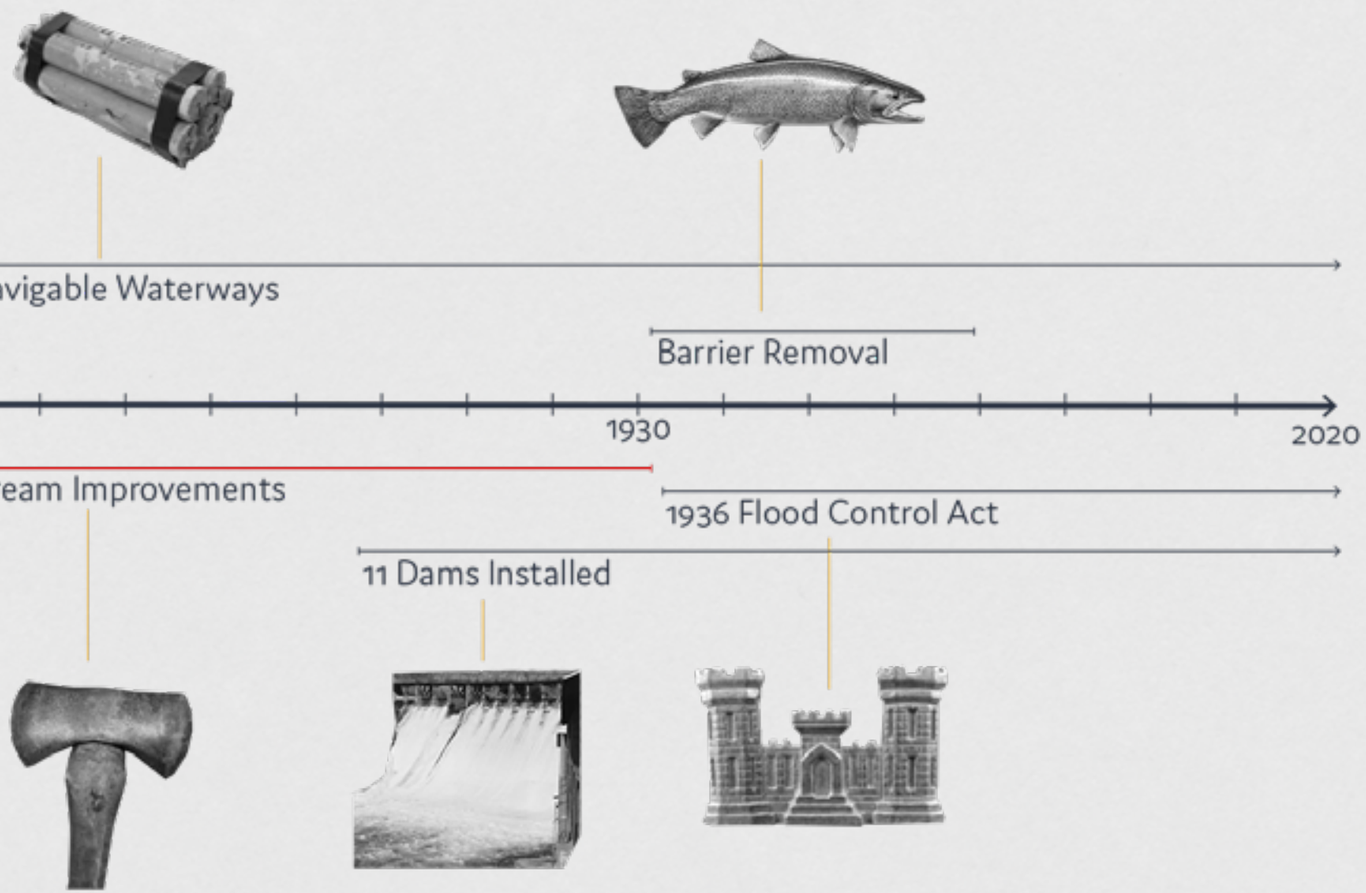
In 1875, near Corvallis, over 5,500 snags and drift trees were pulled from a 50-mile reach of river. These trees ranged between 5 and 9 feet in diameter and from 90 and 120 feet long.

Report of the Secretary of War. Report of the Chief of Engineers. 1875. In House executive documents: 1st Session 44th Congress, 1875-1876, Vol. 2, Pt. 2. U.S. Government Printing Office, Washington, D.C.

FORGOTTEN

Large wood has been absent from the landscape for so long, most people don't know it's gone. Additionally, some would rather not see it because of aesthetics and perceived dangers.

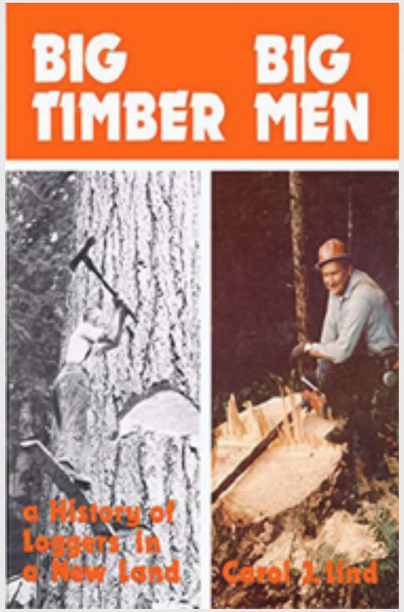
Piégay H, Gregory KJ, Bondarev V, Chin A, Dahlstrom N, Elosegi A, Gregory SV, Joshi V, Mutz M, Rinaldi M, Wyzga B, Zawiejska J. 2005. Public perception as a barrier to introducing wood in rivers for restoration purposes. Environmental Management 36: 665–674.

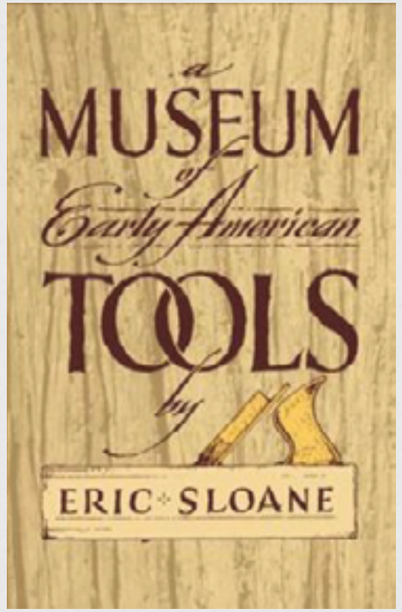


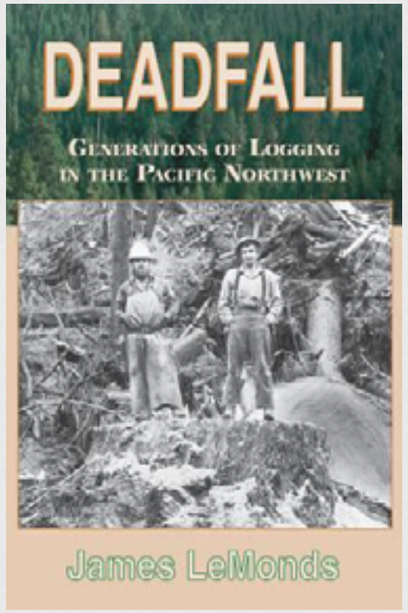
LW REMOVAL

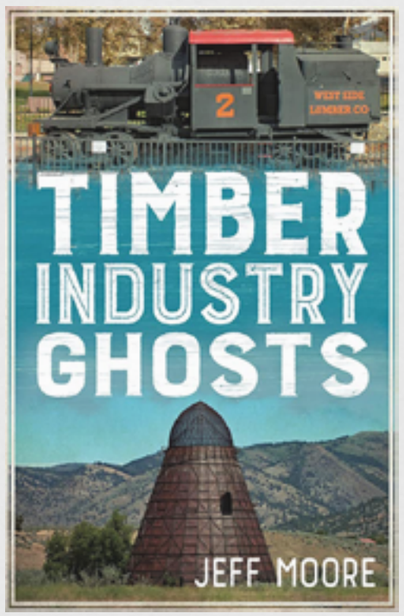
The systematic removal of wood has been practiced for more than 100 years.

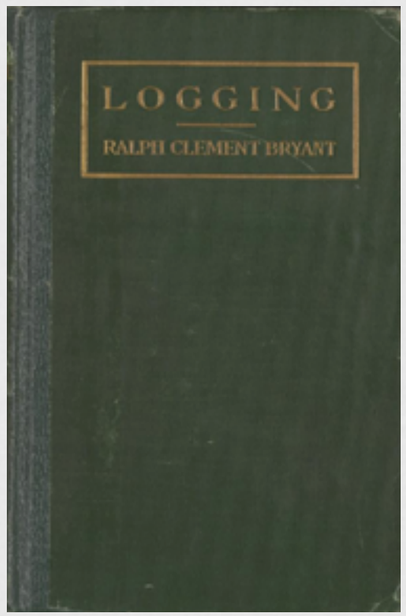
Sedell, James R.; Luchessa, Karen J. 1982 . Using the historical record as an aid to salmonid habitat enhancement. In : Armantrout, Neil B., ed. Proceedings of the symposium on acquisition and utilization of aquatic habitat inventory information; Portland, OR. Bethesda, MD: American Fisheries Society, Western Division: 210-223.

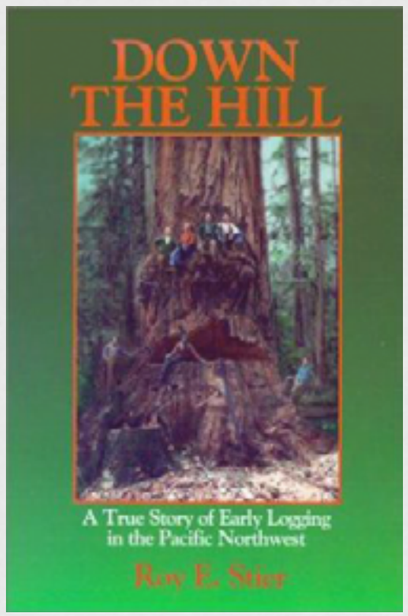












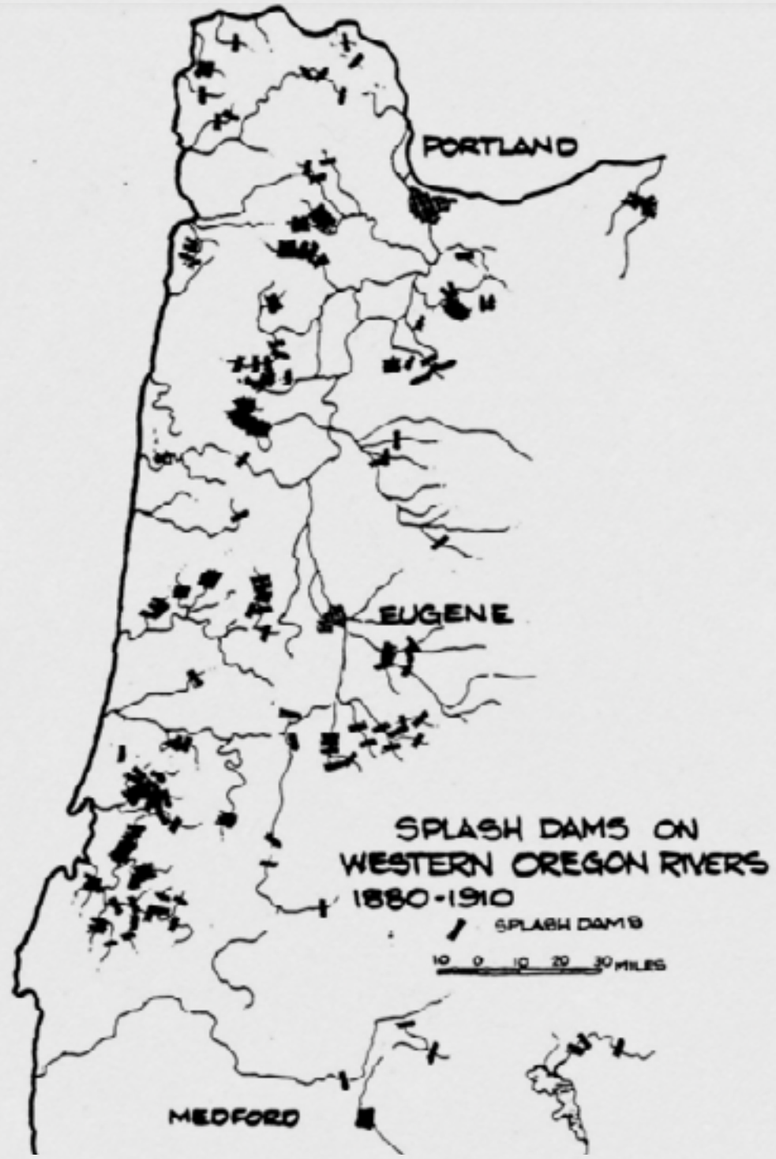
CULTURAL RESEARCH

Logging has deep roots in PNW culture, economy, and land management/policy.

Logs waiting for spring flood to carry them to Columbia River. Oreg. Hist. Soc. Research Lib., OrHi4698

RIVER LOG DRIVES

Splash dams and 'stream improvements' devastated riparian ecosystems.



Miller, R. R. (2010,)

A train hauls timber camp buildings across a trestle in the woods on the way to the next harvesting site.. Courtesy Oreg. Hist. Soc. Research Lib., OrHi48497

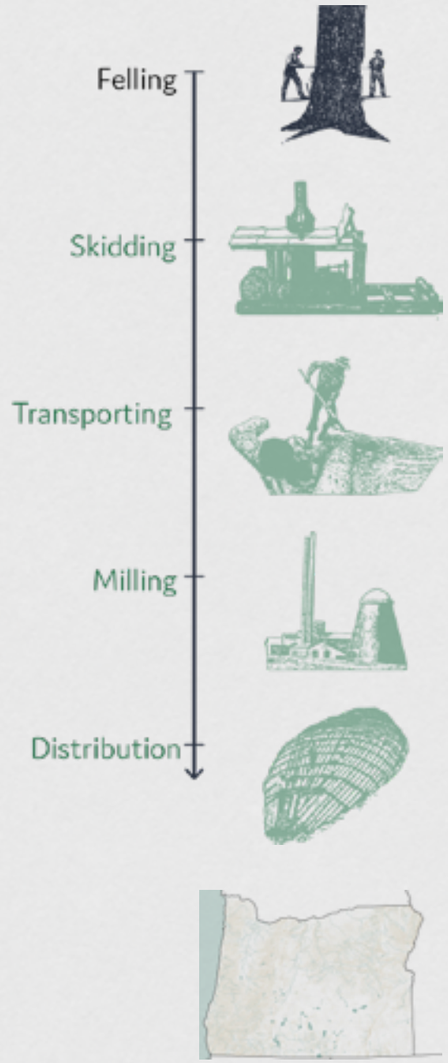
ESTABLISHING CAMP

After cruisers identified harvestable stands, camps of loggers would settle nearby.

Two loggers with springboards pounding wedges into tree. OSU Special Collections & Archives Research Center

FELLING

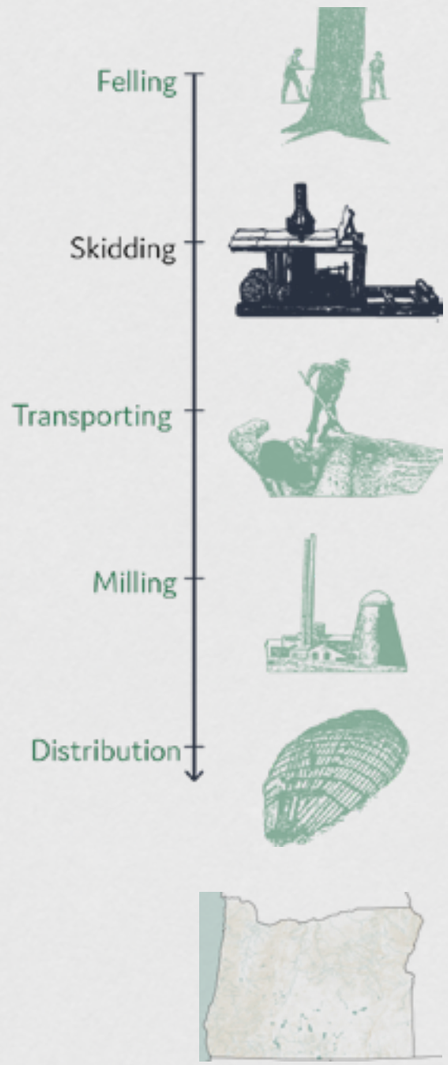
Crews would head out to saw and buck trees. Sawyers would use springboards to elevate them above the root-flare and brush.



Men stand near four donkey engines at work in a clearcut, Pacific Northwest. Courtesy Oreg. Hist. Soc. Research Lib., 016336

SKIDDING

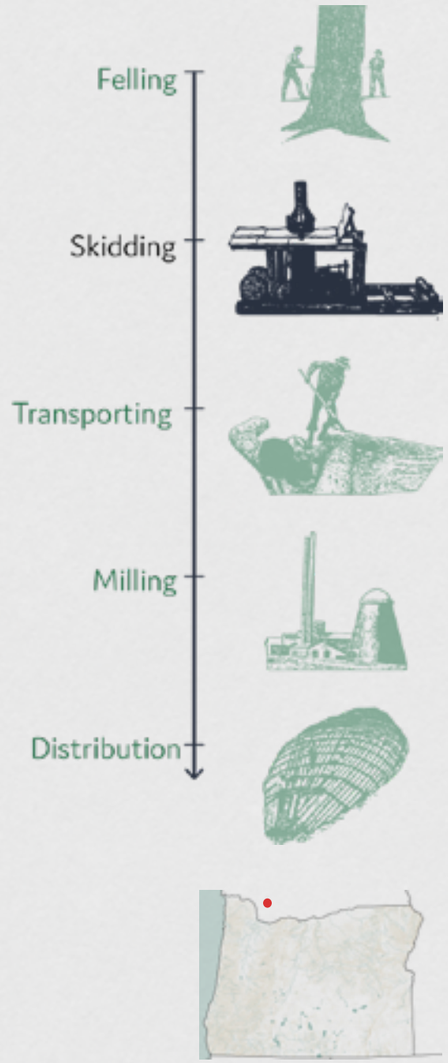
After buckers cut the trees to merchantable lengths, timber would be pulled via steam donkey to a central location for transportation.



Cold-decking fir, cedar, spruce, and hemlock, Gray's Harbor. Courtesy Oreg. Hist. Soc. Research Lib., 017406

TRAMWAY

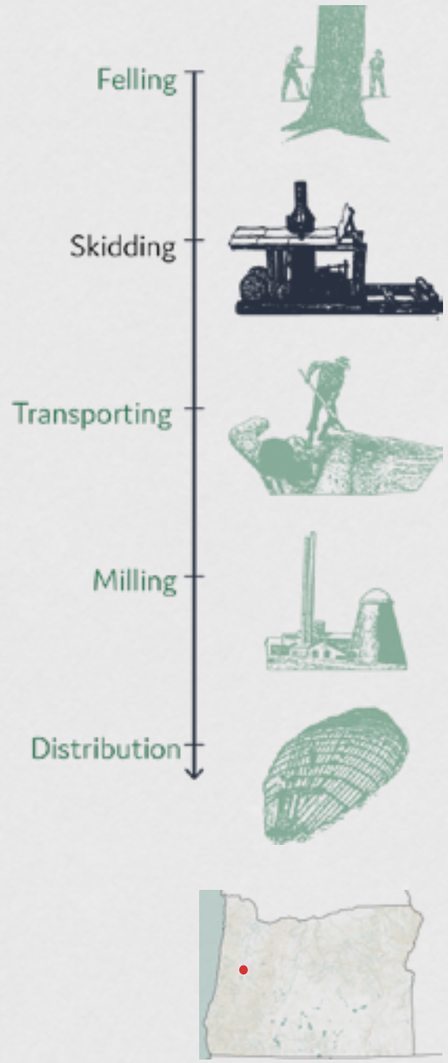
Loggers were often ran over by the tremendous logs if they were not paying attention or if the whistle blower, "whistlepunk", didn't sound the warning that timber was on the move.



Logging on Big Sandy, Leona, Oregon, 1889. Courtesy Oreg. Hist. Soc. Research Lib., 3687

TEAMSTERS

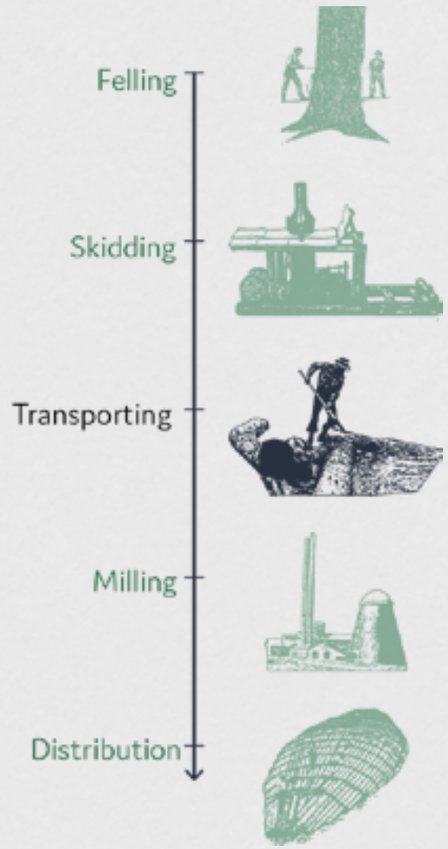
Timber would then be pulled out of the forest to the nearest water body. Small or early operations would use oxen, but the beast of burden was quickly forgotten with the invention of the steam donkey.



The Columbia and Nehalem Valley Railroad. OSU Special Collections & Archives Research Center. WilliamsG:Ford 27

RAIL

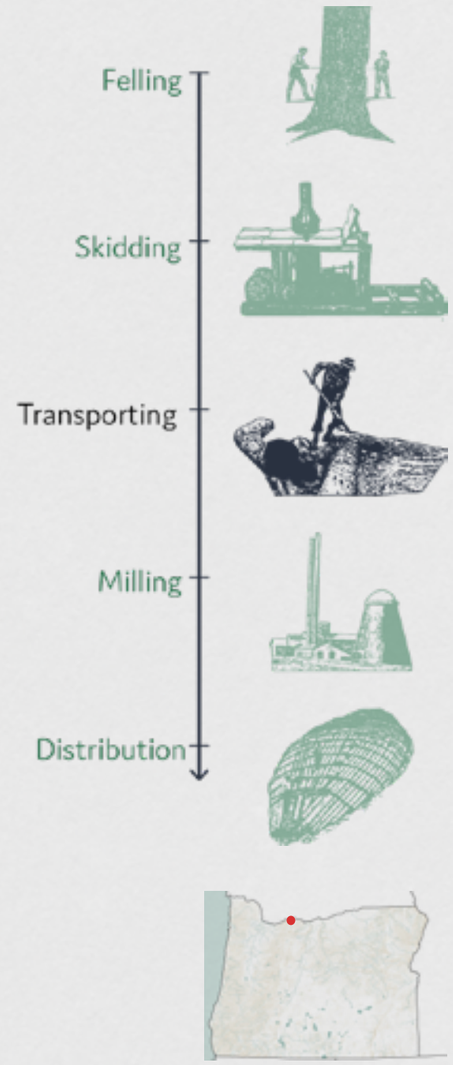
Rail revolutionized the scale of logging operations. Rail was used for moving camps, moving timber, moving lumber, transporting crews, etc.



Large Wood, Long Legacy

LOG FLUME

Larger mills would use log flumes, a.k.a water slides for timber. The largest and longest running flume in the United States was across the Columbia River from Hood Mountain.



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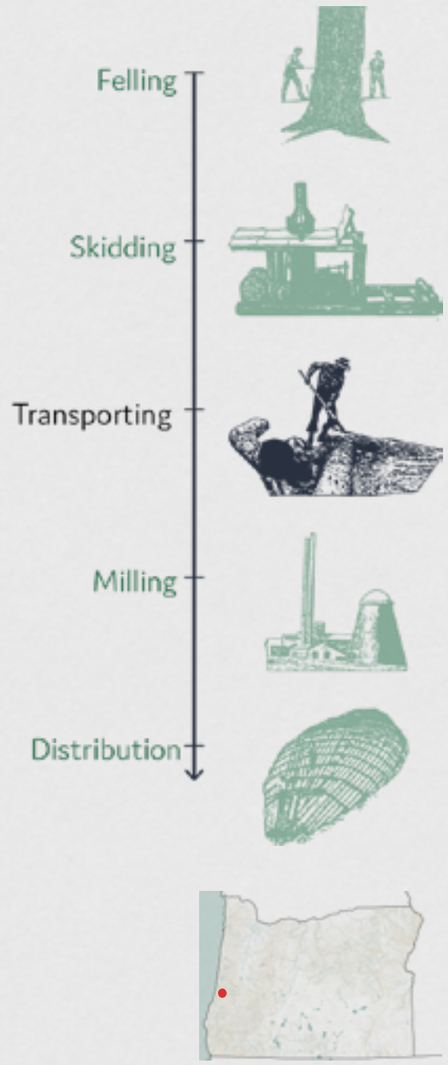
Men use long poles in 1951 to maneuver logs into rafts to float on the Umpqua River to a mill for processing. (Oregon State Archives)

LOG DRIVE

The more common form of timber transportation was the log drive. This job was done by the ‘river pigs’ and ‘powder monkeys’ who unstuck log jams, and blew up obstructions.



LUMBER MILL

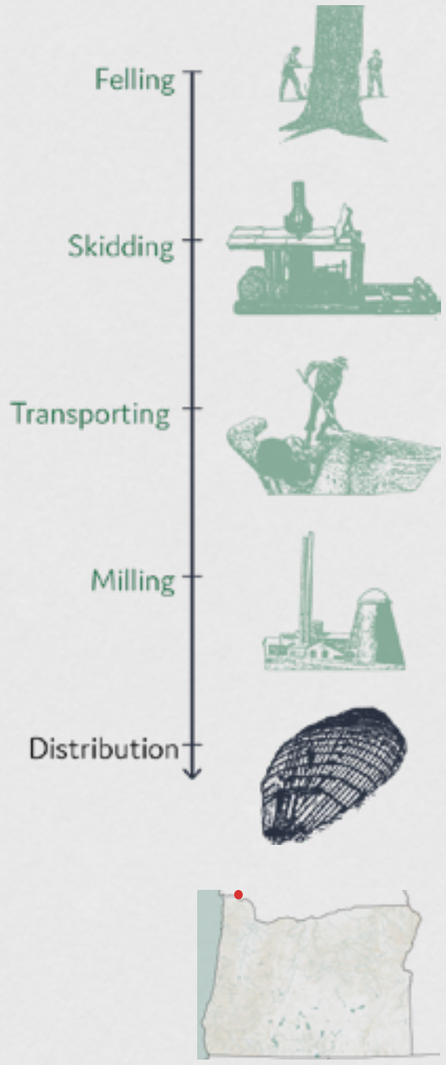
Most lumber mills had a log pond for storing and moving timber and a beehive burner for burning sawdust.

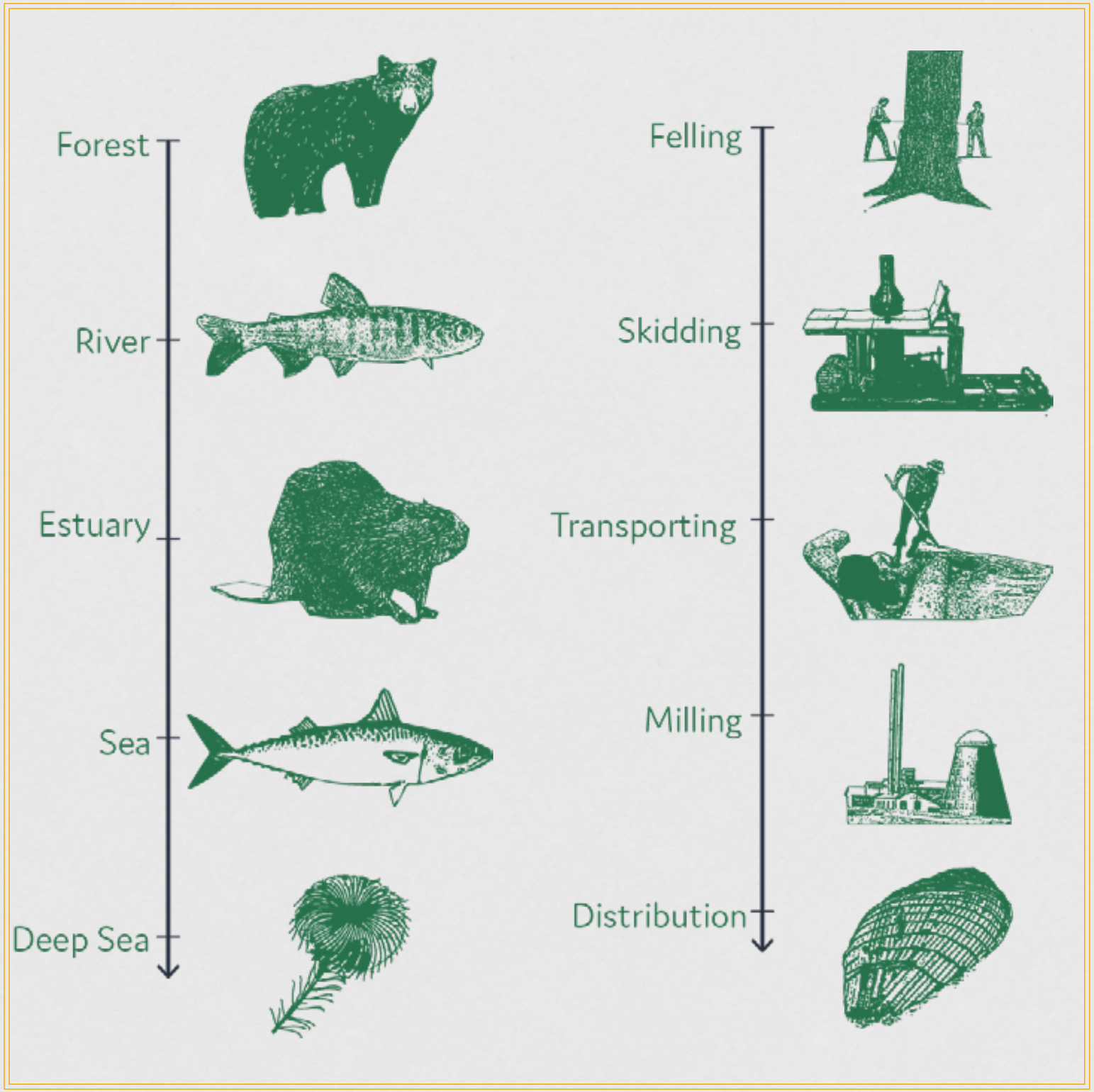
Pope & Talbot Sawmill, from log pond, Oakridge, Oregon . OSU Special Collections & Archives Research Center

Log raft from Oregon to San Diego. Courtesy Oreg. Hist. Soc. Research Lib., OrHi79635

BENSON RAFT

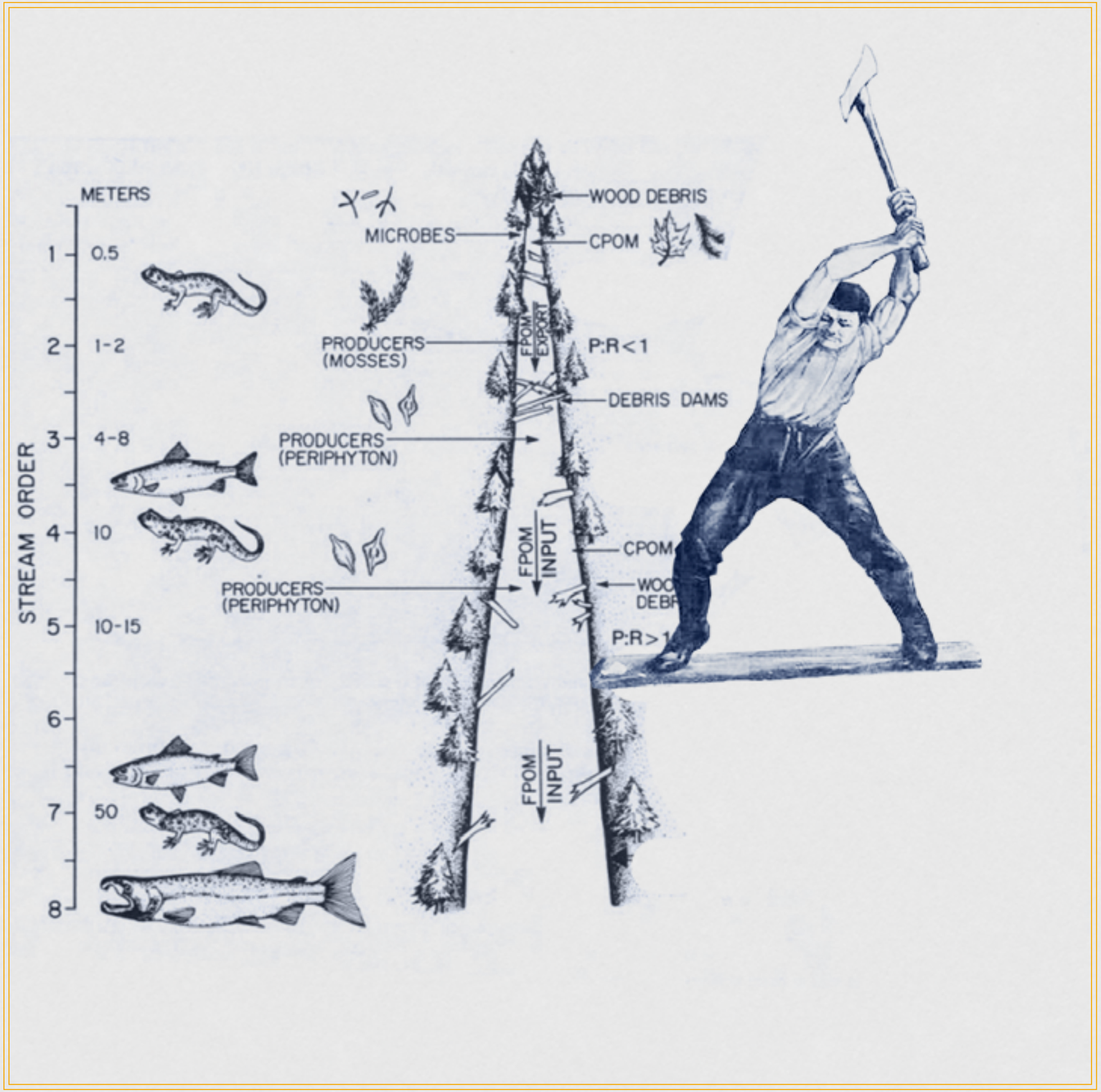
The Benson Raft was invented in Portland, and was used to bring large amounts of lumber to San Diego which was developing quickly with the gold rush, yet lacked the trees that the Pacific Northwest had to develop cities.





PARALLELS

It's through these processes that parellels emerge between large wood and logging.



RIVER CONTINUUM

Disturbance at any point of this continuum creates long lasting consequences.

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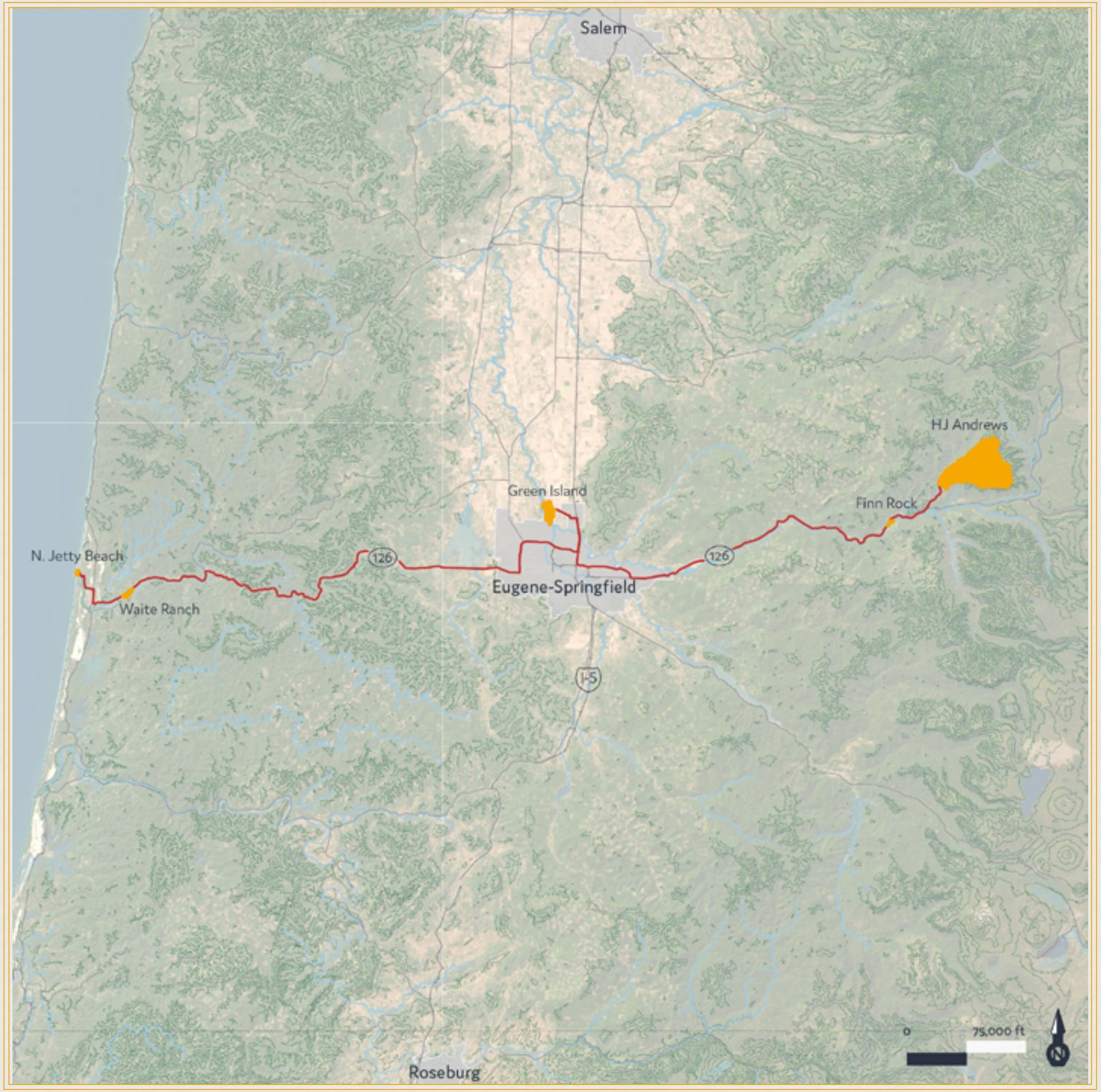
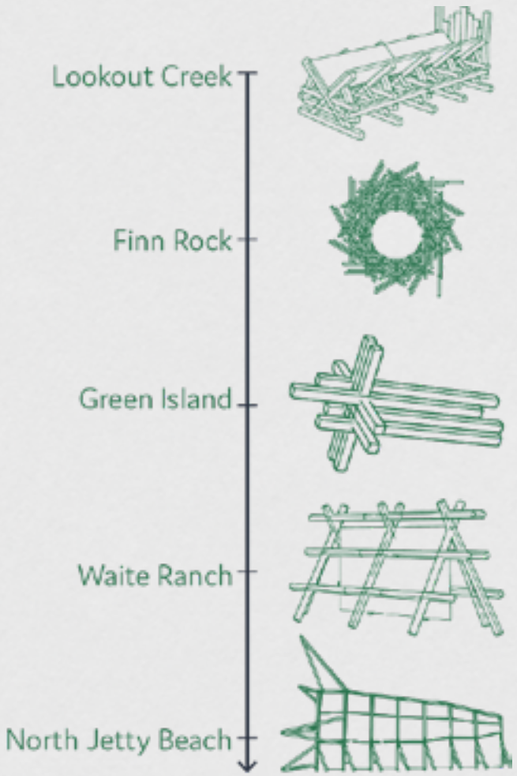


THE TRIP

A series of landscape installations along Hwy 126 that explores the role of large wood in different ecosystems.



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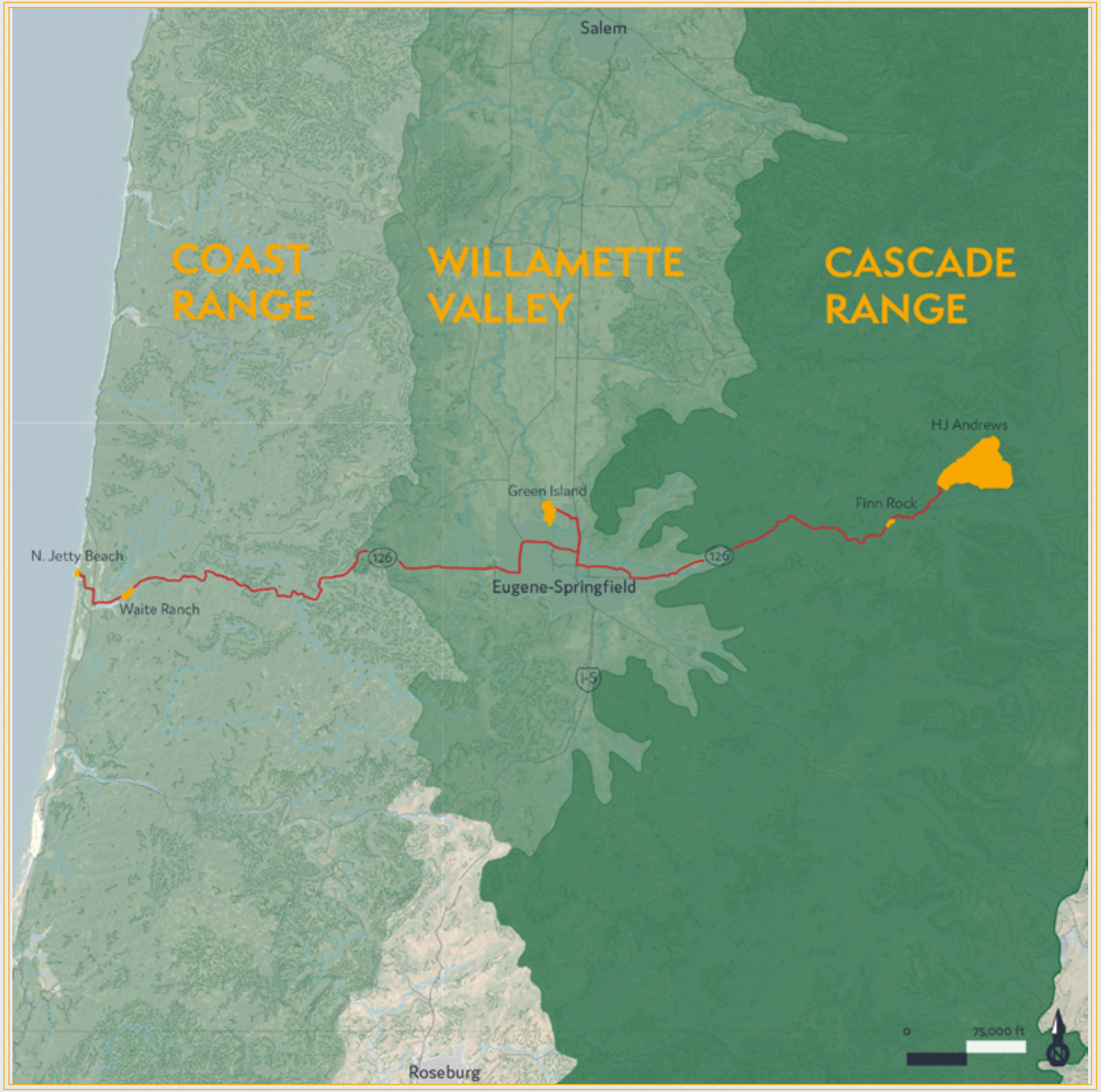
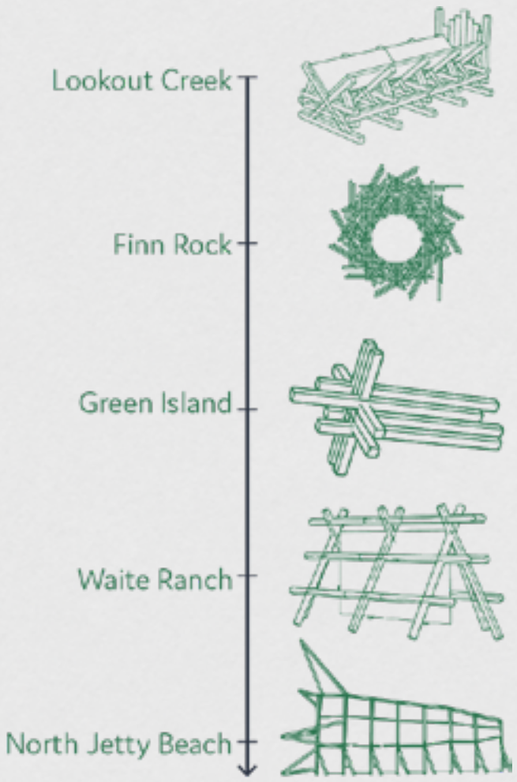


THE TRIP

This trip explores the three major eco-regions of Western Oregon.



Large Wood, Long Legacy

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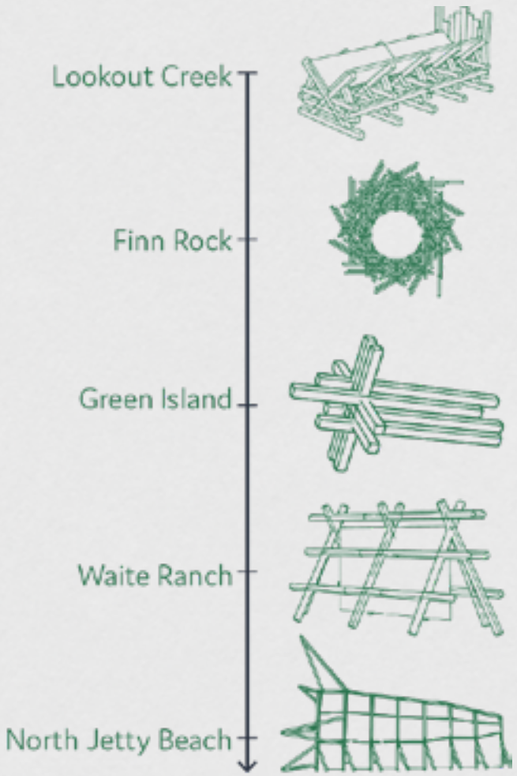
THE TRIP

HJ Andrews is one of the most important research locations for understanding PNW ecology. McKenzie River Land Trust sites incorporate large wood in restoration efforts.

HJA
HJ ANDREWS EXPERIMENTAL FOREST

Research



MCKENZIE RIVER TRUST

Restoration

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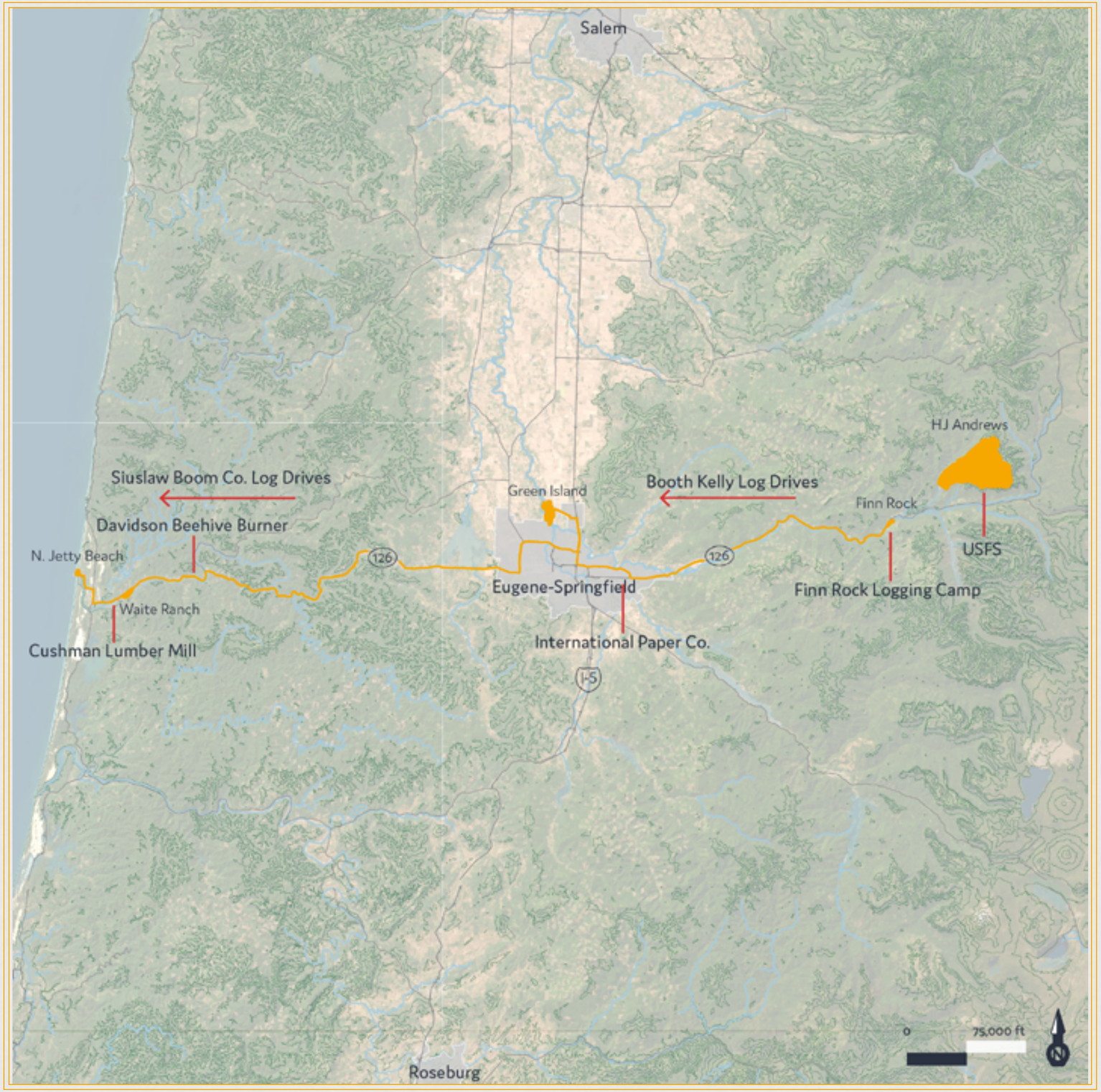
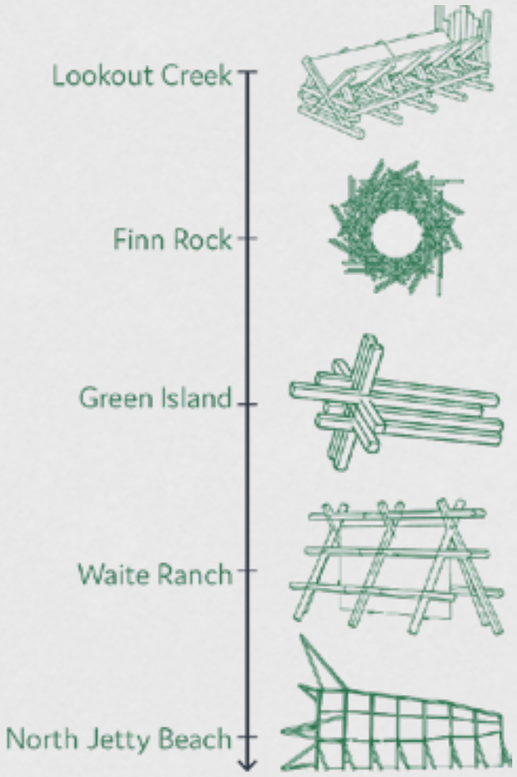


THE TRIP

Each location was selected because of the significance to large wood, and the juxtaposition of logging.



Large Wood, Long Legacy

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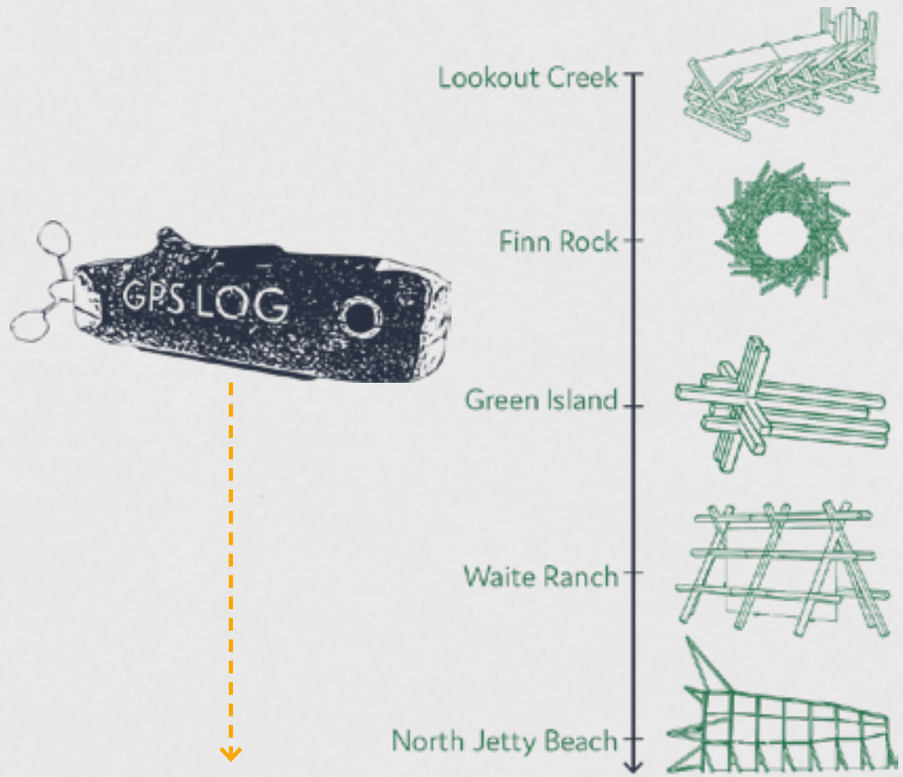
THE GUIDE

The trip is also connected by GPS Log voyages.



GPS LOG

As GPS Log floats down the McKenzie River, it will share live location tracking, which the public can use to follow the log.

GPS

Hi-Viz

Ballast

Collaborators: Kadence Neuens and Will Bonner

GPS LOG

Collaborators: ***Ian Escher Vierck**, Kadence Neuens, and William Bonner*

The idea of strapping a GPS to a piece of wood is not a new one. Researchers, like the ones at **H.J Andrews,** have been doing similar projects for years. Inspired by the idea of documenting the log's journey, and imagining the voyage large wood takes from the **mountains to the sea**, Will Bonner and I had the idea of tracking wood while it travels down the McKenzie River.

GPS Log tracks live data of its movements. GPS log was engineered like a boat to consistently float in the same orientation with its antenna pointing towards the sky. As the log pings every two minutes, the data is displayed live on GPSLogDrive.com for folks to watch as it makes its way downriver.

My collaborator, Kadence Neuens, helped engineer this website to track GPS Log and share information about its voyage thus far. Will Bonner will take the data, which includes altitude and coordinates, and make data visualization art, for further interpretation

0 MILES
Distance

00:00:00
Travel Time

0 mph
Average Speed

0 snags
Stops

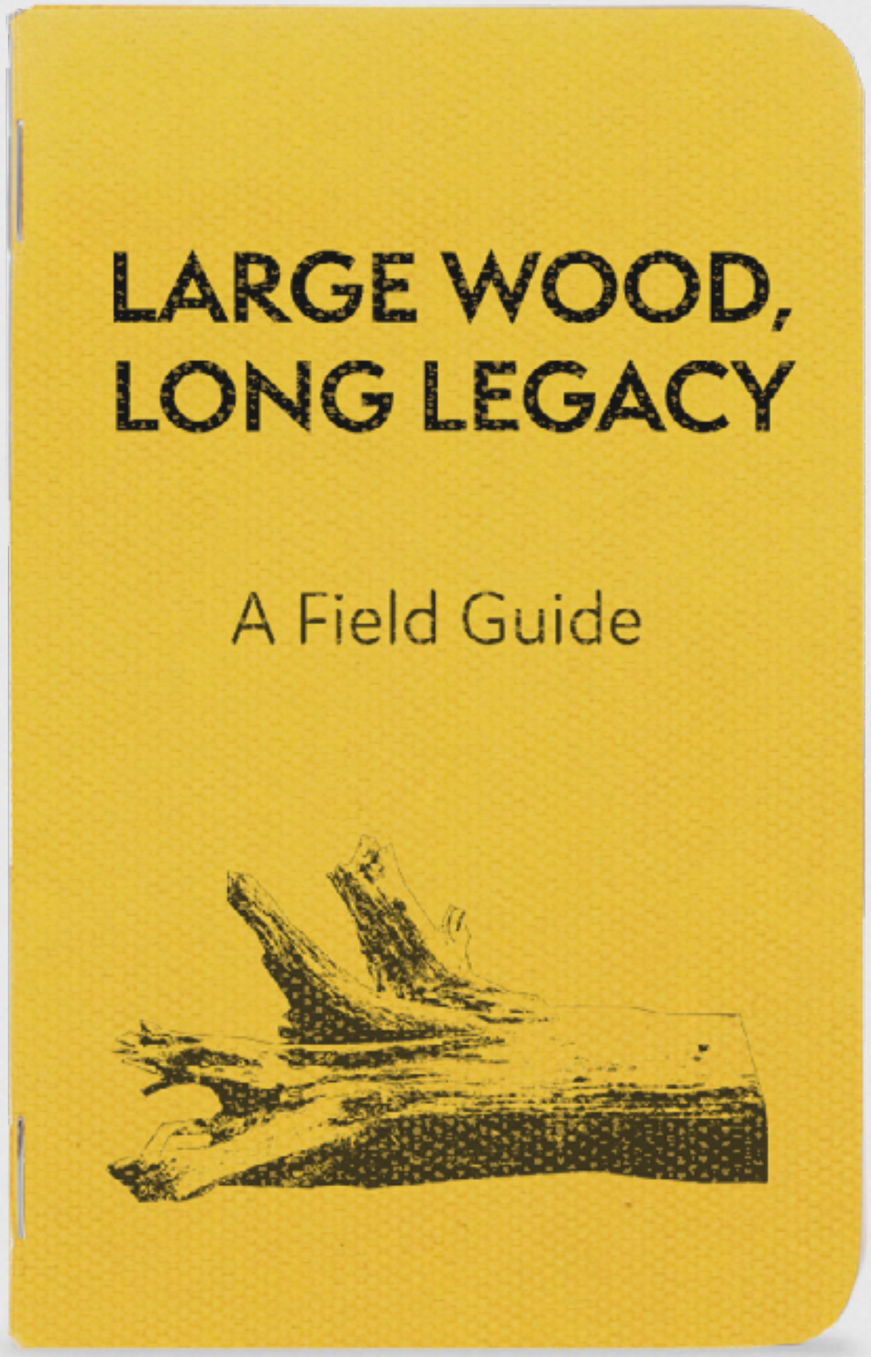
Altitude

GPSLOGDRIVE.COM

GPS Log can be followed live, as it makes its way down the river. Further interpretation of GPS Log movement will be represented via visual data art.

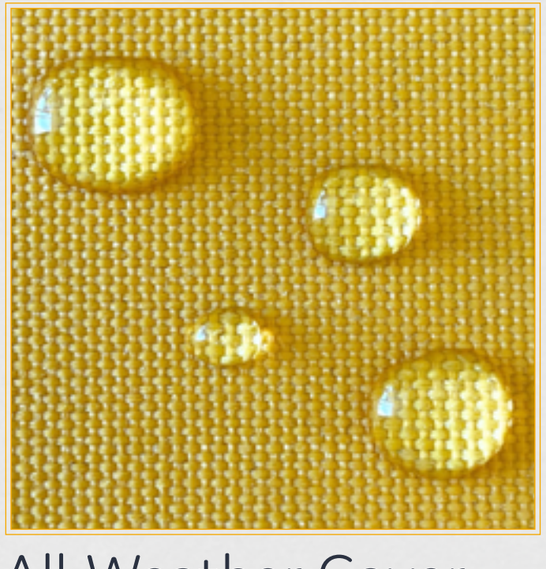
Large Wood, Long Legacy

Ian Escher Vierck

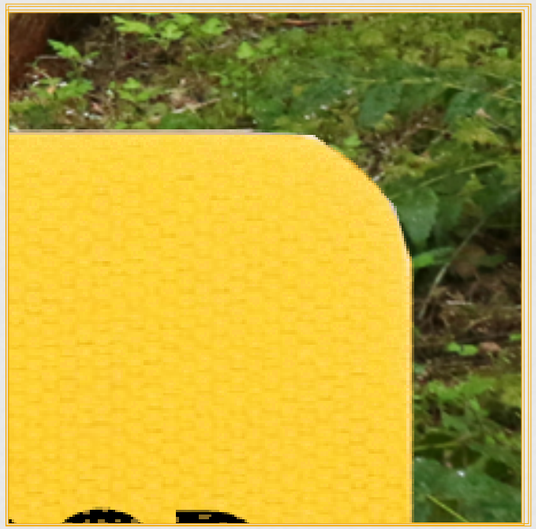


FIELD GUIDE

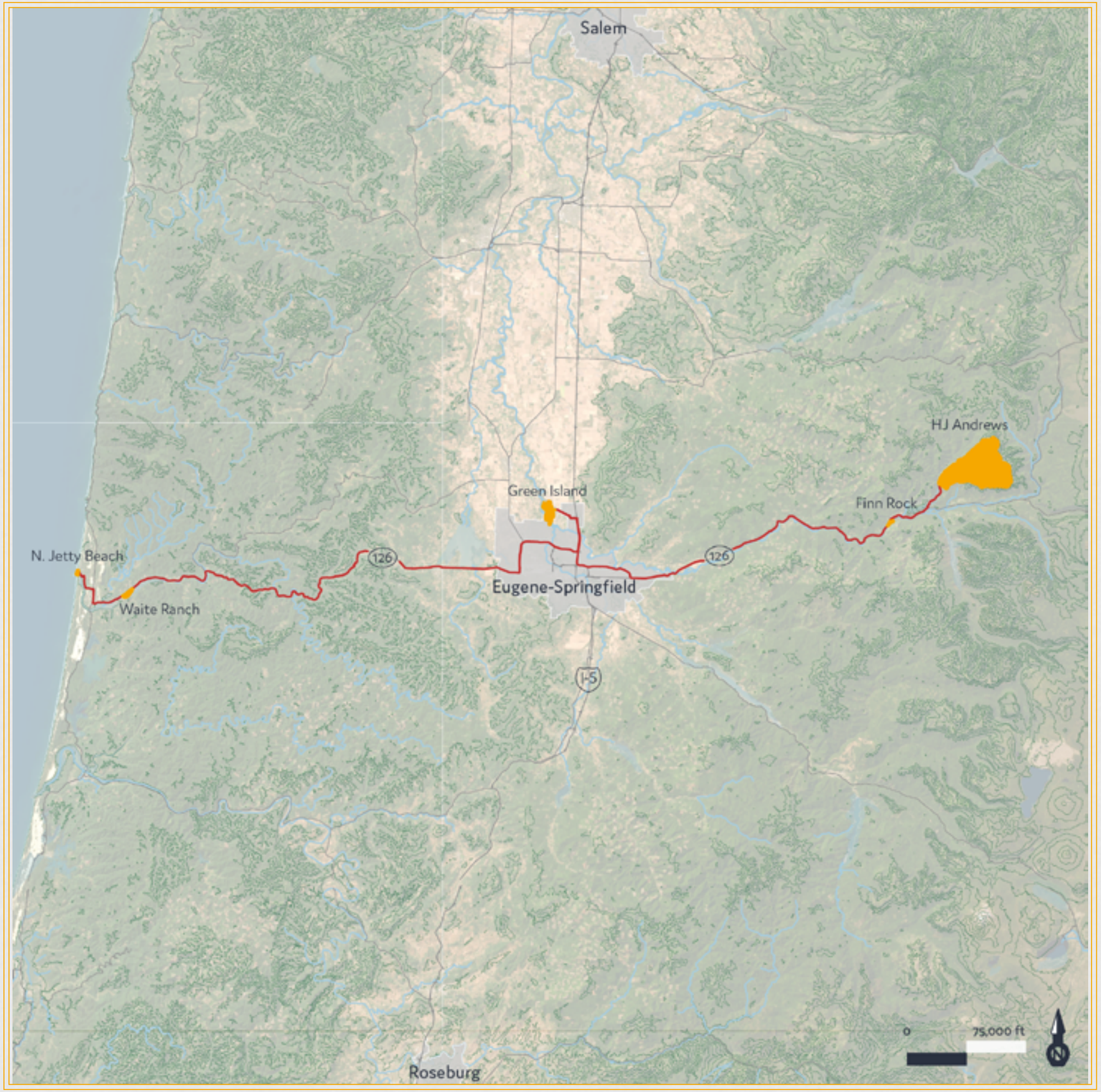
Through the Field Guide, visitors can interpret, expereience and reflect on large wood.



All-Weather Cover

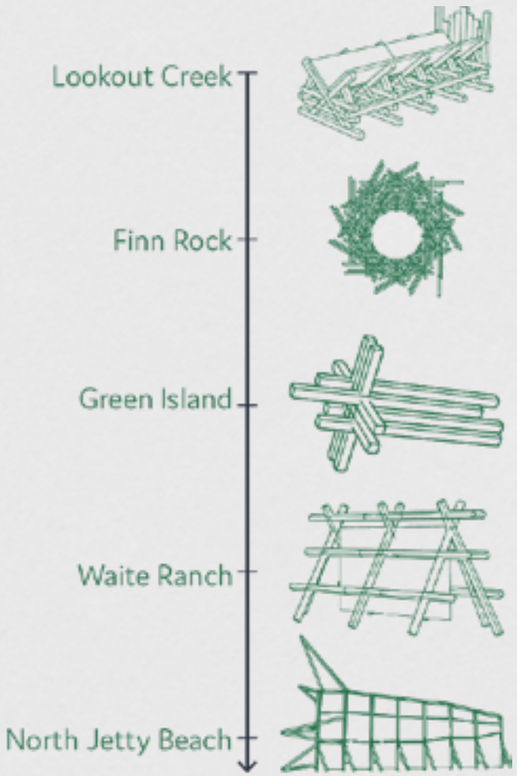


Loose-proof color



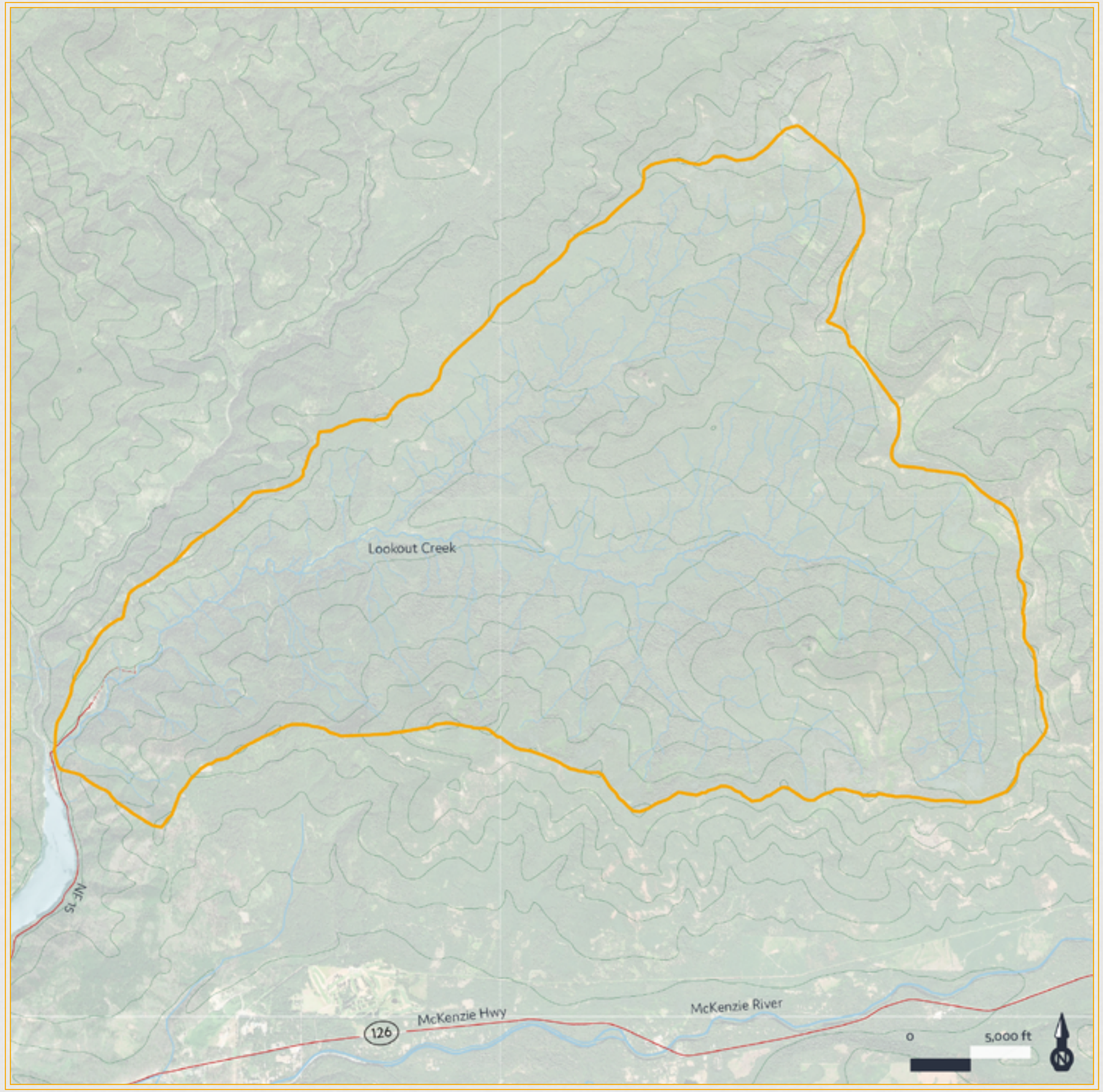
THE TRIP

A series of landscape installations along Hwy 126 that explores the role of large wood in different ecosystems.



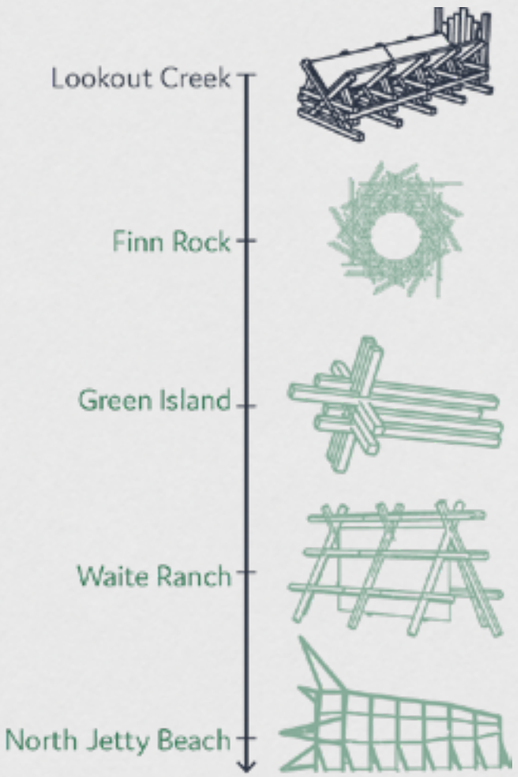
Large Wood, Long Legacy

Ian Escher Vierck



HJ ANDREWS

Lookout Creek can serve as an example of a first order stream in an old growth forest. Here, visitors may learn about large wood's ability to direct water flows.

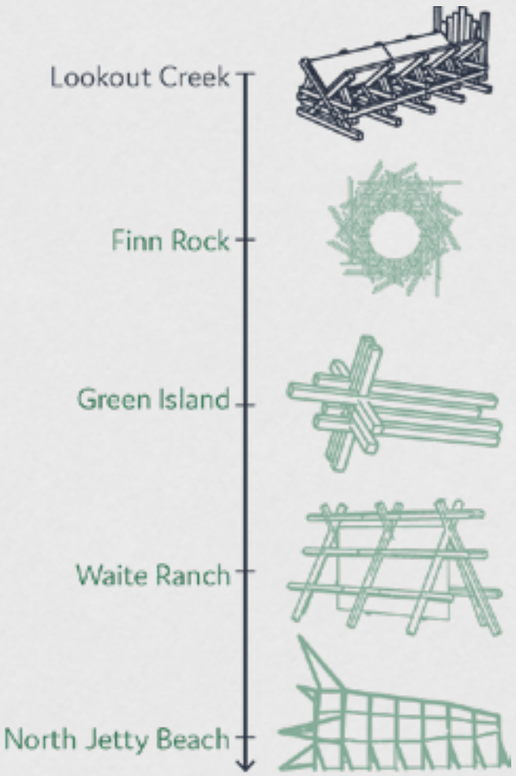


Large Wood, Long Legacy

Ian Escher Vierck

OLD GROWTH

HJ Andrews contains old growth forest clocking in at 300-500 years old.



Large Wood, Long Legacy

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NURSE LOG

One of the most admired elements of an old growth forest is the nurse log.

Large Wood, Long Legacy

Ian Escher Vierck

INSTALLATION

This installation raises the nurse log from the ground and contains interpretive elements.

Large Wood, Long Legacy

Ian Escher Vierck

INSTALLATION

This installation is inspired by the log flume.

Log Flume

Large Wood, Long Legacy

Ian Escher Vierck

INSTALLATION

Carved on the walls are plants that could be found growing from the nurse log.

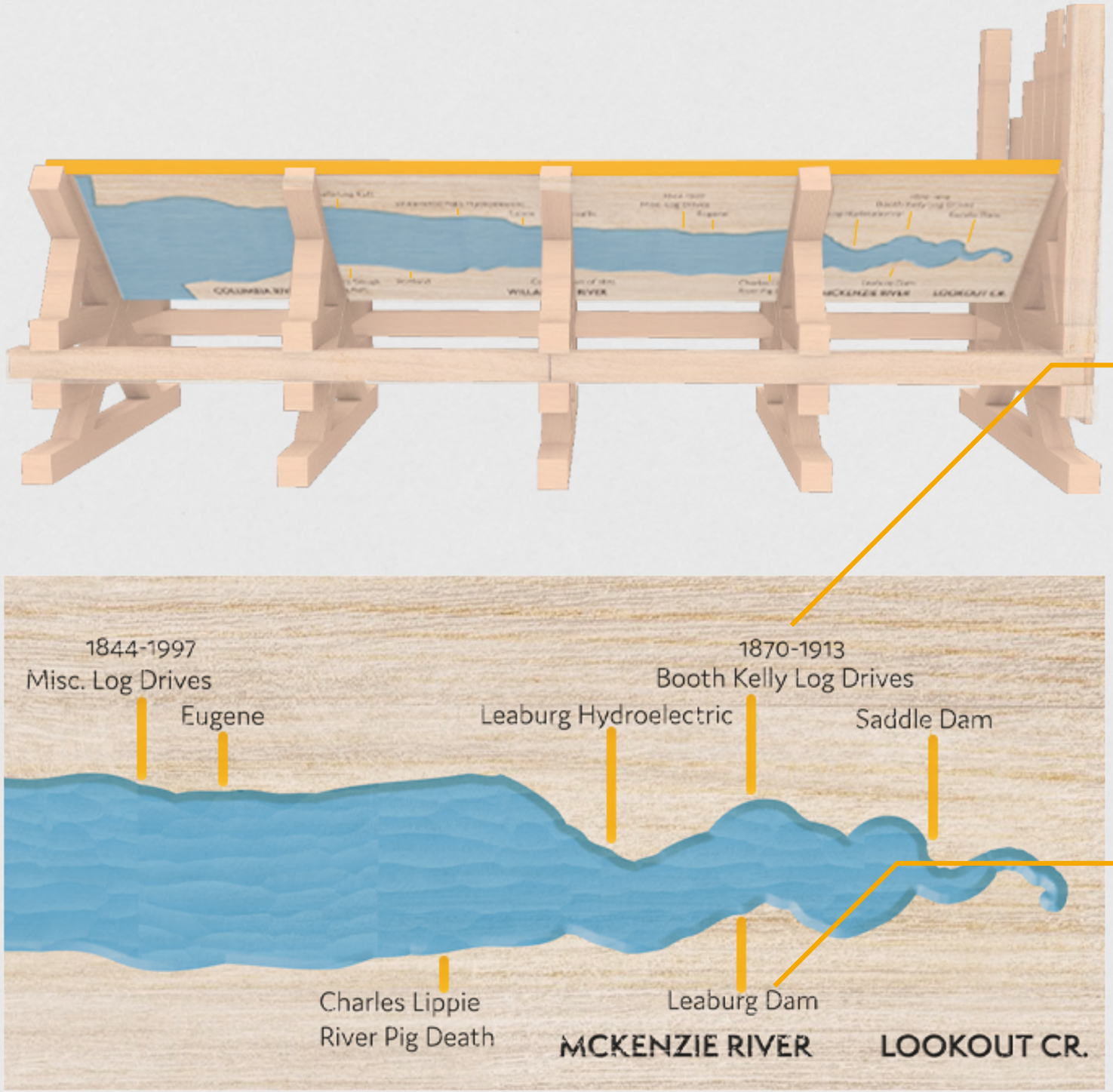
Gaultheria shallon

Tsuga mertensiana

LOG FLUME

The log flume contains a river continuum diagram, connecting Lookout Creek to the Pacific Ocean.

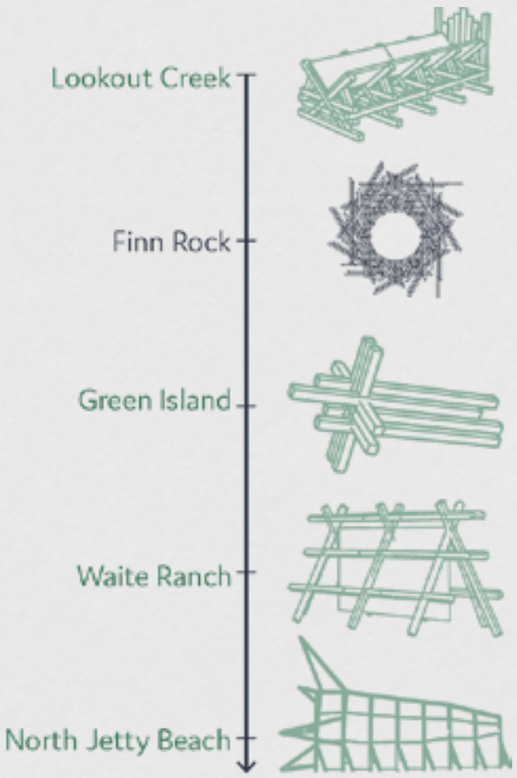
Hist. Context



Infrastructure

FINN ROCK REACH

Finn Rock Restoration area highlights cutting-edge large wood restoration efforts.



McKenzie River Trust

Large Wood, Long Legacy

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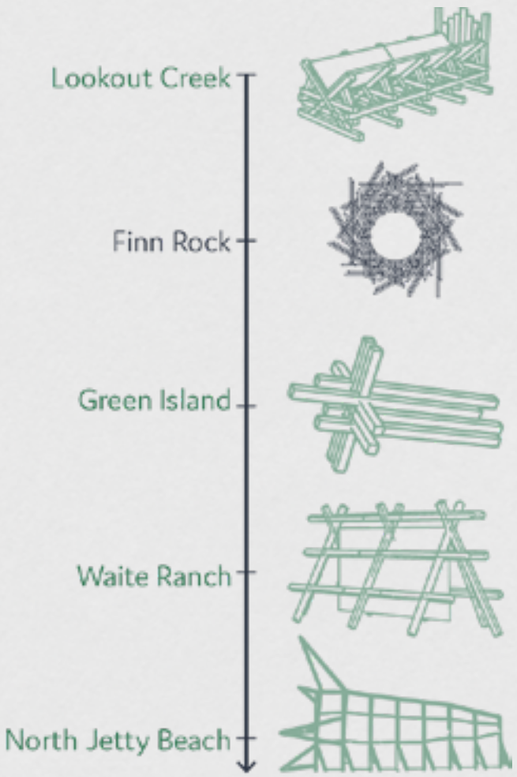
FINN ROCK REACH

The Finn Rock Restoration project restored nearly 85 acres of riparian habitat along the McKenzie River.

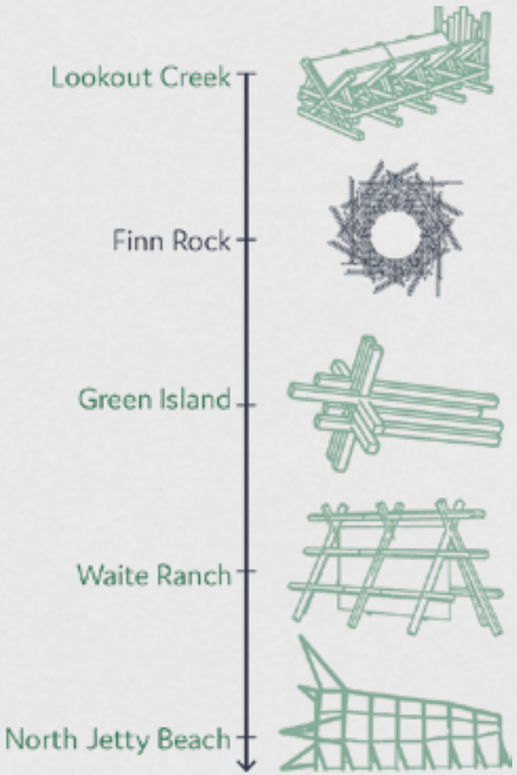


Large Wood, Long Legacy

Ian Escher Vierck

ROOT WAD

The root wad is an essentialelement of a log jam because of its irregular form.



Large Wood, Long Legacy

Ian Escher Vierck

INSTALLATION

This installation interacts with the creek.

Large Wood, Long Legacy

Ian Escher Vierck

INSTALLATION

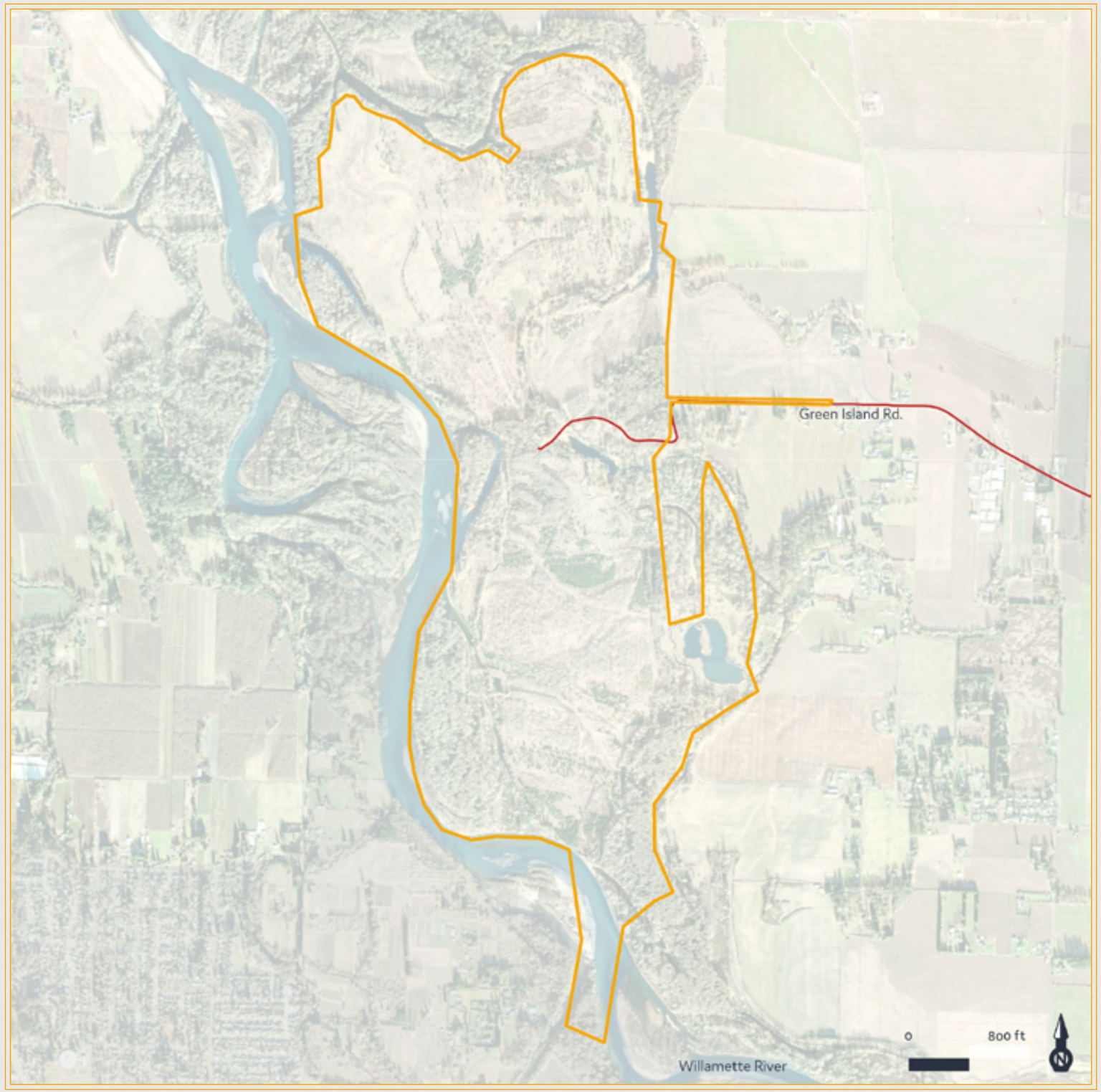
Inspired by the form of engineered root wads. Carved into the beams are the stages of the salmon life-cycle.

Restoration tech

Salmon

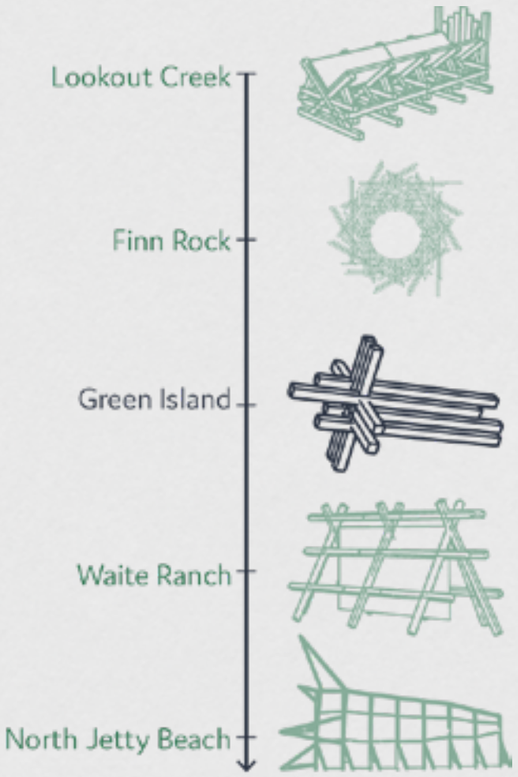
Large Wood, Long Legacy

Ian Escher Vierck



GREEN ISLAND

Green Island is located north of the McKenzie and Willamette River confluence.



McKenzie River Trust

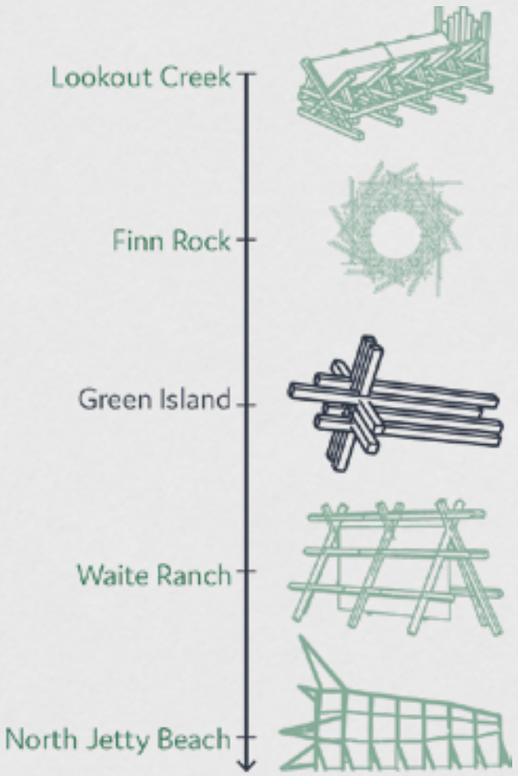
Large Wood, Long Legacy

Ian Escher Vierck

Large Wood, Long Legacy

WILLAMETTE RIVER

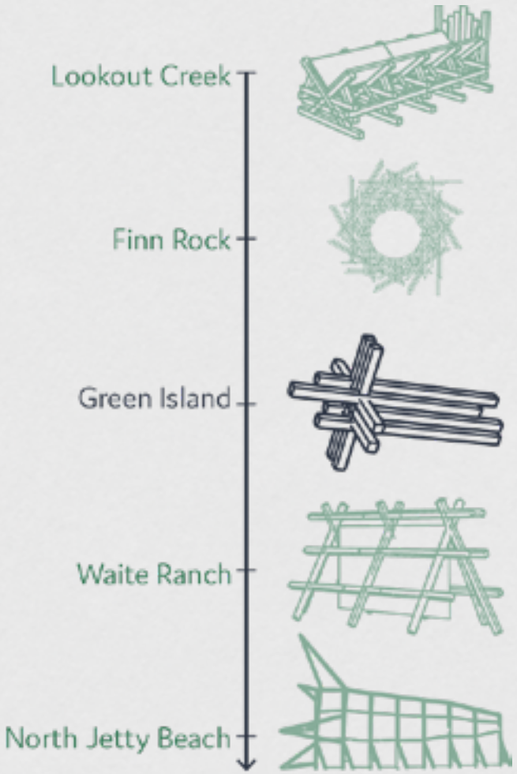
The Willamette River is anastmotizing, creating opportunities for ‘hard points’.



Ian Escher Vierck

HARD POINTS

Hard points are buried log jams that create erosion resistant islands.



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LOG JACKS

This ‘hard point’ is reminiscent of coastal erosion barriers. The random placement of these jacks creates a pattern called ‘Jack Straw’.

Large Wood, Long Legacy

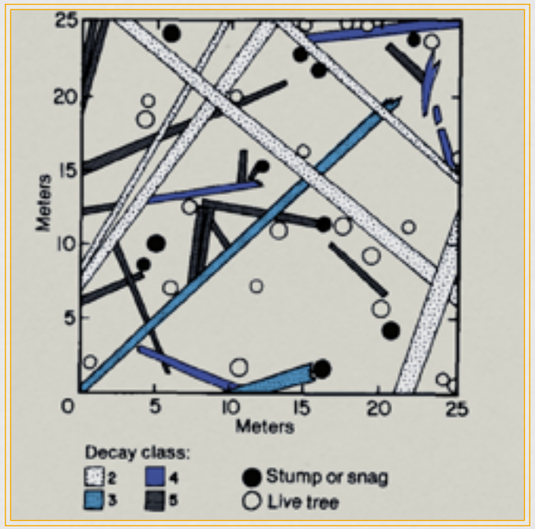
Ian Escher Vierck

Large Wood, Long Legacy

LOG JACKS

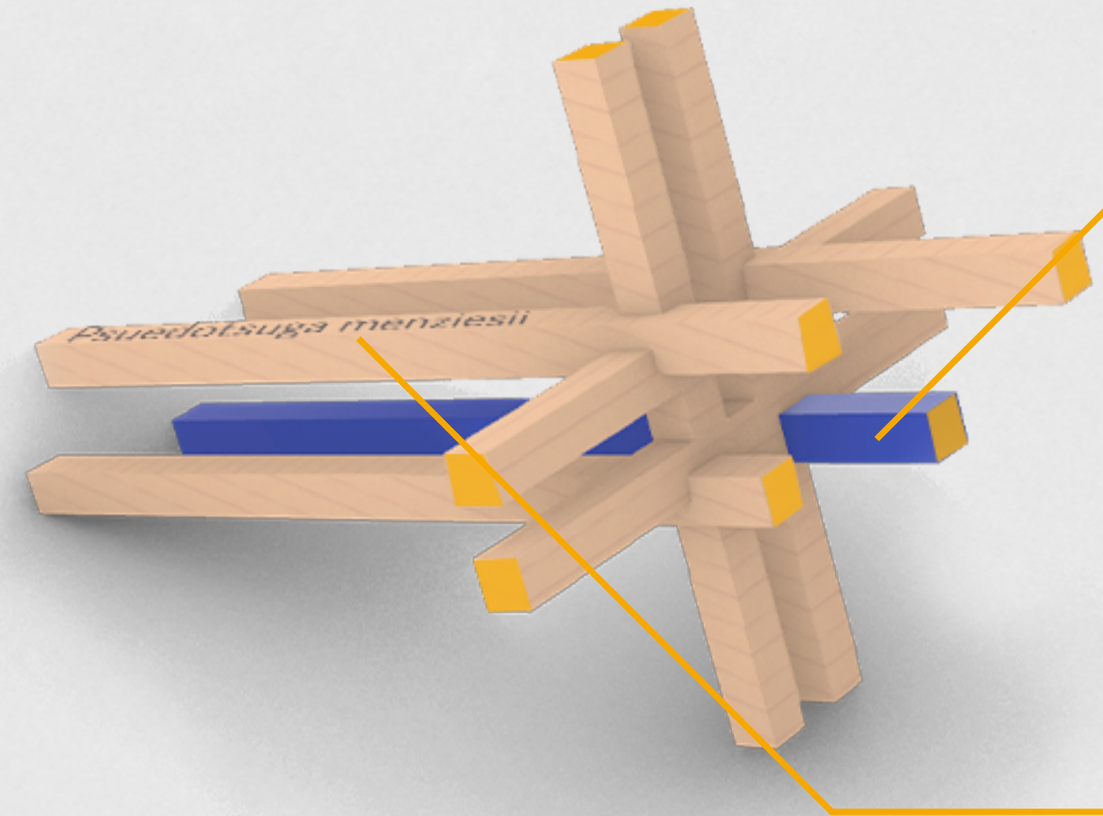
This ‘hard point’ is reminiscent of coastal erosion barriers.

Coastal Erosion



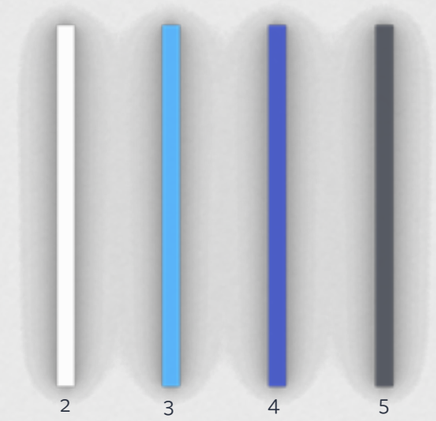
Jack Straw

Ian Escher Vierck

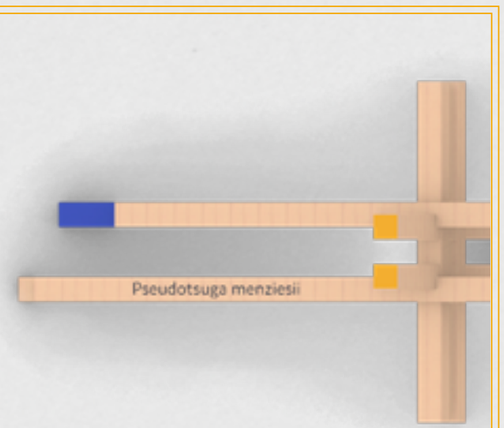


LOG JACKS

Although hard to distinguish, every specimen of large wood is a different species and decay class.



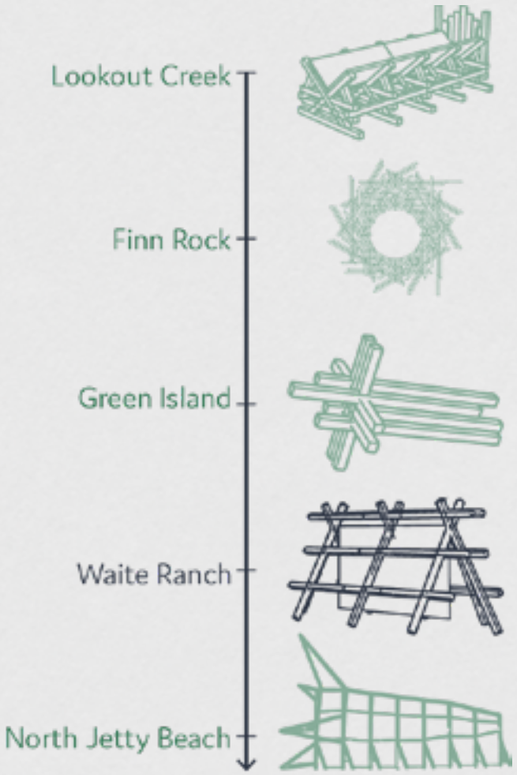
Decay Class



Wood ID

WAITE RANCH

At Waite Ranch, visitors can learn about the complexities of an estuary ecosystem. Here they can see the topographic diversity that large wood provides.



McKenzie River Trust

Large Wood, Long Legacy

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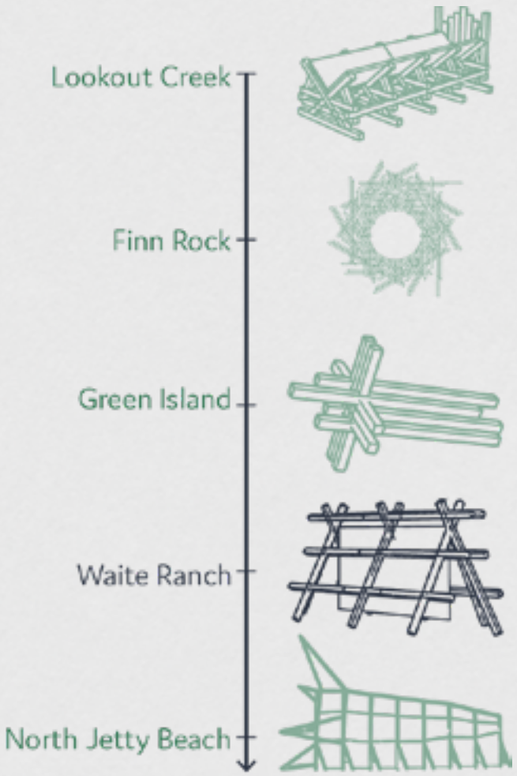
Large Wood, Long Legacy

TIDAL MARSH

In tidal marshes, fresh and salt water are in a constant dance.



Ian Escher Vierck

Large Wood, Long Legacy

Ian Escher Vierck

INSTALLATION

This installation highlights the biodiversity of both the fresh and salt water ecosystems.

INSTALLATION

The stand is inpired by fernacular fish drying racks.

Fish Rack

DETAILS

Arboreal Anglers is a exploration of narrative, material, and material culture. Each angler represents an organism that relies on large wood in different ways.

Collaborators: Blake Schouten, David Buckley Borden, Nancy Silvers, Rachel Benbrook

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Large Wood, Long Legacy

Ian Escher Vierck

DETAILS

The *Arboreal Anglers* explore angler culture. A community that can serve as a strong ally for river restorations.

DETAILS

The Anglers are outfitted with old logging gear to draw connections to the log drives that left the environmental legacies.

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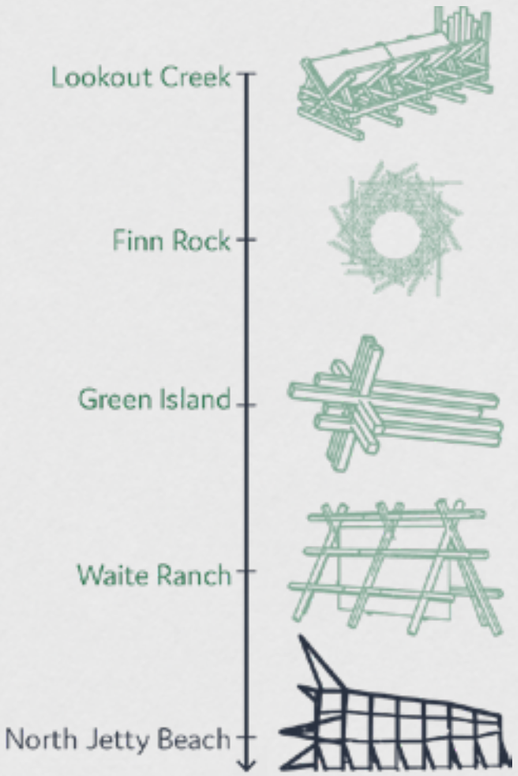
NORTH JETTY BEACH

North Jetty Beach is a Lane County Park adjacent to the Siuslaw River and Florence.



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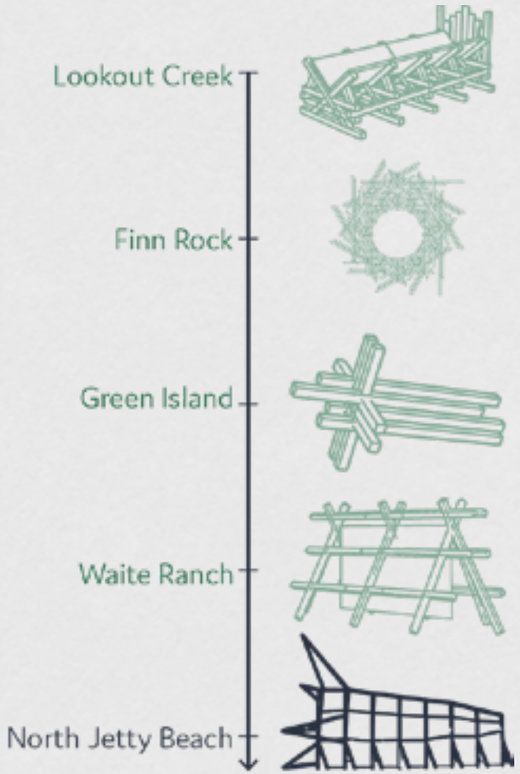
NORTH JETTY BEACH

Driftwood in North Jetty Beach provides important shelter for the harsh windswept sand and battering waves.

Large Wood, Long Legacy



Ian Escher Vierck

INSTALLATION

This installation also provides shelter through the form of a ship cradle.

Large Wood, Long Legacy

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LOG CRADLE

This installation also provides shelter through the form of a ship cradle.

Log Raft Cradle

Root Flare

Large Wood, Long Legacy

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Outside

Inside

Limnoria tripunctata

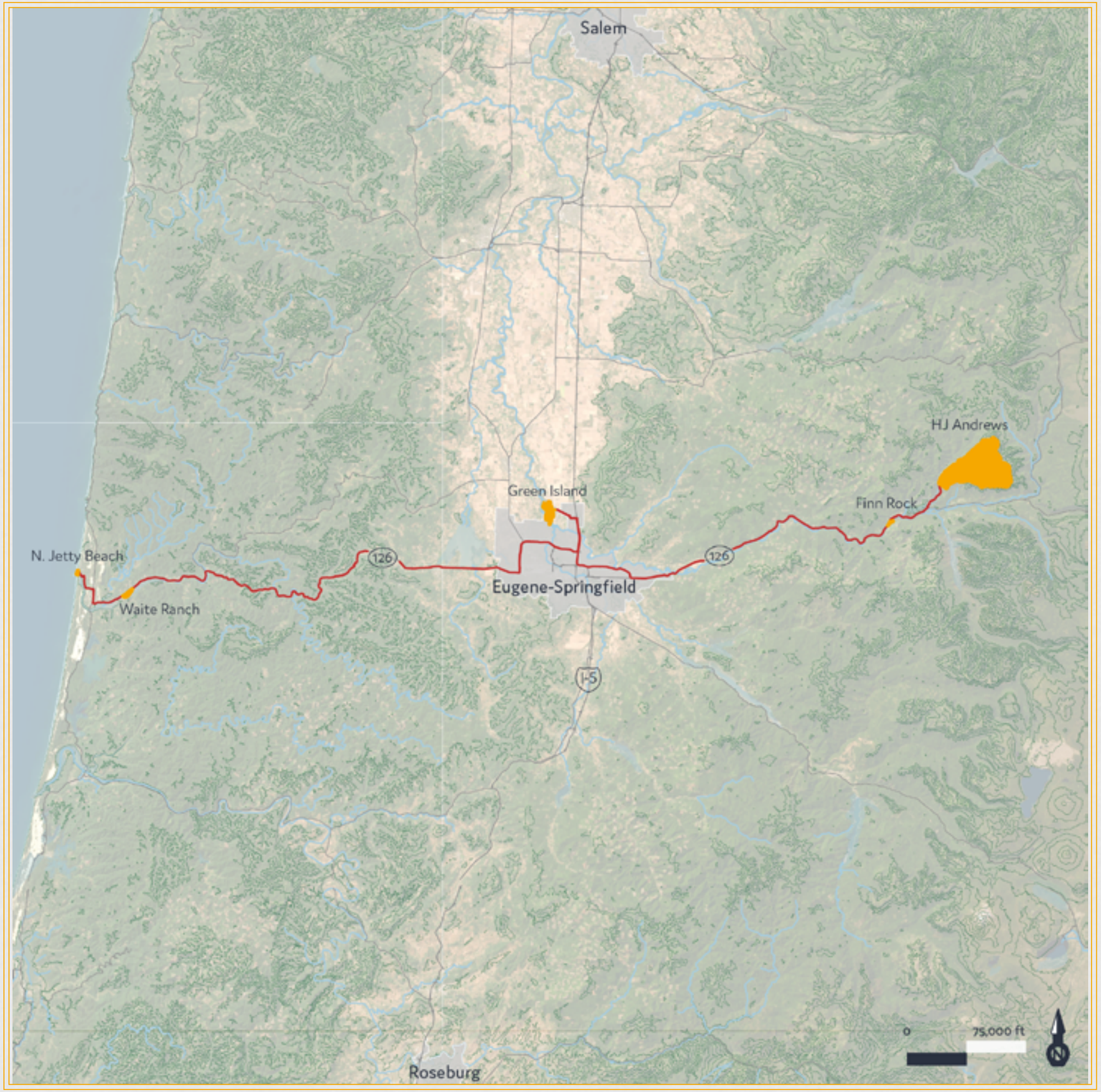
Crinoid spp.

DETAILS

Beached

Adrift

Deep



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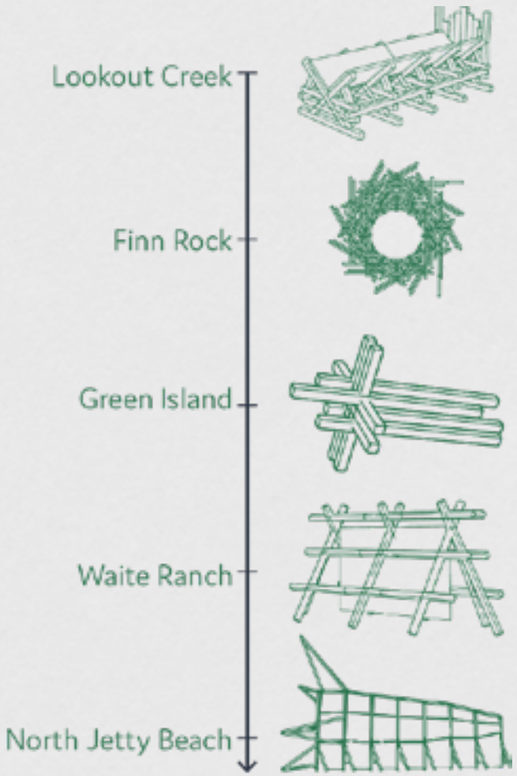
A series of landscape installations along Hwy 126 that explore the role large wood in different ecosystems.



Large Wood, Long Legacy

Ian Escher Vierck

INTENTIONS

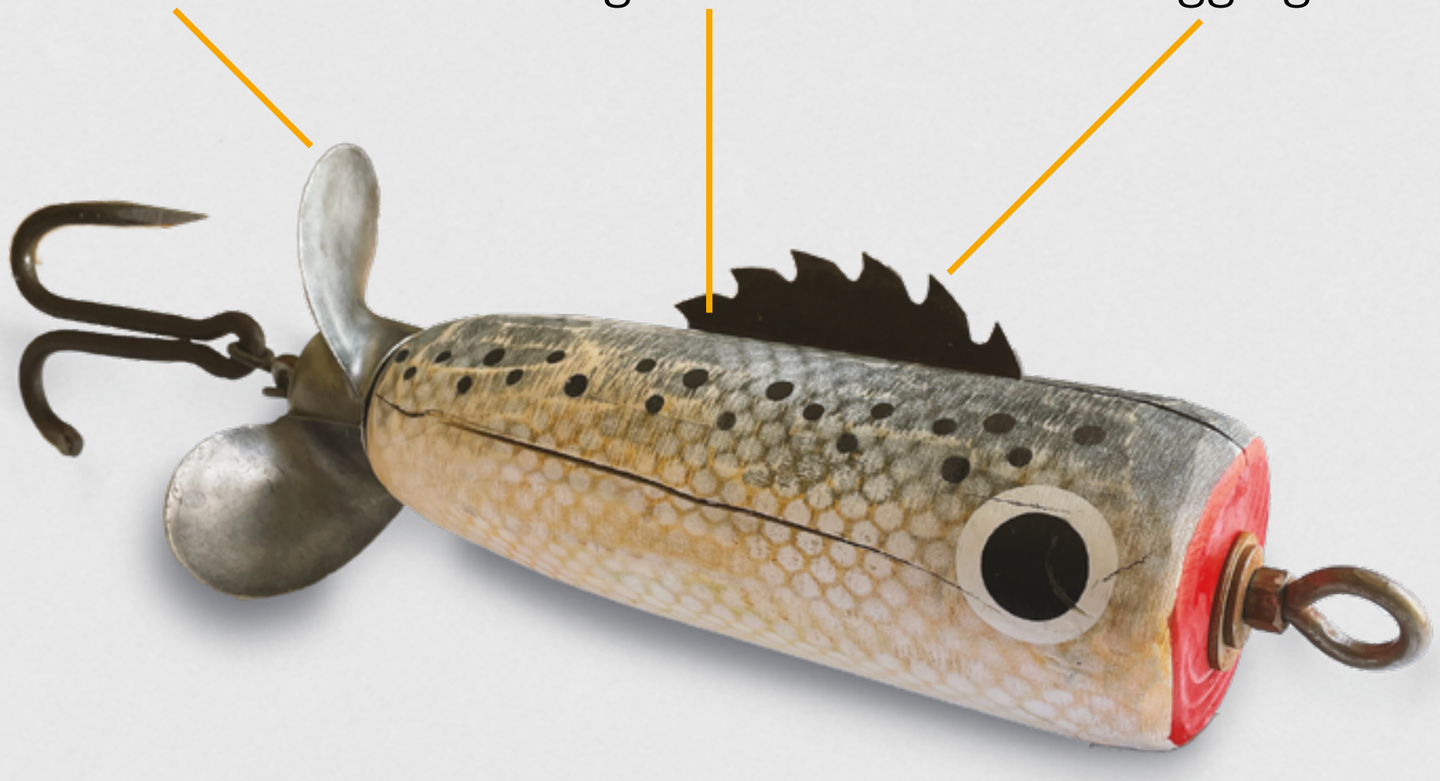
To incite a curiosity that motivates visitors to learn about large wood, appreciate it in other landscapes, and advocate for its existence in the PNW.

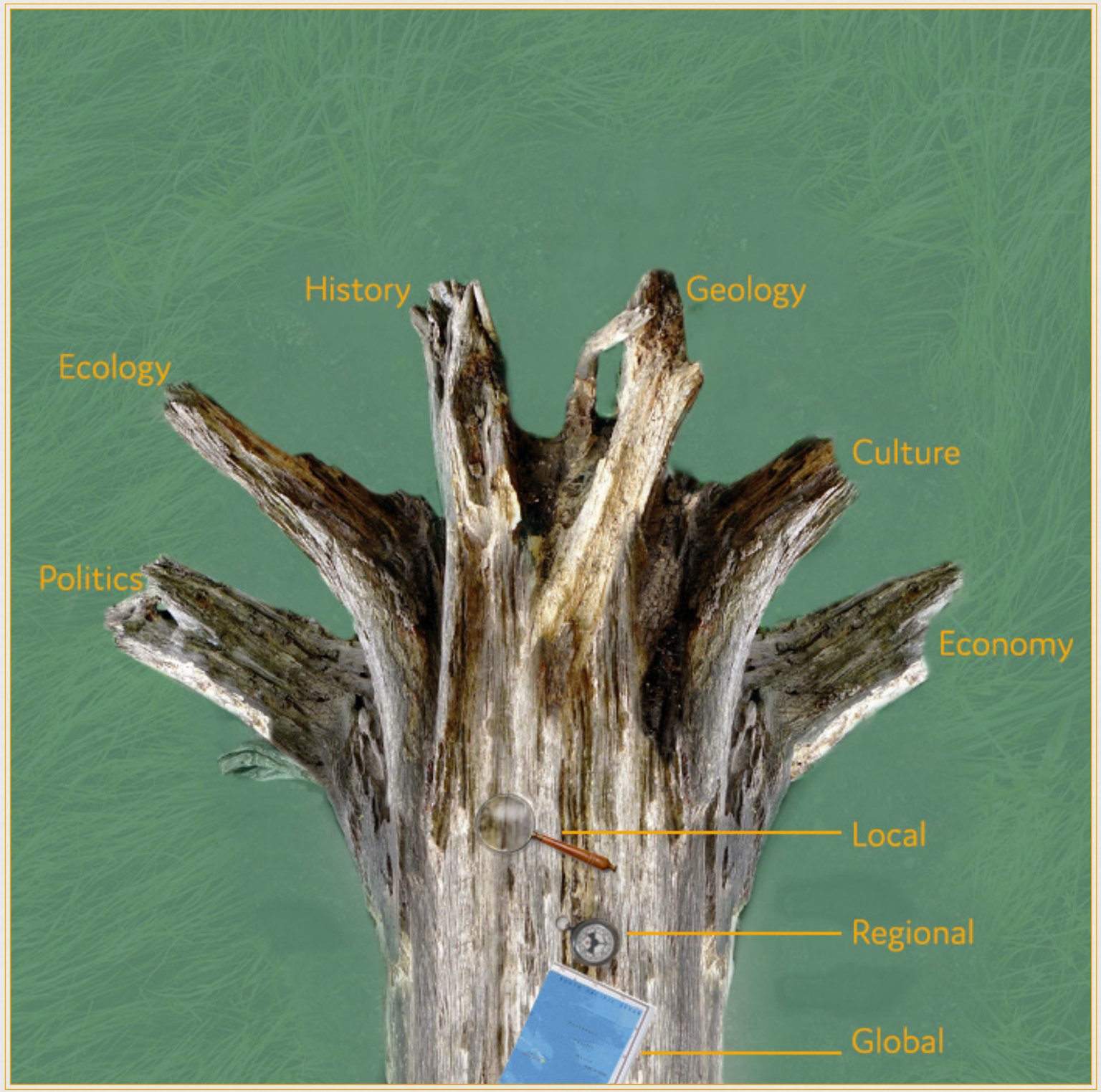
AESTHETIC STRATEGY

Research Tech

Angler Culture

Logging



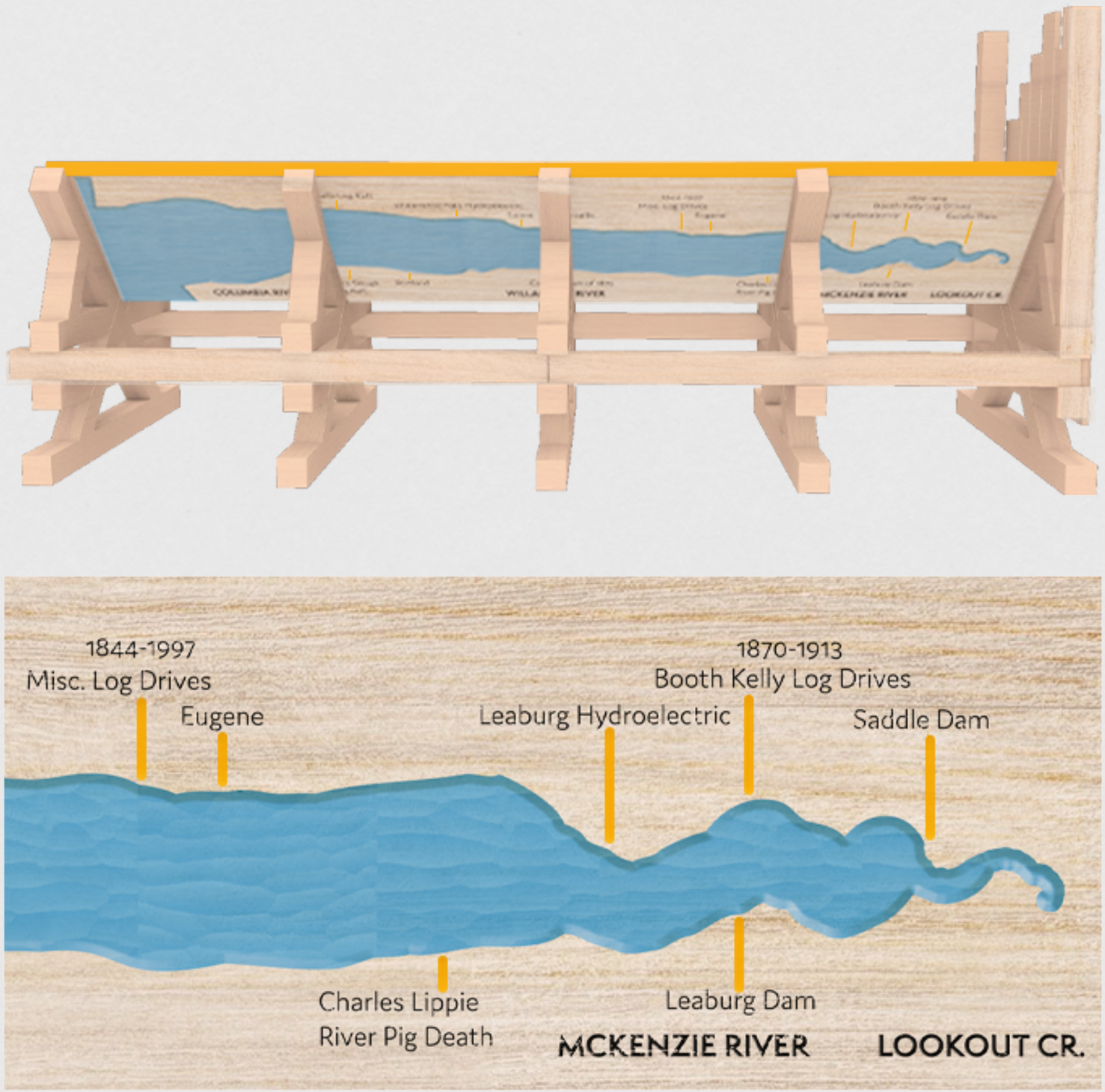


LW CONNECTIONS

This project intends on connecting the audience through different scales of the 'human' and 'natural' worlds.

Large Wood, Long Legacy

Ian Escher Vierck



Large Wood, Long Legacy

WHAT NEXT?

-Build selected installations throughout the summer.

-Install selected installations with HJ Andrews, McKenzie River Land Trust, and the Land Lab

-Deploy GPS Log

McKenzie River Trust

Ian Escher Vierck

ADVISORY TEAM

David Buckley Borden	Design Mentor
Sam DeRoche	Senior Educator for the WI DNR
Fred Swanson Ph.D	Retired Forest Service Research Geologist
Michael Nelson Ph.D	Professor of Environmental Ethics and Philosophy
Will Bonner	Designer
Kadence Neuens	Software Engineer
Rob Ribe Ph.D	Professor Emeritus

COLLAB AND HELP

Blake Schoulten

Eric Dean

Ignacio Lopez Buson

Isaac Martinotti

Jake Brotis

Jeffrey Billington

Kadence Neuens

Kennedy Rauh

Kory Russel

Michael Geffel

Mike Bartell

Nancy Silvers

Peter Olson

Rachel Benbrook

Sabine Winkler

Sarah Phillips

Tom Coates

Tristan Matlock

UO Facilities

Will Bonner

Woodshop regulars

Large Wood, Long Legacy

Ian Escher Vierck

Title
Welcome to Large Wood, Long Legacy, a design project that communicates ecological concepts through a variety of creative, interpretive, and experiential media
.
Intentions
As an emerging environmental designer, I use design to intrigue people, capture their attention and make an opportunity for discourse, leading to a greater understanding of ecology that can then be extrapolated outside of the design and ultimately catalyze advocacy.

Project Methodology
By doing in-depth research, and collaborating with scientists, designers, professionals, and educators, I have developed a thorough understanding of large wood in the different ecosystems of Western Oregon, and am interpreting this understanding through landscape installations and experience.

Design Research
To contextualize this project, I turned to case studies that helped me understand science communication through art and design.

Aesthetic Strategy
From these case studies, I learned about the importance of an Aesthetic Strategy, which can be summed by the instrumenting of relevant colors, materials, and cultural themes to increase the impact of a particular narrative.

Aesthetic Strategy cont.
The case studies identified two 'aesthetic strategies' mirroring and friction synthesis, both of which are used in Large Wood, Long Legacy. However, to summarize these two specific strategies, this case study pointed out the strengths of hybridizing colors, materials, and cultural themes to create something visually intriguing and deeply integral to the narrative.

Precedents
My main precedents for this project are David Buckley Borden, Mark Dion, Maya Lin, and Buster Simpson. From the mixing of these precedence elements of Large Wood and Long Legacy have formed.

Definitions
To the average person 'large wood' has many synonyms, however, it is important to define those 'synonyms' in the context of forests and explore their origins and values. These synonyms used to describe wood imply a monetary value or waste. Large wood is defined by ecologists to have a diameter of 10cm for more than 1m in length. Large wood has caught my interest because it is an under-appreciated element of our landscape. It is a vessel of life, nutrients, geomorphological processes, and more.

LW Connections
This vessel, Large Wood, connects us to policies, ecologies, history, geology, culture, and the economy through different spatial scales from the forest to the sea.

Forest
The most bountiful source of large wood in western Oregon has been old-growth forests, where trees live for hundreds, and last often thousands of years once they senesce or die and become large wood. Once a tree meets the forest floor where it will rest for hundreds or even thousands of years, it goes through both physical and chemical changes. Each fallen tree makes contact with the forest floor in its own unique way. This contact creates a gradient of conditions that change the physical and chemical composition, providing different opportunities for organisms. Here, large wood becomes an important corridor for the movement of critters in the old-growth forest. In the event of a large rain event, large wood near waterbodies can move downstream to larger rivers.

River
Large wood in the river ecosystem plays an important role in the geomorphological processes that shape our waterbodies. It gets snagged on the riverbed, on large rocks, on other large wood, and accumulates sediment, changing the shape and flow of the river. This large wood creates riffles and pools, important for the rearing of our beloved anadromous fish. Pools are where the stream deepens and water slows, fish like trout and cohos salmon feed in pools. The depth and tranquility of the water provide habitat that allows different types and ages of fish to inhabit their preferred water layers. The wood protruding from the surface of the water is used by birds like the great blue heron and belted kingfisher to hunt the fish. As large pieces of wood bound down the river, generally during floods, they knock large wood loose, sending it further downstream.

Estuary
In Western Oregon, our rivers eventually lead to the Pacific Ocean. Here, a cyclic dance between the rivers and oceans creates a fluid mixing and exchanging of sediment, nutrients, and debris. The estuary is a flat, muddy environment where large wood provides a welcomed structure. As ocean tides push and pull at the estuary, large wood slowly makes its way to the shores where currents push it up and down the west coast in the form of driftwood that floats again.

Sea
The destiny of large woody debris in the marine ecosystem is awe-inspiring. Large wood is at the will of currents and tides, all of which change with the seasons. While in the clutches of the currents, plants, mollusks, krill, tuna, birds, and insects can inhabit large wood. Entire ecosystems float below the large wood. Even commercial fishers look for adrift wood, for its reputation for hosting commercial fish.

Hawaii
This voyage across the Pacific ocean is a treacherous one. However, Large Woody Debris acts as a refuge and vector for all kinds of life during this journey. Large wood can float for such long distances that wood from the West Coast can be found washed ashore on the beaches of Hawaii.

Deep Sea
Yet, unlucky voyagers may find themselves sinking to the ocean where they either die from the extreme environmental conditions or are consumed by deep ocean mollusks, crabs and fish. Despite losing its travelers, large woody debris continues to support life. The bottom of the ocean is an unforgiving place where nutrients and carbon are hard to come by. Not only do these large pieces of wood provide nourishment to the organisms at the bottom of the ocean, it also provides structural complexity for habitats and entire ecosystems.

River Continuum
Unfortunately, these processes have been all but halted. And as the river continuum represents are just a gradient of conditions that all impact each other. They are all connected.

Historical conditions
The Pacific Northwest looks and functions nothing like it ever has before. Early descriptions depict log jams ¾ mile wide and ¼ mile long, valleys so wet that travelers were confined to the hills, and a Willamette River split into 5 separate channels. This Pacific Northwest was bountiful with large wood. And when this wood was removed from the Willamette River, reports described wood 9ft in diameter and 120 ft long.

Forgotten
In the absence of this large wood, we have also forgotten the importance and profound impacts it has on the landscape and are only now beginning to seriously explore and consider how we can reintroduce wood back into the Pacific Northwest. And yet, most folks would rather not see the wood because of aesthetics and perceived dangers.

Timeline
Large wood has been removed for a multitude of different reasons throughout colonial history. Congress and the logging industry contracted the Army Corps of Engineers and private stream dredging companies to remove obstructions from rivers. As dams were installed, debris was removed to not damage the infrastructure. And for a while, it was believed that wood in streams obstructed salmon movement. Yet, the largest contributor to the systematic removal of large wood over time is the timber industry.

Logging
Logging has deep roots in Oregon's culture. Oregon has historically been the nation's major timber-producing state. Today, Oregon still leads the United States in softwood exports. The logging industry has shaped our coasts, rivers, and forests through intensive forest management, enabling policies, and stream 'improvements'. All this has been supported by a cultural aesthetic to tame, control, and clean up our landscapes.

Logging
These stream improvements, which included dredging, explosives, and splash dams, were done to ease the transportation of timber through the rivers and streams. This devastated aquatic life by disrupting natural water processes, obstructing fish movement, and overloading streams with organic matter. Leading to a state of long-term ecological tragedy, called ecological legacies. These environmental legacies went beyond the river.

Forest
Initially, logging occurred near waterbodies, where trees could be felled, and immediately pulled into the water and floated to a nearby mill. However, very quickly, the forests near the mills and waterbodies were cleared of trees. Logging operations spread through the cascades of the Pacific Northwest as timber cruisers found new stands to harvest. Once new locations were found, logging camps would follow. Teams of men would saw, buck and rig trees, pulling the wood with skidway flumes and tramways to a central location.

River
As timber harvests accumulated, smaller operations would use oxen to transport logs to rivers. Larger operations would use rail or the iconic log flume, all of which used and reused the wood that was also being harvested. Timber would be moved to the closest 'improved' stream where 'river pigs', dancing on the rafts of logs, would drive timber downriver to the mills.

Sea
Mills would cut timber to appropriate sizes, either to mill or send to places such as San Diego via the Benson Raft. The Pacific Northwest provided the wood for cities to develop during the Gold Rush in California.

Synthesis
These movements of timber within Oregon parallel the movement of large wood's 'natural processes'. However, timber extraction was very destructive.

River Continuum Concept
And, as I described before, the removal of large wood at any point of this continuum creates long-lasting consequences, called an environmental legacy. Large wood and logging have interesting parallels, and conflicts which I see as an interesting opportunity to explore large wood using creative inspiration from Oregon's historic timber industry.

Transition
It is at this interesting intersection where I propose Large Wood Long Legacy.

The Landscape Installations
Large Wood, Long Legacy is a series of landscape installations and experiences that explores the role of large wood in different ecosystems in Western Oregon.

The Trip- Regions
This series of landscape installations runs along Highway 126 and transects three major ecoregions of Oregon.

The Trip HJA and MRLT
This trip starts at HJ Andrews, one of the most important sources of ecological research and our understanding of large wood and stops at three restoration projects that incorporate large wood in the restoration efforts.

The trip- Logging
Additionally, each location sits adjacent to or once-hosted logging operations, some still visible or apparent along the trip. The overall trip also has a guide.

GPS Log
The idea of strapping a GPS to a piece of wood is not a new one. Researchers have been doing similar projects for years.

GPS Log prt2
The wood, named GPS Log, has a GPS attached to it, tracking live data of the movements. The GPS has to face the sky, so GPS log was engineered like a boat to consistently float in the same orientation. Additional graphic details were added to help distinguish GPS Log from other pieces of wood.

GPS Log prt3
As the GPS pings every two minutes, the data is displayed live on GPSLOGDRIVE.com for folks to track GPS Log as it makes its way downriver, and learn more about large wood with a digital field guide. My collaborator, Kadence Neuens, engineered the website to track GPS Log and share information about its voyage. Will Bonner will take the data, which includes altitude and coordinates, and make data visualization art, for further interpretation of GPS Log's journey. All of this was done to engage an audience outside of Western Oregon.

The field guide
The LW LL Field Guide, when paired with the landscape installations, invites visitors to interpret and explore the ecological roles large wood plays in different ecosystems. This field guide explores site-specific topics of large wood like nurse logs, root wads, and tree islands, and highlights the natural processes depicted in the installations.

HJ Andrews
The trip starts at HJ Andrews Experimental Forest Long Term Ecological Research Station. Other than some historically logged sites, much of HJ Andrews is old-growth forest, an ecosystem defined by the senescence or deterioration of trees. Here large trees fall and become large wood. The fallen tree becomes a habitat and then a nutrient and moisture-rich medium for new trees and plants to grow. Old-growth forests are dependent on microorganisms and fungi utilizing the large wood.

Installation Concept
25 percent of the wood in an old-growth forest takes the form of downed wood. The fungi that inhabit wood, quickly connects it to the greater mycelium network. The accumulation of moisture and nutrients makes decaying logs an incubator for new forests. Seeds of trees like western hemlock readily germinate on decomposing logs, and connect to the mycelium within the log which makes the seedling more resilient and successful. This wood provides new life to the forest, often in the form of nurse logs. Providing life from death.

Installation
This installation raises the nurse log to eye level. Inviting visitors to explore the new life developing on the large wood. The form raising the nurse log is inspired by a log flume. An iconic piece of logging infrastructure that transported large amounts of timber to lumber mills throughout the Cascades. This flume form represents the movement and transition from one life form to another.

Detail
Carved into the inner sides of the installation are plants one may find growing from the nurse log.

Detail 2
On the outside panels is a river continuum diagram that connects the nurse log to HJ Andrew's Lookout Creek and to the Pacific Ocean. Annotated on this diagram are current or past obstructions and disturbances that impact wood, organisms, and water on the route.

Finn Rock
As visitors go down the Mckenzie Highway, Hwy 126 they will stop at Finn Rock. Finn Rock was once a famous logging camp. Today it is known as a new state-of-the-art large wood restoration project, managed by the McKenzie River Land Trust. Here folks can see engineered log jams and an abundance of large wood in Cone Creek aimed at producing a rearing habitat for anadromous fish.

Installation Concept
An essential element of a log jam is the root wad, whose form and shape act as an anchor, securing large wood to the banks and beds of the river. This obstruction is called a log jam and is not unlike a beaver dam. Log jams have been an integral process of the temperate forest. The various-sized spaces and forms within the sunken wads create habitats for a diversity of aquatic bugs, fish, and microorganisms. Some consider root wads as ecosystem engineers for their ability to make new land for trees to grow on. Their influence on the geomorphology of the river creates a rearing habitat for anadromous fish like salmon and trout.

Installation
At the Finn Rock Site, visitors will see a partially submerged geometric installation inspired by the engineered root wad used in some habitat restorations. This installation invites visitors to watch the creek flow through the rootward, possibly seeing wood and creatures interact with the root wad. Throughout time, as the root wad accumulates wood and sediment it will start to function as its natural counterpart.

Installation Detail
Inside of this of this installation, visitors can see that each beam of a hexagon contains carvings of the stages of the salmon life cycle, highlighting the cyclical nutrient flow between salmon and large wood, forest and sea.

Green Island
Continuing down the Mckenzie HWY, a route used by the Booth Kelly Timber Company for log drives. The next stop, Green Island is a McKenzie River Land Trust restoration site. This site sits just north of the Willamette and McKenzie River Confluence. Here, visitors can see the anastomosing Willamette River.

Installation concept
Within the braided channels of this river are islands and gravel bars. Some of these landscape features are temporary and erode away with time, yet others resist. These resilient landforms are fortified with buried log jams, called hard points.

Installation
Much like coastal erosion barriers, the log jacks have been piled up on the bank of the river. Not only are these jumble of jacks suggestive of coastal erosion barriers, but the highlighted colors are also reminiscent of the jack straw pattern, a pattern created by fallen trees in the forest.

Installation
This installation contains multiple ‘jacks’. Each jack has a colored member representing a different decay class of wood. Carved into another member on the jack is a name of wood found in Willamette River hard points. These details were added to explore how although large wood may appears the same, it is extremely diverse and dynamic.

Waite Ranch
After Green Island, the trip heads down the Siuslaw River to Waite Ranch. Waite Ranch is a future restoration site of the McKenzie River Land Trust. Waite Ranch is an estuary ecosystem right next to an old logging mill. At this estuary or tidal marsh, visitors will see the importance that the structure that large wood provides in a dynamic and complicated ecosystem which is heavily influenced by the salinity of the water.

Installation Concept
At these estuaries or tidal marshes, fresh and saltwater are in a constant state of mixing. This mixing of the fresh and salt water ecosystems, provides an opportunity to celebrate the biodiversity that large wood supports in both ecosystems.

Installation
This installation highlights the organisms that rely on Large Wood in both fresh and saltwater ecosystems. This form is inspired by vernacular fish drying racks. Hanging on a fish drying rack is the Arboreal Angler Collection.

Angler 1
The Arboreal Angler Collection is a series of collaborative pieces that explore PNW ecosystems and the material culture of logging and anglers.

Angler 2
The Arboreal Angler Collection uses materials, color and form to connect to the PNW anglers that could be strong allies of river restoration projects.

Angler 3
Every Arboreal Angler is outfitted with old logging gear. This logging gear draws connections to the log drives and land management that has left the environmental legacies.

North Jetty Beach
The final point, at North Jetty Beach, visitors will see driftwood scattered along the beach.

Installation Concept
This driftwood provides cover for the more fragile critters of the coast like the gribble, sand plankton, etc. Despite appearing anchored, driftwood is constantly cycling between the shore and the sea, prevailing winds and currents are orthogonal with the coast. Driftwood that succeeds in becoming embedded in the beach stabilizes the foredunes that stabilize the beach and protect adjacent ecosystems.

Installation
The installation on North Jetty Beach represents the important structure that driftwood provides to the dunes and organisms of the coast. The timber framing of this installation is wrapped with fabric to provide shelter and create an interesting visual experience, inviting visitors closer.

Install details
Its form is inspired by the ship cradles used to build Benson Log Rafts. The massive rafts of timber would be tugged down the coast to the South to gold rush cities. As visitors approach the installation, they will notice that every fabric panel contains an illustration of an organism.

Install detail continued
Each color of fabric represents a different location of the marine ecosystem. The yellow fabric represents the beach, the lighter blue fabric and the dark blue explore the creatures in the deep sea. Each creature relies on large wood.

Overall Trip
Overall, these series explore the role of large wood in different ecosystems. Each installation highlights the expansive ecological value of large wood.

Intentions
Large Wood, Long Legacy intrigues people, creates a platform for discourse, educates visitors and supports them in extrapolating their experience outside of the trip, eventually leading to advocacy for large wood in the PNW landscape.

Broader design context
Large Wood, Long Legacy merges ecology and culture in a provocative interpretation. The representation of this strategical interpretive fusion seems to be a distinctive form of environmental interpretation, science communication, and historical interpretation. This strategy anchors Large Wood, Long Legacy to the people and place.

Aesthetic Strategy
This Aesthetic Strategy, whatever it may be called, connects Oregon's historical logging with angler culture, a sprinkle of restoration, and extensive ecological research at HJ Andrews Experimental Forest. The elements of this strategy use visually interesting hybridization of these topics to intrigue visitors' curiosity and their desire to understand.

Large Wood Connections
They also highlight how large wood connects us to Oregon's cultural history, economy, policies, environment, and the rest of the world in provocative ways.

What is next?
During this project and beyond, I have developed relationships with the McKenzie River Land Trust, HJ Andrews Experimental Forest, and of course, the Fuller Land Lab. Throughout the Summer I will be developing some select installations along with some environmental interpretation/ education materials to be installed with McKenzie River Land Trust, HJ Andrews, and the Land Lab.

SOURCES

Abbe, T. B., & Montgomery, D. R. (1996). Large woody debris jams, channel hydraulics and habitat formation in large rivers. Regulated Rivers: Research & Management, 12(2-3), 201–221. https://doi.org/10.1002/(sici)1099-1646(199603)12:2/3<201::aid-rrr390>3.0.co;2-a

Anderson, N. H.; Steedman, R. J.; Dudley, Tom. 1984. Patterns of exploitation by stream invertebrates of wood debris (xylophagy). Verhandlungen International Verein Limnologie. 22: 1847-1852.

Bienhold C, Pop Ristova P, Wenzhöfer F, Dittmar T, Boetius A (2013) How Deep-Sea Wood Falls Sustain Chemosynthetic Life. PLOS ONE 8(1): e53590. https://doi.org/10.1371/journal.pone.0053590

Bryant, R. C. (1913) Logging; the principles and general methods of operation in the United States. [New York, J. Wiley & sons, inc.; etc., et] [Pdf] Retrieved from the Library of Congress, https://www.loc.gov/item/13021871/.

Bull, Evelyn. (2002). The value of coarse woody debris to vertebrates in the Pacific Northwest.

Carpenter, Steven E.; Harmon, Mark E.; Ingham, Elaine R.; Kelsey, Rick G.; Lattin, John D.; Schowalter, Timothy D. 1988. Early patterns of heterotroph activity in conifer logs. In: Watling, R.; Lyon, A.; Boddy, L., eds. Fungi and ecological disturbance: Proceedings of the Royal Society of Edinburgh mycological symposium; University of Sheffield, Edinburgh.

Edinburgh, Scotland: Royal Society of Edinburgh: 94B: 33-43.

Collins, B. D., Montgomery, D. R., Fetherston, K. L., & Abbe, T. B. (2012). The floodplain large-wood cycle hypothesis: A mechanism for the physical and biotic structuring of temperate forested alluvial valleys in the North Pacific coastal ecoregion. Geomorphology, 139-140, 460–470. https://doi.org/10.1016/j.geomorph.2011.11.011

Franklin, J. F., Cromack, K. J., Denison, W., McKee, A., Maser, C., Sedell, J., Swanson, F., & Juday, G. (1981). Ecological characteristics of old-growth Douglas-fir forests. https://doi.org/10.2737/pnw-gtr-118

Gurnell, A.M., Piégay, H., Swanson, F.J., & Gregory, S.V. (2002). Large wood and fluvial processes. Freshwater Biology, 47, 601-619.

Harmon, M.E., Sexton, J. Water balance of conifer logs in early stages of decomposition. Plant Soil 172, 141–152 (1995). https://doi.org/10.1007/BF00020868

Hood, Greg. (2007). Large woody debris influences vegetation zonation in an oligohaline tidal marsh. Estuaries and Coasts. 30. 441-450. 10.1007/BF02819390.

Hood, Greg. (2007). Large woody debris influences vegetation zonation in an oligohaline tidal marsh. Estuaries and Coasts. 30. 441-450. 10.1007/BF02819390.

Hyatt, T. L., & Naiman, R. J. (2001). The Residence Time of Large Woody Debris in the Queets River, Washington, USA. Ecological Applications, 11(1), 191–202. https://doi.org/10.2307/3061066

Johnson, D. H. O'Neil, T. A. (2001). Decaying Wood in the Pacific Northwest Forests: Concepts and Tools for Habitat Management. In Wildlife-habitat relationships in Oregon and Washington (pp. 580–623). essay, Oregon State University Press.

LeMonds, James. Deadfall: Generations of Logging in the Pacific Northwest. Mountain Press Pub. Co, 2001.

Lind, Carol J. Big Timber, Big Men: A History of Loggers in a New Land. Hancock House, 1978.

Marcot, B. G. (2017). Ecosystem processes related to wood decay. https://doi.org/10.2737/pnw-rn-576

Marcot, Bruce G. 2017. A review of the role of fungi in wood decay of forest ecosystems. Res. Note. PNW-RN-575. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 31 p.

Maser, C., Tarrant, R. F., Trappe, J. M., & Franklin, J. F. (1988). From the forest to the Sea: A story of fallen trees. https://doi.org/10.2737/pnw-gtr-229

Miller, R. R. (2010, September 23). Is the past present? historical splash-dam mapping and stream disturbance detection in the Oregon coastal province. ScholarsArchive@OSU. Retrieved October 17, 2022, from https://ir.library.oregonstate.edu/concern/graduate_thesis_or_dissertations/4m90f001t

Montgomery, D. R., Buffington, J. M., Smith, R. D., Schmidt, K. M., & Pess, G. (1995). Pool spacing in forest channels. Water Resources Research, 31(4), 1097–1105. https://doi.org/10.1029/94wr03285

Moore, J. (2019). Timber industry ghosts. Arcadia Publishing.

Parks, C. G., Bull, E. L., & Torgersen, T. R. (1997). Field guide for the identification of Snags and logs in the interior Columbia River basin. https://doi.org/10.2737/pnw-gtr-390

Phelps, J. (2011). The geomorphic legacy of splash dams in the Southern Oregon Coast Range.

"Piégay H, Gregory KJ, Bondarev V, Chin A, Dahlstrom N, Elosegi A, Gregory SV, Joshi V, Mutz M, Rinaldi M, Wyzga B, Zawiejska J. 2005. Public perception as a barrier to introducing wood in rivers for restoration purposes. Environmental Management 36: 665–674.

Powers, P. D., Helstab, M., & Niezgoda, S. L. (2018). A process‐based approach to restoring depositional river valleys to stage 0, an Anastomosing Channel Network. River Research and Applications, 35(1), 3–13. https://doi.org/10.1002/rra.3378

Rector, W. G. (1949). From Woods to Sawmill: Transportation Problems in Logging. Agricultural History, 23(4), 239–244. http://www.jstor.org/stable/3740583

Rogers, H. S., Halpern, M., Hannah, D., & Ridder-Vignone, K. de. (2021). Routledge Handbook of Art, Science, and technology studies. Routledge.

Sedell, J. R.; Leone, F. N.; Duval, W. S. 1991. Water transportation and storage of logs. In: Influences of forest and rangeland management on salmonid fishes and their habitats; Special Publication 19. [Place of publication unknown]: American Fisheries Society: 325-368

Sedell, James R.; Luchessa, Karen J. 1982 . Using the historical record as an aid to salmonid habitat enhancement. In : Armantrout, Neil B., ed. Proceedings of the symposium on acquisition and utilization of aquatic habitat inventory information; Portland, OR. Bethesda, MD: American Fisheries Society, Western Division: 210-223.

Stier, Roy E. Down the Hill: A True Story of Early Logging in the Pacific Nortwest. BookPartners, 1995.

Swanson, Frederick J., et al. "Reflections on the History of Research on Large Wood in Rivers." Earth Surface Processes and Landforms, vol. 46, no. 1, 2020, pp. 55–66., https://doi.org/10.1002/esp.4814.

Trevarrow, E., Arismendi, I. The role of large wood in streams as ecological corridors for wildlife biodiversity. Biodivers Conserv 31, 2163–2178 (2022). https://doi.org/10.1007/s10531-022-02437-2

Tufte, E. R. (1991). Envisioning information. Graphics Press.