The Learning Forest

Sharing scientific knowledge on sustainable land management in the Olympic Experimental State Forest and beyond

Issue 10 • Fall 2021

Editorial Board Message

This issue of The Learning Forest highlights the power of local communities to improve the management of natural resources, and the need to address community wellbeing when decisions about natural resources are made.

The featured article describes new forest management tools that will be tested in the **Type 3 Watershed Experiment**. The initial idea for stakeholder participation in this study has developed into a true learning-based collaboration. To date, local communities have provided ideas for some of the experimental tools, participated in informational workshops, attended a recent stakeholder engagement field tour, and joined the study's learning sub-groups.

The guest article describes an Olympic Peninsula-based group's proposal to The Nature Conservancy (TNC) for a "**natural climate solution**," which TNC defines as "conservation, restoration, and improved land management actions that increase carbon storage or avoid greenhouse gas emissions." This group is exploring whether expanding alder silviculture in Pacific Northwest coastal areas could help meet near-term climate mitigation targets while also providing ecological and economic benefits. One of the key research questions is how this solution may benefit rural communities.

In both projects, local communities do not simply advocate for change; they also advocate for learning. Whether testing new forest management tools or exploring the potential benefits of alder, there is enormous potential for researches and local communities learning together to generate creative solutions, leverage monitoring efforts, and build acceptance for management and policy changes.

In this Issue

Courtney Bobsin, UW

Researchers and stakeholders participating in a stakeholder engagement field tour for the Type 3 Watershed Experiment

Featured Article

Expanding the Tool Box

The Type 3 Watershed Experiment

by Cathy Chauvin and Teodora Minkova, DNR; and Bernard Bormann, ONRC

The time is right for a major expansion of the forest management toolbox. That is the primary message of a group of researchers with the University of Washington Olympic Natural Resource Center (ONRC), Washington Department of Natural Resources (DNR), and cooperating agencies and stakeholders on the Type 3 Watershed Experiment in the Olympic Experimental State Forest (OESF).

> In forestry, as in life, progress means trying something new.

This study is based on the idea that a forest ecosystem includes more than just trees, wildlife, and the cycling of nutrients. It also includes the people who use and depend on the forest: the loggers, the hunters, the family cycling down a forest road on a sunny day in July. For that reason, improving ecosystem wellbeing requires innovative tools that can meet the needs of both the forest and the local community.

To achieve this vision, DNR must not only meet its own management objectives for the OESF, which are to generate revenue for trust beneficiaries and provide habitat and other ecological values, but also understand the local community's needs.

Researchers spent the past year developing this understanding through public and Tribal outreach. From these efforts, they learned that people would like the forest managed more effectively for elk, insects, birds, fish, and the herbaceous plants and shrubs that grow in the early stage of forest development, when the forest floor is bathed in light. Tribes are interested in how DNR could manage usual and accustomed and ceded lands to better serve their cultural needs.

To meet these needs, researchers create seven new forest management tools, three based on their experience and knowledge, and four based on ideas provided by Tribes and stakeholders (Text Box 1). "Incorporating people's ideas into management tools is what makes this study unique," explains Bernard Bormann, ONRC Director and one of the principal investigators on this project. These tools also draw on scientific findings that have emerged since major planning efforts were completed, such as the 1994 federal *Northwest Forest Plan*, which covers federal lands in western California, Oregon, and Washington; and DNR's 1997 **State Trust Lands Habitat Conservation Plan**, which covers state trust lands in western Washington.

All seven tools will be tested against standard practices and a no-management control in this study. If successful in meeting DNR's objectives and community needs, they could represent the first major expansion of the forest management tool box in more than 20 years.

Exploring the Tool Box

All of the new tools in this study are designed to push the boundaries of current practices and knowledge.

Two tools involve planting and harvesting multiple rotations of alder. The "red alder beneath widely-spaced conifer" tool involves planting alder beneath heavily thinned conifers in the riparian buffer. When mature, the alder will be harvested, but the conifers will be retained to increase the complexity of the riparian forest.

The "alder and cedar polyculture tool" involves planting and harvesting two rotations of red alder to one rotation of western red cedar in upland areas. These species will be planted in 5- to 10-acre patches scat-

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Text Box 1. The Type 3 Watershed Experiment Tool Box

This flowchart illustrates the experimental treatments and the standard and control treatments that will be tested in this study. A brief description of the treatments is provided below the chart. The riparian study plan describes the riparian tools in detail. The upland study plan is in progress, but drafts describing each tool can be found on the project website along with a wealth of background information. Visit this link to read the 2016 OESF Forest Land Plan.

Alternative 1 Based on researcher experience		Alternative 2 Based on stakeholder feedback		Standard Management Based on the 2016 OESF Forest Land Plan		Control No management	
Riparian	**Upland**	**Riparian**	**Upland**	**Riparian**	**Upland**	**Riparian**	**Upland**
Active habitat restoration	Complex early seral Accelerated variable density thinning	Alder rotations under heavily thinned conifers Variable width buffers	Cedar-alder polyculture Ethnoforestry with variable density planting	Fixed, no-entry riparian buffers*	Variable retention harvest Variable density thinning	No entry	No entry

Standard management tools (in use now)

- **Variable retention harvest**: In this stand-replacement harvest, retain at least eight standing, large, and small trees per acre that represent the pre-harvest stand as a whole. Retain down wood and snags if possible.
- **Variable density thinning**: Thin some areas, leave some areas unthinned, and cut small gaps in the forest canopy to encourage growth of a second canopy layer.
- **Fixed, no-entry riparian buffers**: Retain a strip of forest along streams called a riparian buffer when harvesting the upland forest. The buffer is a standard width based on the size of the stream and the presence or absence of fish, and is not thinned or otherwise managed.

Variable retention harvest

New tools

- **Active habitat restoration**: Actively restore stream habitat conditions by thinning the streamside forest, cutting gaps in the canopy, and felling trees into the water to create log jams.
- **Complex early seral**: Retain more than eight trees, logs, snags, and slash at time of stand replacement harvest and delay planting to emulate natural disturbance and create early seral habitat.
- **Accelerated variable density thinning**: Leave some areas unthinned. Thin some areas more heavily and install larger gaps (about 2.5 acres each) than the standard variable density thinning.

Variable density thinning

- **Alder rotations under heavily thinned conifers**: Plant repeated rotations of alders between widely spaced conifers.
- **Variable width buffers**: Make riparian buffers wider or narrower based on the stream's bankfull width, fish presence, percent of the watershed harvested in the last 10 years, and stream temperature.
- **Cedar-alder polyculture**: Plant two rotations of red alder to one rotation of western red cedar in 5- to 10-acre patches scattered across the harvest unit. Some patches will be pure alder, some pure cedar, and others will be a mix of both.
- **Ethnoforestry with variable density planting**: Plant Douglas-fir in clumps of 4 to 36 trees each to create variable growing space and gaps in which plants that are important to people and wildlife will be favored.

*The OESF Forest Land Plan allows a limited amount of management in buffers. Buffer management was simplified for this tool for comparison purposes in this study.

tered across the harvest unit in upland areas. Some patches will be pure alder, some pure cedar, and others will be a mix of both.

Alder has many advantages. It enriches mineral soil as it grows. In the riparian (streamside) forest, the leaves that alder contribute to the stream are easily digestible by the insects that are critical to the aquatic food web. In addition, both alder and cedar are culturally and economically important. For example, their wood is used for furniture, siding, cabinets, and other labor-intensive items that support jobs in the forest products industry.

These tools "are not entirely new ideas," says Bormann. They have been studied in small research plots, but not at the operational scale of timber sale units.

Another example is the "complex early seral" tool. The early seral stage of forest development begins when a strong wind, wildfire, timber harvest, or other stand-replacing disturbance creates an opening in the forest. Over time, the opening fills in with herbaceous plants, shrubs, and trees that grow amid the remnants of the previous stand. This complex habitat supports a wide range of wildlife and can persist for 30 years or longer, until the young trees grow large enough to cast the forest floor back into deep shade.

This stage is vanishingly rare on the western landscape. One reason is that private and public forest managers rush their stands through this stage, first replanting the forest and then removing plants that compete with the young trees. They do this for economic reasons but also because state statute requires reforestation within three years of a timber harvest.

Another reason is that the *Northwest Forest Plan* was focused on providing late seral habitat and did not specifically address the early seral stage. Some researchers at the time were concerned about this decision because young forest plantations would not provide the same ecological processes as early seral habitat. The early seral stage could be addressed in future plan updates, however; a **24-year synthesis of science since the plan was adopted** emphasized the importance of this seral stage to biodiversity.

With the complex early seral tool, researchers will create small (less than 40-acre) patches of early seral habitat in harvest units by retaining trees, logs, snags, and slash at time of harvest; delaying replanting; and planting less developed seedlings. Although a few research studies like the **Long-term Ecosystem Productivity Study** have tried creating early seral habitat in small areas, no one has created it at this scale.

Tools are designed to meet management objectives in ways that benefit the community

Another tool that will create early seral habitat is the "ethnoforestry and variable density planning" tool. After a timber harvest, conifer trees will be planted in clumps of 4 to 36 trees. Trees growing within the clumps are expected to develop crowns of different shapes and sizes, contributing to the structural diversity of the forest. In the gaps, researchers will favor plants that are important to both people and wildlife, especially deer and elk. This tool may benefit local communities who have expressed an interest in hunting and a concern for the health of the ungulate population. Variable density planting has been discussed among some researchers, but has not been tried in the Pacific Northwest.

A key question is whether "we can grow a crop of trees with the same number of trees and the same timber volume but distributed in a way that also meets other objectives," says DNR Coast District Manager Bill Wells. A tool that allows DNR to meet social needs with the same timber volume would be a win-win.

Making it Real

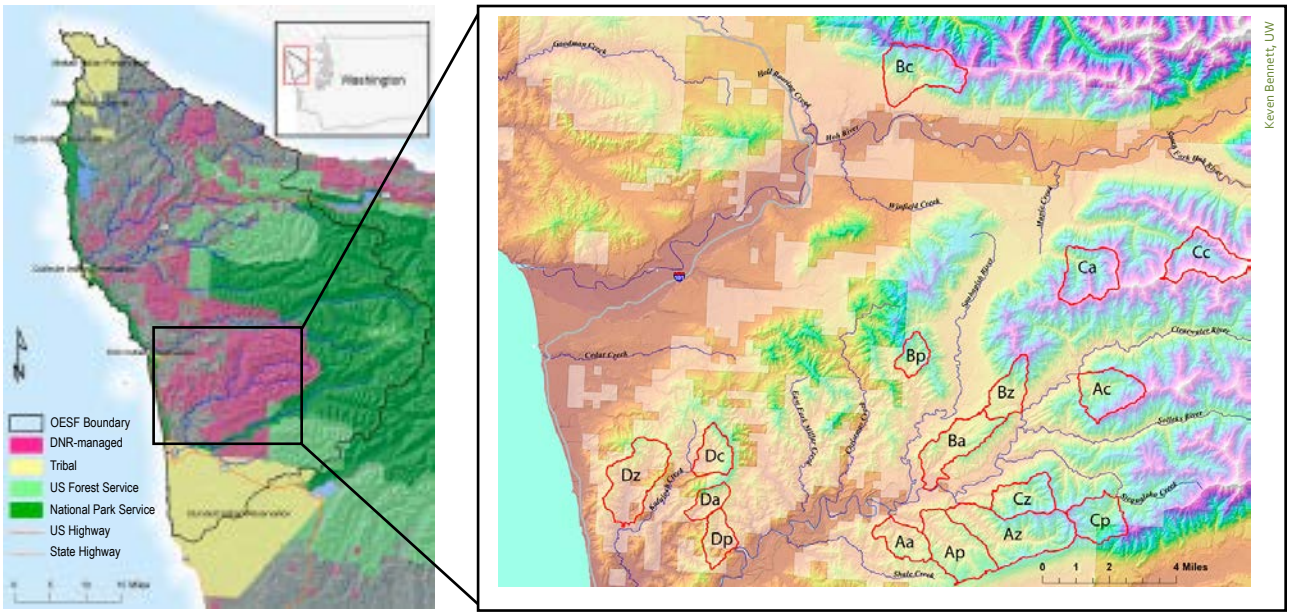
On this study, there is no separation between science and operations

"This is a management experiment," says OESF research program manager Teodora Minkova. "We are conducting actionable science that can be used by managers. We want to give DNR land managers new ways to manage the forest."

Although some specific ideas may be tested at smaller scales, all the tools in this study will be implemented within upcoming timber sales, with an average unit size of 30 acres (Figure 2). Testing at this scale is critical to understanding not only the environmental effects, but the economics and logistics of these tools.

"Our challenge was building a bridge between what the researchers plan and what we can implement on the ground," explains DNR Olympic Region planning forester Kevin Alexander. "We had to understand what was needed and then find ways to implement the tools at a reasonable price."

Figure 2. Study Map
This study will be implemented in 16 watersheds in the OESF that were chosen to represent average conditions across the OESF. In total, this experiment spans 20,000 acres.



Each tool also must prove itself against current practice, represented by the 2016 **OESF Forest Land Plan**, and a no-management control (Text Box 1). The main question will be whether the new tools improve ecosystem wellbeing. To answer this question, researchers will monitor everything from fish and songbirds to understory plant composition. Stakeholders are invited and encouraged to participate in the entire learning process.

A separate group of specialists, trust beneficiaries, and timber purchasers will examine the cost of implementing these tools and their effect on revenue provided to trust beneficiaries. Ultimately, economic and ecological data will be combined in a cost and benefit analysis to quantify the merits of each treatment. "We are asking how much we gain ecologically and at what cost," explains Minkova. "The results will help DNR managers decide if we can afford to do it."

Researchers know that no tool can meet all objectives equally. Ultimately, success for this study may be a new set of forest management tools that, implemented in combination across the landscape, will move forest managers farther ahead on meeting multiple objectives than they have ever travelled before. For example, these tools could diversify the species and structure of the working forest, which could increase their resilience to disturbances like fire that could worsen with climate change.

Is that worth trying something new? The likely answer is yes.

About the Authors

Bernard Bormann, Ph.D, is a professor at the School of Environmental and Forest Sciences, College of Environment, University of Washington, and Director of the Olympic Natural Resources Center. His research includes forest ecology, the role of soils in long-term productivity, and adaptive management. He can be reached at **bormann@uw.edu**.

Teodora Minkova, Ph.D, is a natural resource scientist with the Washington State Department of Natural Resources and an affiliate assistant professor at the University of Washington's School of Environmental and Forest Sciences. She manages the Olympic Experimental State Forest research and monitoring program. She can be reached at **teodora.minkova@dnr.wa.gov**.

Guest Article

Red Alder: A Natural Climate Solution for the Northwest?

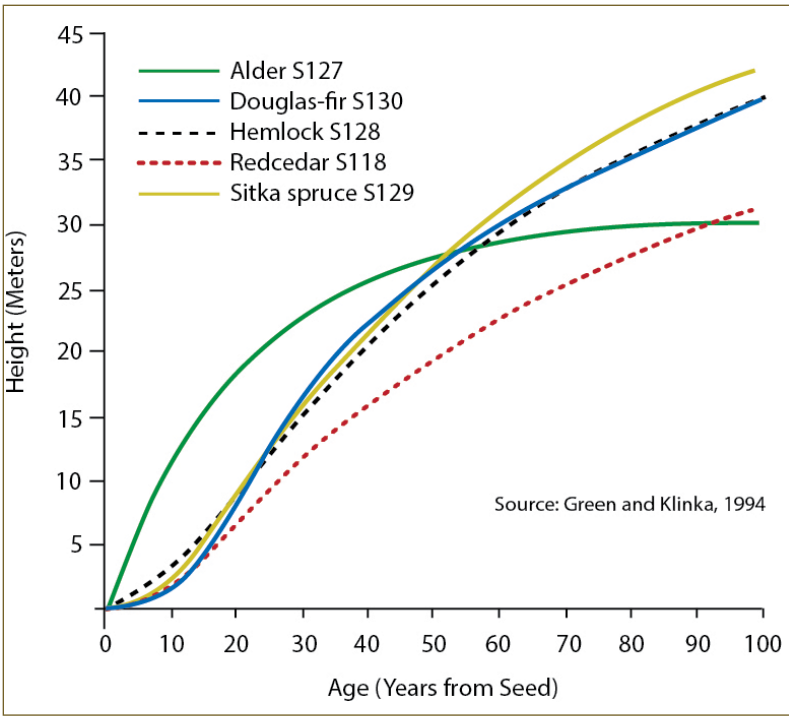
by Dick Binns; Garret Dalan, The Nature Conservancy; Indroneil Ganguly, University of Washington; and Mike Maki, the Schultes Center

In February, 2019, The Nature Conservancy (TNC) hosted a meeting with an Olympic Peninsula-based group to discuss sustainable initiatives aimed at rural economic prosperity on Washington's coast. In addition to TNC, organizations represented in this group included the North Olympic Development Council, the University of Washington's Olympic Natural Resources Center, and a Grays Harbor biochar consultant. Later, the group was expanded to include industry representatives from trade groups and local mills.

Drawing on a wide range of backgrounds, this group is developing a proposal to TNC to analyze whether expanded red alder silviculture is a viable natural climate solution for coastal areas in California, Oregon, Washington, Alaska, and British Columbia. Natural climate solutions are nature-based activities that either avoid carbon emissions, or promote carbon sequestration via improved management and restoration of lands and water. Supporting projects at the intersection of community wellbeing and natural climate solutions is a current focus for TNC.

Huh, red alder? This may be an initial reaction to the group's focus on what some might think of as the Northwest's largest weed. And yet with more research, practice, and public outreach, increased silviculture of red alder on private, state, and federal lands in coastal forests may be a unique win-win.

On a board-foot basis, red alder's economic value exceeds that of most conifers, aside from cedar. Research has shown that in its first 20 years, red alder accumulates biomass twice as fast as conifers, while its height can increase two and a half times faster than conifers (Figure 1). By contrast, most conifers, including Douglas fir and hemlock, have slow growth rates the first 15 years, followed by rapid growth rates starting around their 20th year. Red alder's rapid early growth means final harvest can occur as early as approximately



Courtney Bobsin, ONRC

Red alder

Figure 1. Height growth from seed to age 100, red alder and conifers. Based on median values for conifers on Site Class 2. Reproduced from Red Alder: a State of Knowledge

30 years after planting, a shorter harvest rotation than some conifers. An easy-to-work hardwood, red alder can mimic more expensive woods, making it an excellent choice for building furniture.

Rapid growth makes red alder an efficient carbon sequestration engine at an early age (Figure 2). Based on studies published by the U.S. Forest Service (listed at the end of this article), young alder stands in some sites can remove nearly twice as much CO_2 from the atmosphere than conifers during their first 30 years, if planted today. Although conifers eventually surpass red alder's total, accumulated biomass and substantially outperform it in carbon sequestration over the long term, red alder may be a viable tool for meeting short-term targets in the next, crucial 30 years of climate mitigation efforts. Plus the durable goods made from alder, such as furniture, will continue to hold (store) carbon for many years.

Ecologically, alder increases soil productivity by fixing nitrogen in the soil and adding soil organic matter. It is the only commercial, nitrogen-fixing tree in the Northwest that benefits itself and the surrounding plant life. The leaf detritus fertilizes the forest floor, provides cover for insects and amphibians, and supports aquatic food chains.

Questions that could be addressed through this TNC proposal include the following:

- Can planting and growing pure red alder stands rather than conifers help in meeting 2050 climate change mitigation targets?
- What is the best available growth and yield evidence, and how is growth and yield geographically distributed? Alder grows well from coastal, northern California to southeast Alaska, and up to 3,000 feet in elevation. Yet it may grow poorly relative to conifers on some sites. Intensely burned forests seem ideal for alder silviculture, given these forests' massive nitrogen and soil organic matter losses.
- Can mixed alder-conifer plantations capture the benefits of both rapid, early alder growth and later conifer growth, especially if later conifer growth is enhanced by improved soil conditions?

Garret Dalan, TNC

Figure 2. Red alder stand. Red alders' early and rapid growth makes them efficient engines for carbon sequestration and a potential solution for meeting short-term climate mitigation goals.

- Is red alder less affected by wildfire than conifers? Alder's potential in altering fire spread is worthy of serious evaluation.
- Could large alders nearing the end of their life spans (commonly found on small woodlots) be harvested and replaced with younger alder plantations to increase sequestration while providing landowners revenue and economic benefits? Young alder plantations tend to sequester carbon faster than older alders. For an effective strategy, landowner engagement may be critical.
- With a life-cycle analysis of entire rotations, wood utilization, and manufacturing, do alder silvicultural systems sequester more carbon than conifers? Alder generates more waste than conifers, but judicious use of bio-industries like the manufacture of biochar (a soil amendment made from wood and other organic material) and production of wood pellets at both harvest and mill sites could improve its environmental profile. Alder biochar also has potential for long-term carbon sequestration and soil enrichment. Moreover, alder boards, produced locally from sustainably harvested forests, could displace particleboards or plastic boards, which have a significantly larger life-cycle carbon footprint.
- Do the ecological benefits of alder to soils, declining bird and insect populations, ungulates, and aquatic food chains tip the balance to alders, if the life-cycle analysis shows that alder's carbon sequestration rates are similar to conifers?

- Will expanded alder silviculture provide more benefits to local communities that are critical to natural climate solutions? Hardwoods are better suited to smaller-scale manufacturing and the barriers for entry into the market (such as the cost of capital equipment) are generally lower. Hardwoods also tend to have larger economic multipliers for a given wood volume than conifers. For example, the products made from hardwoods, such as furniture, tend to have higher economic returns than those made from conifers, such as dimensional lumber.

Climate change and its impacts abound, as demonstrated by the odd weather patterns of the past two summers and the growing number of western Washington wildfires. The sooner a credible response to these threats is mustered, the better the odds of navigating them in reasonable fashion. Developing a deeper understanding of red alder's role as a natural climate solution may improve the response to climate change while growing the economies of rural Washington.

About the Authors

Dick Binns is retired from Intel and the U.S. Navy. Decades ago, he spent summers in the woods around Sequim logging and performing pre-commercial thinning. He volunteers with The Nature Conservancy, grows oysters, and works to restore native plants to the South Sound. He can be reached at **dick.binns@gmail.com.**

Garrett Dalan is the Washington Coast Community Relations Director for The Nature Conservancy. In this role, Dalan is focused on economic development in natural resources on the Washington coast. With a degree in Fisheries Science from the University of Washington, his career also has involved private aquaculture and local environmental health. He can be reached at **garrett.dalan@TNC.org.**

Dr. Indroneil Ganguly is an Associate Professor at the University of Washington's School of Environmental and Forest Sciences, and Associate Director of the Center for International Trade in Forest Products. Dr. Ganguly's research focuses on the wood products trade and environmental evaluation of traditional and innovative wood products. He has developed life-cycle environmental assessment models for a broad range of innovative wood products and wood-based construction systems, and also investigates the environmental impacts of trade and the legality of regulations on sustainable wood and bioenergy trade flows. He can be reached at **indro@uw.edu.**

Mike Maki has been involved in sustainable agriculture and forestry, and rural economic development for nearly 50 years with Agroforestry Consultants, Evergreen State College, Washington State University Extension, and other organizations. His interests include red alder and other nitrogen-fixing species. He can be reached at **mike.maki5648@gmail.com.**

For More Information

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Project Updates

Type 3 Watershed Experiment


Henry Gould, DNR

Intern Elise McLane samples for fish as part of pre-treatment monitoring

The upland silviculture study plan for the Type 3 Watershed Experiment is nearly complete. Over the past several months, researchers from the University of Washington (UW), Washington State Department of Natural Resources (DNR), the U.S. Forest Service Pacific Northwest Research Station, and Oregon State University, assisted by DNR managers and foresters, have identified research questions and developed experimental treatments (silviculture prescriptions), hypotheses, and monitoring approaches. Researchers also identified the 13 timber sales in the 16 experimental watersheds in which the upland and riparian prescriptions will be implemented. DNR foresters are working with the researchers to delineate the timber sales units and write the timber sale contracts in a way that accommodates the research design.

The 2021 fieldwork in the 16 experimental watersheds included pre-treatment monitoring by DNR technicians and interns, UW interns, and research staff. A total of 32 stream reaches were sampled for fish, macroinvertebrates, periphyton, water chemistry, water temperature, flows, and riparian vegetation. Other work completed included 47 tree plots and 94 understory plots.

A major step towards implementing the project's vision for learning-based collaboration was the establishment of several learning sub-groups, each of which include stakeholders and project staff. Each sub-group is focused on a separate topic such as cedar browse, trust beneficiaries, and the Tribal perspective.

Passive Acoustic Monitoring


Teodora Minkova, DNR

Volunteers Stan Rullman and Jeffrey Olmstead completing a habitat survey

Part of the Type 3 Watershed Experiment, **this project** uses sound recorders (autonomous recording units) to document the presence of indicator bird species and evaluates their occupancy in response to habitat change caused by forest management. The project is partially funded by the **Earthwatch Institute**.

After a pause in 2020 due to COVID-19, Earthwatch sent five teams of volunteers to the OESF from across the U.S. between April and August 2021 to help with field work. The teams were hosted, trained, and supervised by project scientists Teodora Minkova, Daniel Donato, and Lauren Kuehne.

During the 2021 field season, volunteers assisted in collecting audio surveys from 213 acoustic monitoring stations. They also conducted habitat surveys at 34 of these stations. Together, the 44 citizen scientists in these five teams contributed close to 1,800 hours of field work.

In addition to helping with the research, volunteers learned about sustainable forestry and the ecology, history, and culture of the Olympic Peninsula. Their experience was recently highlighted in an article in DNR's Blog, "**Ear to the Ground**."

You are Invited to Participate

The Washington Department of Natural Resources (DNR) and the Olympic Natural Resources Center (ONRC) invite researchers and stakeholders to participate in research, monitoring, and other learning activities in the Olympic Experimental State Forest (OESF). Contact Teodora Minkova at teodora.minkova@dnr.wa.gov. Information on past and current projects in the OESF can be found at this **link**.

Education and Outreach

Interns and Capstone Students Working in the OESF

Over the summer of 2021, DNR and the University of Washington's (UW) Olympic Natural Resources Center (ONRC) hosted multiple students working in the Olympic Experimental State Forest (OESF).

Courtney Bobsin, ONRC

Top: Intern Will Browne installing a wildlife camera on the ethnoforestry field trial site

Bottom: Image of elk from the wildlife camera

Six undergraduate students from the UW School of Environmental and Forestry Sciences (SEFS) worked on the ethnoforestry field trials for the Type 3 Watershed Experiment and the Long-term Ecosystem Productivity Study. They collected tree and understory vegetation data, installed wildlife cameras to monitor browsing, and assisted DNR crews in riparian habitat monitoring and electrofishing.

Another UW SEFS student interned with DNR for three months, conducting riparian vegetation, stream habitat, and fish surveys at the 32 stream sample reaches of the Type 3 Watershed Experiment. DNR also hosted an intern from Green River Technical College who worked on timber sale layout and planning.

Two undergraduate students from the UW Program of Environment did a capstone project on the Passive Acoustic Monitoring study. Trained to recognize calls of indicator bird species using spectrograms of the recorded audio surveys, the students processed 10 percent of the audio surveys collected in 2020. Another student was hired to process audio surveys collected during the 2021 breeding season. They will perform this work in the 2022 winter and spring quarters.

The students' feedback indicated a productive and engaging summer with occasional concern about the difficult field terrain. For more information about interning in the OESF, contact **Teodora Minkova**.

Stakeholder Engagement Field Tour for the Type 3 Watershed Experiment

After introducing the Type 3 Watershed Experiment to stakeholders, tribes, and other interested public during the **OESF Science Conference** in April 2021, project staff organized a researcher's summit followed by a field tour of the Type 3 Watershed Experiment on October 9, 2021.

Teodora Minkova, DNR

Type 3 Watershed Experiment field tour

Hosted by DNR and the UW's ONRC, the event brought together 36 people representing DNR, UW, Washington State University, Oregon State University, Gray's Harbor College, Tribes, environmental non-profits, the forest industry, business development, and the local community.

The purpose of the event was to discuss the many tools that will be implemented within the study. Attendees were given an opportunity to share feedback and ask questions to ensure the study addresses ecosystem wellbeing as a whole, people included.

The field tour included stops at five upland and riparian sites. At each stop, principal investigators and managers explained the details of the tool to be implemented, compared it to DNR's standard practices and other tools in the study, and asked for comments and questions. The group had great discussions and left the research team with excellent ideas to consider and possibly incorporate into the study plan.

The Type 3 research team also provided details on ways to get further involved in the study, for example participating in interviews with one of the social science researchers or joining one or more study sub-groups. For more information, contact **Courtney Bobsin**.

New OESF Webpages

DNR has recently redesigned the **OESF web pages**, which are housed within **DNR's website**. The new pages features information about the natural environment, forest management, research and monitoring, current projects, educational opportunities, maps and data, and more. Visit the site to learn more about this unique forest.

New OESF web pages

Announcements

New ONRC Research Scientist

The University of Washington's (UW) Olympic Natural Resources Center (ONRC) has hired Courtney Bobsin as a full-time research scientist to help with the Type 3 Watershed Experiment, the Long-term Ecosystem Productivity (LTEP) study, the ethoforestry field trials, and other ongoing projects. A Ph.D. candidate in the UW School of Environmental and Forest Sciences, Bobsin currently is focusing on achieving ecosystem wellbeing through collaborative and learning-based approaches to forest management. Bobsin received her Master of Science degree in 2017 working on the LTEP study under ONRC Director Bernard Bormann. She can be reached at **cbobsin@uw.edu**.

Olympic Forest Collaborative Public Meeting

Join the Olympic Forest Collaborative for a virtual public meeting on Wednesday, January 12th at 5 pm. The Collaborative, along with Olympic National Forest and Washington State Department of Natural Resources partners, will update the community and stakeholders on ongoing projects and the new monitoring protocol, and showcase the Collaborative's new Olympic Forest video. For access to the Zoom link, email Olivia Awbrey at **olivia.olympicfc@gmail.com**.

Featured Photos

Stan Rullman, Earthwatch

Stan Rullman, Earthwatch

Earthwatch volunteers helped researchers Teodora Minkova (DNR) and Lauren Kuehne (Omfishient Consulting) survey bird habitat in the OESF.