# HSC 2022 Committee Meeting Minutes

# August 19, 2022 Zoom

Attendees: Andrew Bluhm, Glenn Ahrens- OSU; Bernard Bormann- University of Washington; Kylie Harrison- Stewardship Forester, Nanaimo, BC; Randy Bartelt- Port Angeles Hardwood & Washington Hardwoods Commission; Dave Sweitzer, Washington Hardwoods Commission; Florian Deisenhofer - WA DNR; Andrew Spencer, Danica Maloney, Kathryn Charleton- Bureau of Land Management; Ruth Halla- Siuslaw national Forest, Hebo District; Alvin Yanchuk, Chris Halldorson, Marty Kranabetter- BC Ministry of Forests; Ken Jones, Tate Jones- Cascade Hardwoods; Tyrol Forfar- HFI Consultants; Garrett Dylan- The Nature Conservancy

The meeting was held on Zoom. Glenn Ahrens, HSC Program Director started off with introductions. Following that, Andrew Bluhm acknowledged the HSC cooperators and went over the meeting agenda, described the HSC Stand Management study, and provided an overview of the data collection schedule for all three installation types.

Last year (Winter 2021/22) measurements consisted of:

* Three Type 2 installations (Mt. Gauldy, Scappoose, and Darrington) had their 27th year measurement.
* Two Type 2 installations (Ryderwood and Clear Lake Hill) had their 32nd year measurement.
* One Type 3 installation (Menlo) had its 27th year measurement.
* There were no thinning or pruning treatments required.

Next year (Winter 2022/23) measurements consist of:

* One Type 2 installation (Maxfield) will have its 27th year measurement.
* Two Type 2 installations (Pollard Alder and LaPush) will have their 32nd year measurement.
* One Type 2 installation (LaPush) will have its 4th and final pruning lift.
* One Type 3 installation (Cedar Hebo) will have its 27th year measurement.

As fall approaches, Andrew will contact each HSC member to provide specifics on the activities and schedule the fieldwork.

Glenn then gave an overview of the red alder growth and yield model and the yield table effort. Key points were:

* When the original alder plantation version of ORGANON (RAP1) was first produced in 2011, the oldest measured data from alder plantations were 18 years total age.
* The HSC has continued to add recent measurements from 27- and 32-year old installations of the Red Alder Stand Management Study to the database. Working with Doug Mainwaring and the Center for Intensive Planted Forest Silviculture (CIPS), we have updated the growth and mortality equations in the *ORGANON Red Alder Plantation (RAP)* growth and yield model with data from older stands.
* It is important to note that both the tree data and personal observations during re-measurements of many of the red alder installations show increasing mortality over the last 15 years. The uncharacteristic mortality exceeds normal density-dependent self-thinning. This has resulted in some reductions in yield compared to expectations based on early performance. For example, observed volume in selected treatments for two of our oldest installations (age 32-33 years) in NW Washington is quite a bit lower than volume predicted based on site index and earlier performance in these stands. Causes of this decline appear to be related to drought, heat, bark beetles, and stem cankers. This is consistent with what we know about red alder physiology and alder’s vulnerability to insects and disease when trees are stressed by drought and heat.
* As we update the growth and mortality equations with the most recent measurements from older stands, we expect resulting yield estimates to decline somewhat. Once the model is updated with the latest data, the growth model and yield tables will accurately reflect the average performance of alder in response to site quality (site index) across the range of our installations over the last 33 years. Since climate is a major driver of site quality, accounting for effects of climate variability and climate change on red alder and other tree species will be a major consideration in evaluating species selection and silvicultural options going forward.

Discussion then centered around: Attendees shared their observations of:

* Whether we could use the HSC dataset to analyze this mortality in relation to stand factors such as site index, density, etc.
* The probable role that drought associated with climate change with these observed increases in recent mortality. Glenn supported this hypothesis with data showing recent increased vapor pressure deficit using data from Molalla, OR. Increase in bark beetle activity.
* The need to explore the observed reduction of volume (vs. predicted); specifically, whether this reduction is an ongoing, steady decline or if there is a specific event/time-stamp associated with this “fall down”
* Adopting/using a growth and yield model that includes climate data.
* Role of soil in site productivity and trying to identify soil characteristics associated with this “fall down”.
* Alvin Yanchuck, with the BC Ministry of Forests, is currently analyzing growth of young red alder in relation to environmental factors and will share his results when finished.
* Awareness that this “fall down” for red alder should be viewed in context of other species as well. For instance, what is the relative importance of red alder growth reductions when compared to other species?

Glenn then discussed the ongoing project with The nature Conservancy called “Red Alder: A Natural Climate Solution for the Pacific Northwest? Natural climate solutions (NCS) are nature-based activities that either avoid carbon emissions, or promote carbon sequestration via improved management and restoration of lands and water. This study is a joint effort between HSC and the Center for Intensive Planted Forest Silviculture (CIPS) at OSU and the Center for International Trade in Forest Products (CINTRAFOR) at the University of Washington.

Highlights of this project include:

* This project will develop a framework to analyze whether expanded red alder silviculture is a viable NCS for working forests in the coastal areas of Washington, factoring in the biomass in the forests and the wood products mix. Aspects of this framework may include (i) the rate of carbon sequestration in red alder plantations, (ii) standing biomass in red alder stands over time, (iii) the longevity of wood products produced from red alder, and (iv) the production emissions associated with bringing the wood products to the market.
* The study will utilize the HSC red alder growth and yield model along with similar models for Douglas-fir and western hemlock developed by CIPS. The growth models will be used to develop estimates of biomass production and carbon fixation for comparing performance of red alder vs. conifers on specific sites under managed forest conditions. CINTRFOR will address the life cycle analysis to estimate carbon sequestration consequences of harvesting and utilization of alder vs conifer wood products.
* A key benefit of this project for HSC is that it will result in an updated working version of the red alder growth and yield model with help from Doug Mainwaring at CIPS. This version of the model will be produced by applying the growth and mortality equations developed by CIPS in a utility called “Red Alder CIPSANON” (written in R-code). This is a much-needed update that HSC can use to develop yield tables and other products of interest. The timeline for this project is July 2022 – April 2023. (Contact Glenn Ahrens if you would like to see the full proposal for this project.)
* This project/proposal focus on aboveground carbon. However, the group is very much interested in the belowground component as well since it has been shown that belowground pools of carbon are greater than aboveground pools and that red alder can have more than 3 times the belowground carbon stores as to compared to coniferous forests.

Glenn then described the proposed lumber recovery project between the HSC and Cascade Hardwood. The main objective of this study would be to provide valuable information for land managers and for mill owners interested in red alder by obtaining information on the recoverable volumes and grade yields of lumber from managed plantations of red alder.

Topics touched on during the discussion include:

* Assessing lumber recovery from managed plantations of red alder is one of the long-term goals for the HSC’s Red Alder Stand Management Study. Plans were developed in 2021 to begin the study of lumber recovery on some of the oldest installations that are expected to reflect rotation-age yield. Two sites were proposed for initiating this study, both of which are in NW Washington, owned by Swaner Hardwoods. These sites are two of the first HSC Type II installations established. The first, Humphrey Hill (#4201), was established in 1989 and the second, Clear Lake Hill (#4202,) was established in 1990.
* HSC staff and representatives for Cascade Hardwood Group have discussed the methods for this study. Swaner Hardwood expressed willingness to go forward with the study, depending on further details to be determined. However, the forester managing these lands for Swaner Hardwood has expressed concerns about the feasibility and operational limitations for harvesting trees at Humphrey Hill. These were due to issues including low volume/acre, high costs, poor access, and problems with the neighbors. The Clear Lake Hill site has fewer issues and constraints, but it is younger and has less volume, suggesting that it might be advisable to wait longer. Because of these issues, the study has not begun yet.
* Cascade Hardwood Group has expressed continued interest in pursuing the lumber recovery study at their mill and it is still a priority for the HSC. Information on the recoverable volumes and grade yields of lumber from managed plantations of red alder is of great interest to land managers and mill owners.
* Given the delays and the concerns about the initial sites selected, further consideration of study sites and the timeline for implementation is needed. In order to make comparisons among management approaches and treatments, and to make statistically valid conclusions, it will be important to study multiple sites for purposes of replication.
* Additional sites could include more HSC Type 2 installations, but a general consensus was that trying to use operational alder plantation(s) would also be desirable. Pursuit of identifying potential candidate sites will be undertaken by the HSC and its cooperators.

Following up on discussion last year, we need to 1) assemble an interest group to discuss needs for an Alder Tree Improvement program and 2) investigate possible collaboration with the established BC Ministry alder breeding program. The next topic, alder genetics, was presented by Andrew. This general topic was broken down into two components- the red alder clone trial and the red alder clone bank.

Clone Trial (for a full description please see the 2020 HSC Annual Report): The objective of this study was to establish a clone trial on public land (OSU Blodgett tract) to compare the performance of red alder clones with a woods run controls. Andrew presented the results from Year 2. For a full description of the study, please see the 2019 HSC Annual Report and for a full description of the Year 1 results, please see the 2021 HSC Annual Report.

Year 2 results include:

* 2nd year survival was poor- averaging 73% (54%-96%). No difference between woods run and clones.
* 2nd year caliper averaged 20mm (15mm-27mm). No difference between woods run and clones.
* 2nd year height averaged 145cm (137cm-155cm) for the woods run sources and for the clones averaged 165cm (101cm-239cm). Clone height was significantly greater than woods run height.
* These results indicate certain clones perform better than other clones and/or woods run sources. However, these results are only from 2-year seedlings and only from one location so conclusions are tenuous at best.

Clone bank (for a full description please see the 2020 HSC Annual Report):

* In 2019, the HSC, WHC, and Hancock Forest Management launched an effort to establish an alder clone bank, using material from WSU’s tree improvement program.
* The main objectives were to preserve the top genetic material, and possibly as a foundation for a future progeny testing/tree improvement program.
* The ODF Schroeder facility was chosen for the clone bank.
* The clones are still doing well and they are now 10-15 feet tall. They have the potential to provide a source of vegetative material and/or seed for further propagation.
* Annual costs for maintaining the clones at Schroeder are in the range of $3,000.

Discussions about the future of an alder tree improvement centered around:

* Potentially using the clone bank as a seed orchard. This would require keeping the trees small through repeated pruning.
* Beyond the initial goal of preserving some of the improved genetic material, the HSC needs to decide on the longer-term objectives for these clones.
* This will depend on the interests and priorities of current HSC members along with any additional cooperators who have an interest in red alder tree improvement.
* Following up on discussion last year, we need to 1) assemble an interest group to discuss needs for an Alder Tree Improvement program and 2) investigate possible collaboration with the established BC Ministry alder breeding program.

Next, Andrew presented the results from the most recent remeasurement of the Pilchuck red alder/redcedar species mixture trial. The study design and previous results can be found in the HSC 2017 Annual Report. Please see this report for study specifics.

A summary of the most results are as follows:

* The relationships among tree mortality, tree size (DBH, Height, cubic foot volume), and stand yield in planted red alder and western redcedar species mixtures were explored at a modified replacement series at a 32-year-old site growing on abandoned agricultural land near Mt Vernon, Washington.
* This study is the only one in the USA and the oldest of its kind in existence.
* Treatments included four species proportions (100% red alder, 25% red alder/75% redcedar, 50% red alder/50% redcedar, 100% redcedar) planted at 680tpa (8’ x 8’ spacing). An additional treatment of pure red alder was planted at 170tpa (16’ x 16’ spacing) was also included.
* Redcedar was planted in 1990 and the red alder planting was delayed for seven years (1997 and interplanting in 1998).
* By 2021, redcedar had much higher survival than red alder.
* The survival of both species was greater in the mixtures than in the pure species treatments.
* Red alder DBH and height was greatest at the lowest densities of red alder and was independent of the mixed or pure treatments.
* Redcedar DBH and height were reduced when grown in species mixtures compared to pure species treatments (16% and 10%, respectively).
* Pure alder treatments had appx. one third the volume of all other treatments
* The 8ft pure alder PAVOL declined from 2016 to 2021 (age 19 to 24)
* Pure cedar averaged 7255ft3/acre at age 31
* Mixtures were right in that range as well (7714ft3/acre and 6374ft3/acre)
* In the mixed species treatments, relative yield (RY) of the red alder was >1 (indicating growth enhancement) whereas for redcedar RY was <1 (indicating a growth penalty).
* Total relative yield (RYT) for the mixtures was ~1, indicating no growth enhancement or penalty.
* Relative land output (RLO) for the mixed species treatments was <1, indicating a substantial increase in per acre productivity as measured by merchantable volume.
* These positive yield improvements over the pure species treatments were observed mainly as the result of increased survival of both species, increased volume of red alder in the mixed species treatment, and shade tolerance of the redcedar allowing the development of a distinct stratified (two-storied) stand structure.
* These results demonstrate that there is potential for mixedwood management and that forest managers should consider species mixtures as a means to enhance productivity, yield, and other management objectives.

Next, Andrew presented the HSC budget. Please see the handouts included in the meeting folder. Highlights included:

* Dues received in fiscal year 2022 were $47,000 (down from the expected $55,500).
* Actual FY2022 costs were greater than what was projected for FY2022.
* To make up for the difference between income and expenses, the HSC had to tap into the carryover funds.
* The HSC will be carrying appx. $47,910 into FY2023.
* Expected FY2023 dues are $38,500.
* To keep a research assistant employed at 0.35FTE will require the HSC to again tap into the carryover funds.

The last topic was the future direction of the HSC. Glenn structured this into: 1) Issues and Opportunities, and 2) Recommendations.

Issues and Opportunities:

* Field measurements and data management have demanded the majority of HSC’s limited capacity. How much longer to sustain the effort for field measurements?
* Andy Bluhm, Associate Director, is leaving July 2023 – transition plan needed.
* Limited capacity and tradeoffs among tasks including growth and yield model updates, yield tables, lumber recovery studies, and genetic improvement.
* HSC membership and financial support is declining. Need further effort to engage new cooperators, determine new research priorities, and develop increased funding related to hardwood silviculture.
* Less interest in managing alder plantations for timber production?
* Continued interest in the ecology and management of red alder across the range of agencies and landowners.
* HSC’s network of long-term alder study sites has great value for pursuing a wide range of research questions of interest in the future.
* Need to understand response of alder to climate stress and potential shifts in site suitability - decline in alder production at lower latitudes and elevation <> growth increases in higher latitudes and elevations?

Recommendations:

* Continue data collection and data management from the HSC installations through the 2022-23 field season.
* Work with CIPS on another update of *Red Alder CIPSANON*.
* Use *Red Alder CIPSANON* to update and flesh out yield tables for selected management scenarios for red alder plantations.
* Pursue a long-term plan for the products from the Red Alder Stand Management Study and *Red Alder CIPSANON* in cooperation with CIPS.
* Continue to pursue a lumber recovery study from managed red alder plantations – consider more study sites and timeline for implementation.
* Survey hardwood-related issues and needs of HSC members and other interested entities.
* Identify priorities for hardwood-related research to inform decisions about the future of the HSC and pursue increased funding.
* Consider holding a Red Alder Symposium in 2023 or 2024 to update the state of our knowledge and stimulate new collaborations.