Searching for Climate-Smarter Forestry: Accelerating the Transition

Summary Report
Expanded and Updated - December 1, 2022

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and Dean Moberg – Director, Tualatin Soil and Water Conservation District

Cover photograph: Hyla Woods' Mount Richmond Forest in the northern Oregon Coast Range.

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Executive Summary

During the summer of 2022, sixty-six Oregonians with diverse experiences, perspectives, and priorities participated in climate-smarter forestry workshops in a western Oregon forest. Climate-smarter forestry was defined as practices that help forests to mitigate climate change and/or to become more resilient to climate-related stresses. Participants represented the design/build sector, elected and appointed leaders, forest practitioners, and advocates from non-profit organizations. Each group attended a separate workshop, and each workshop was structured the same in order to facilitate comparisons between the different groups. Peter Hayes (Hyla Woods) and Dean Moberg (Director, Tualatin Soil and Water Conservation District) facilitated the workshops.

Participants generally agreed that climate-related stresses were negatively impacting western Oregon forests and that it is important to accelerate adoption of climate-smarter forestry practices. Participants considered fourteen strategies and, on average, rated the following strategies as most likely to advance climate-smarter forestry without causing significant negative side effects:

- Increase accountability for results
- Reduce the conversion of forestland to other land uses
- Increase the ecological complexity of forests
- Increase forests' ability to catch and hold carbon
- Enhance forest soil quality
- Improve forest hydrology
- Keep and care for older forests
- Re-establish forests on land that used to be but no longer is forested
- Store carbon in long-lived wood products
- Implement careful thinning of existing forests

Strategies that received lower average ratings included:

- Implement assisted migration of tree species or genotypes
- Reduce the risk of wildfire
- Improve forest roads
- Address diseases and insect pests

Participants were widely split on whether carbon offset trading should be a component of climate-smarter forestry. Participants identified seven categories of solutions to barriers for climate-smarter forestry: collaboration, direct financial incentives, education and communication, labor and technology, market evolution and development, public policies, and research. In the fall of 2022, a follow-up email survey was sent to 17 forestry consultants, woodland owners, and woodland managers. The survey asked these practitioners to rate the 14 strategies, plus an additional three strategies for decarbonizing forestry operations, according to practicality. The survey also asked practitioners to provide their insights into solutions for overcoming barriers to implementing climate-smarter forestry strategies.

Results from the summer workshops and the fall email survey are included in this document, and the facilitators are also sharing the results via presentations. For more information, contact Peter Hayes: peter_hayes@comcast.net

The Workshops

What?

Oregonians with diverse experiences, perspectives, and priorities participated in a series of climate-smarter forestry workshops. Climate-smarter forestry was defined as practices that help forests to mitigate climate change and to become more resilient to climate-related stresses. Although many of the strategies discussed in the workshops could pertain to forests across Oregon, the focus of this project was western Oregon forests. Each workshop followed the same process and structure in order to allow comparison of results between groups.

Why?

The workshop goals were to work together to accelerate the pace and scale of the transition toward climate-smarter forestry, to find useful common ground where possible, and to honor inevitable differences where necessary.

Who?

A separate four-hour workshop was held for each of four forestry and wood product interests: design/build professionals (architects, contractors, and mill managers), appointed and elected leaders (also referred to as "general"), practitioners (forest managers and owners), and advocates/non-profits. In total, 66 people enthusiastically engaged in the process with commitment and positive spirit. Some who were invited to the workshops were either unable or unwilling to participate, which resulted in incomplete representation of all forest interests. The workshops were facilitated by Peter Hayes - Hyla Woods and Dean Moberg - a director of the Tualatin Soil and Water Conservation District.

When?

The workshops were held in the summer of 2022.

Where?

To ground the explorations in the specific realities of a working forest, the workshops were held in Hyla Woods' Mt. Richmond Forest in the north Coast Range, west of Gaston, Oregon.

Given the large number of topics explored in each workshop in a limited time and with a healthy diversity of perspectives, readers should be aware that what follows is a record of what took place during the workshops and not a consensus-based plan of action. This report should be viewed as a window into the perspectives and priorities offered by participants. Many participants expressed interest in working together to use the workshop results as a foundation for future coordinated action.

Note: The term "climate-smarter" is used, rather than "climate-smart," in hopes of encouraging a continuum mindset as opposed to a potentially divisive binary mindset, and to acknowledge that climate resilience and mitigation is one of multiple dimensions of responsible forest stewardship.

Observed Climate-Related Impacts on the Mt. Richmond Forest

The following climate-related changes have been observed in the Mt. Richmond Forest where the workshops were held. Many participants in each workshop affirmed that they had observed similar changes in other western Oregon forests.

- **Temperatures:** Mt. Richmond Forest records document increased daytime high temperatures, increased nighttime low temperatures, extended hot periods, and occasional abnormally low temperatures. Recent events in our region include high temperatures in 2014 and 2015, the record 116° F heat in 2021, and unusual freezing temperatures in April 2022.

- **Accelerating Tree Die-off:** Some tree die-off is scattered across the Mt. Richmond Forest and has occurred in several tree species, while other die-off is concentrated in areas of widespread mortality. Some die-off is understandable given variable soils and complex hydrology, but other cases are harder to explain. Die-off in young Douglas-fir plantations and varying age classes of western redcedar are of particular concern.

- **Hydrology:** Annual water cycles in the Mt. Richmond Forest are changing. Creeks that historically flowed continuously have begun to dry up in the summer. More intense precipitation events and abnormally high runoff is overwhelming road drainage infrastructure that worked well for years.

- **Wildfire:** While connections to changing conditions are uncertain, scope and scale of wildfire near the forest has increased and remains a serious concern.

Workshop Results

Guiding questions

Participants in each workshop explored and answered the following questions:

1. Who are we? What do we bring and what do we hope to gain?
2. What basic understandings are critical to engaging with climate-smarter forestry issues?
3. In what ways are western Oregon forests being influenced by climate-related changes and stresses?
4. What strategies are most appropriate and important to accelerate the pace and scale of the transition toward climate-smarter forestry?
5. What are the barriers to implementing climate-smarter forestry strategies?
6. What are potential solutions to those barriers?
7. What will we each do to advance climate-smarter forestry in the coming months and years?

Each workshop began with facilitators presenting a simple vision of a desirable future resulting from climate-smarter forestry strategies in Oregon, showing increases over time for three variables: 1) average amount of carbon stored per acre, 2) capacity of forests to be resilient to climate-related stress, and 3) improved vitality, resilience and opportunity in rural, forest-dependent communities. Though there was no process to ask for official endorsement of this vision, participants appeared to embrace it.

Key outcomes and accomplishments

- Almost all participants appeared to be committed to advancing climate-smarter forestry.
- Participants increased their understanding of climate-smarter forestry strategies while learning from the perspectives, priorities, and concerns of others.
- Participants generally agreed that climate-related stresses were negatively impacting western Oregon forests.
- Facilitators presented fourteen climate-smarter forestry strategies, and participants offered no additional strategies when offered that opportunity.
- Figures 1-14 show how participants ranked the relative importance of each strategy. Strategies M1 through M7 are ways climate-smarter forestry can mitigate climate change (e.g., by sequestering carbon) and strategies A1 through A7 are approaches to improving forest adaptation to climate change.
- Some participants stressed that the relative appropriateness and importance of strategies will vary dependent on a specific forest's ecological, cultural, and economic context, much of which is affected by the landowner's goals.
- Participants identified and prioritized barriers to implementing the strategies as well as solutions to those barriers.

Common ground – greatest alignment of opinion:

1. It is important to incentivize Oregon forests that store more carbon per acre, are more resilient to climate-related stresses, and support the vitality of Oregon communities.
2. There are important opportunities and responsibilities to accelerate adoption of climate-smarter forestry practices.
3. Climate-related stresses on Oregon forests will increase.
4. Success in accelerating the pace and scale of climate-smarter forestry adoption depends on motivating and supporting those people whose decisions directly shape forests.
5. Implementation of climate-smarter forestry strategies depends on Oregonians working together to identify and remove barriers. This will require more work as well as a blend of economic, policy, and cultural approaches.
6. Education, understanding, and ongoing research are critically important.
7. Success depends on people becoming better at working together across boundaries to achieve common goals.
8. There is much excellent and important work related to climate-smarter forestry already being done – and more investment, engagement, and effort is required.
9. The urgency of climate change calls for thoughtful but expedient action.
10. Explore new procurement practices that allow purchasers to know where their wood comes from as a means to reward and cultivate climate-smarter forestry practices.
11. Ongoing learning and accountability for results should be a high priority.

Uncommon ground – areas of disagreement

1. **Adaptation vs. Mitigation** - While all participants appeared to agree that investment focused on adaptation (increased climate resilience) and mitigation are both important, some advocated for greater emphasis on adaptation while others advocated for greater emphasis on mitigation. See Figure 15.
2. **Carbon Offset Trading** – While all participants appeared to acknowledge complications and challenges related to carbon offset trading in forestland, some supported and others opposed this strategy. See Figure 16.
3. **Leakage** - While many participants acknowledged that decreases in Oregon's lumber production could contribute to increased production in other regions, participants did not agree on whether this should affect the adoption of climate-smarter forestry in western Oregon forests.

Figures 1-16 provide greater details about where participants agreed or differed regarding climate-smarter forestry strategies.

Strategy ratings

Participants discussed and prioritized fourteen climate-smarter forestry strategies, including those that aim to increase forest resilience or adaptation (Strategies A1-A7) and those that contribute to climate mitigation (Strategies M1-M7). Participants rated each strategy on a 1 to 5 scale, with "1" indicating that a strategy had very significant problems and few if any benefits, and "5" indicating that a strategy had very significant benefits and few if any problems. Benefits were defined as probable outcomes that would be especially effective at addressing adaptation or mitigation and/or would have positive side effects. Problems were defined as probable outcomes that would not be effective at addressing adaptation or mitigation and/or would have significant negative side effects. Examples of side effects to consider were impacts on historically underserved communities, impacts on hydrology, and impacts on wildlife.

The facilitators asked participants to disregard potential barriers in their strategy ratings because barriers would be addressed in a separate exercise. For example, if a participant thought a strategy would be highly effective but expensive, they were instructed to temporarily disregard the expense and thus give that strategy a rating of 4 or 5. Participant ratings of the 14 strategies are illustrated in Figures 1-14, which also include the average ratings for each strategy.

Facilitators briefly mentioned strategies to reduce greenhouse gas emissions from forest operations, for example by substituting electrically operated equipment for operations that typically rely on internal combustion engines. Though participants expressed interest in these strategies, there was insufficient time to discuss or prioritize them during the workshops.

Table 1. Summary of adaptation (A1-A7) and mitigation (M1-M7) climate-smarter forestry strategies.

Code	Name	Description
A1	**Wildfire Risk**	Reduce the incidence, severity, and extent of catastrophic forest fires.
A2	**Thinning**	Carefully reduce the density of trees when needed to improve forest health.
A3	**Forest Complexity**	Manage forests to encourage a diverse mix of tree species, tree age classes, and understory vegetation.
A4	**Pests**	Manage forests to minimize the risks and impacts of diseases, insect pests, and invasive species.
A5	**Water (hydrology)**	Manage forests to increase the infiltration rate of precipitation, increase soil water holding capacity, and decrease the rate of runoff.
A6	**Forest Roads**	Construct and/or modify forest roads and associated bridges, culverts, and water bars in order to reduce erosion during runoff events.
A7	**Assisted Migration**	When indicated by scientific data, carefully explore planting tree species and genotypes adapted to future climate conditions.
M1	**Keep the Forest in Forest**	Reduce the conversion of forest to other land uses.
M2	**Catch and Hold Carbon**	Increase net carbon sequestration in forest vegetation and soils.
M3	**Soil Health**	Improve forest soil biological, physical, and chemical characteristics in order to store carbon, improve forest health, and improve hydrology.
M4	**Older Trees**	Where appropriate, retain and care for areas of older forest
M5	**Long-Lived Wood Products**	Store carbon in wood products with a long useful life.
M6	**Reforestation**	Establish forests on sites where trees are adapted but are not now growing due to deforestation in the past.
M7	**Accountability**	Ensure individuals and organizations working toward climate-smarter forestry goals are accountable for achieving those goals.

High priority strategies (average ratings greater than 4.0)

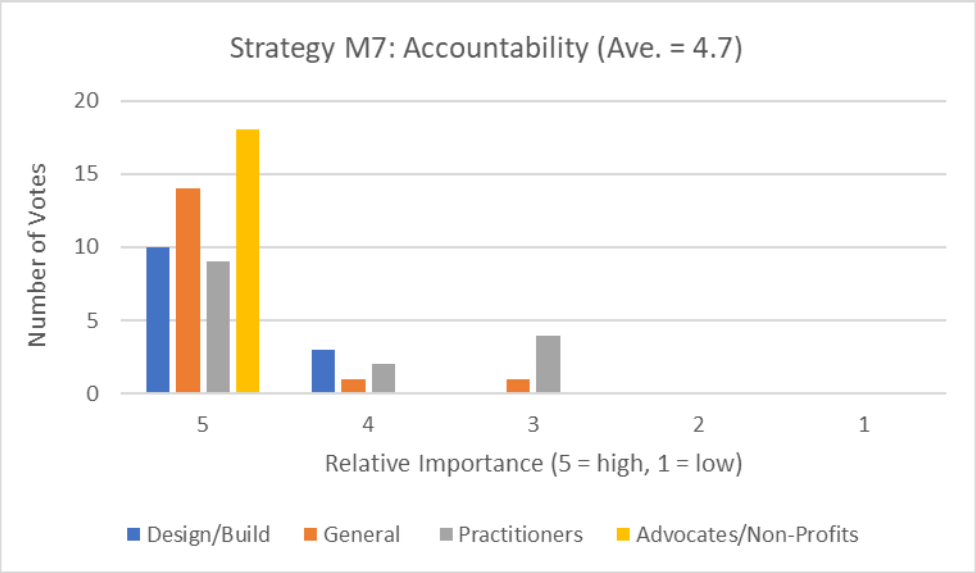


Fig. 1. Accountability – ensure that individuals and organizations working toward climate-smarter forestry goals are accountable for achieving those goals. Most participants rated this strategy as highly important (average = 4.7 out of 5.0). Participants thought most of the solution categories applied to this strategy: collaboration, direct financial incentives for forest owners, education and communication, market evolution and development, public policies, and research (see following section on barriers and solutions).

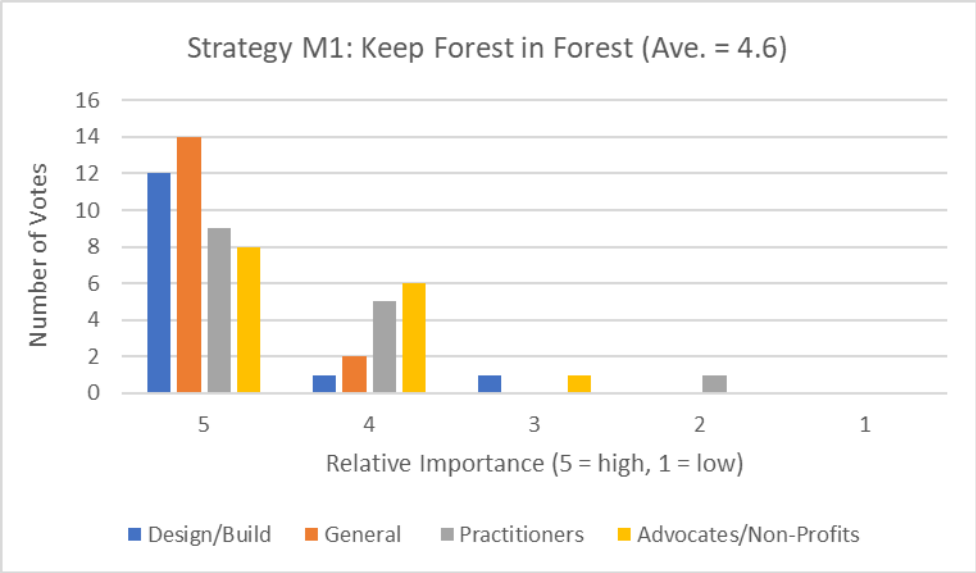


Fig. 2. Keep forest in forest – reduce the conversion of forestland to other land uses. Participants identified public policy as the main solution category that applies to this strategy.

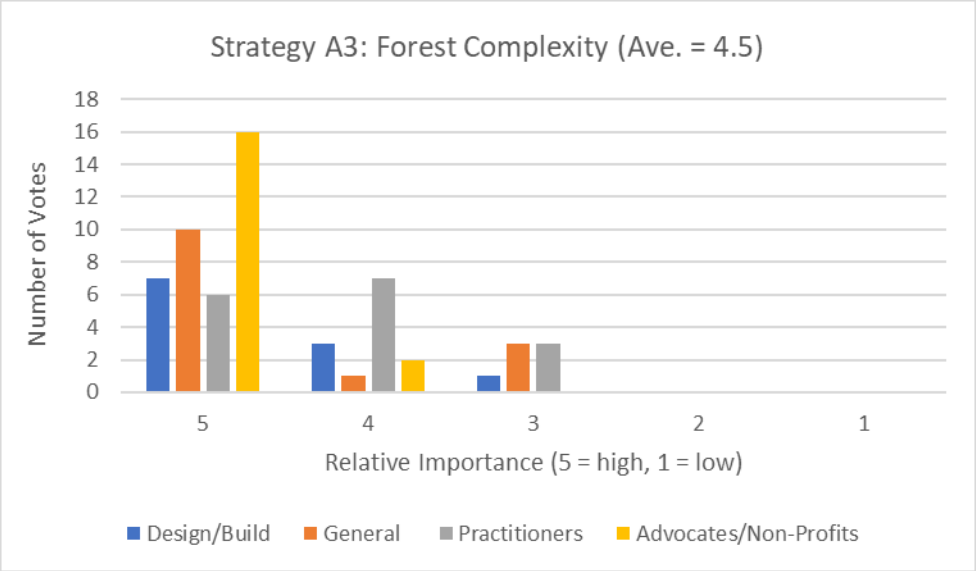


Fig. 3. Forest complexity – manage forests to encourage a diverse mix of tree species, tree age classes, and understory vegetation. Participants identified the following solution categories for this strategy: collaboration, education and communication, labor and technology, market evolution and development, public policies, and research.

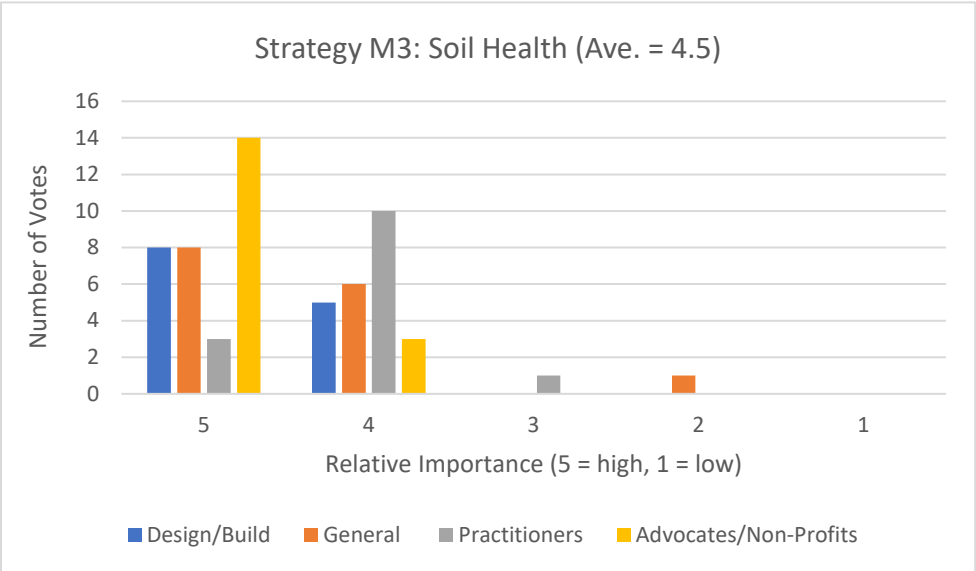


Fig. 4. Soil health – improve forest soil biological, physical, and chemical characteristics in order to store carbon, improve forest health, and improve hydrology. Participants identified research as the main solution category that applies to soil health.

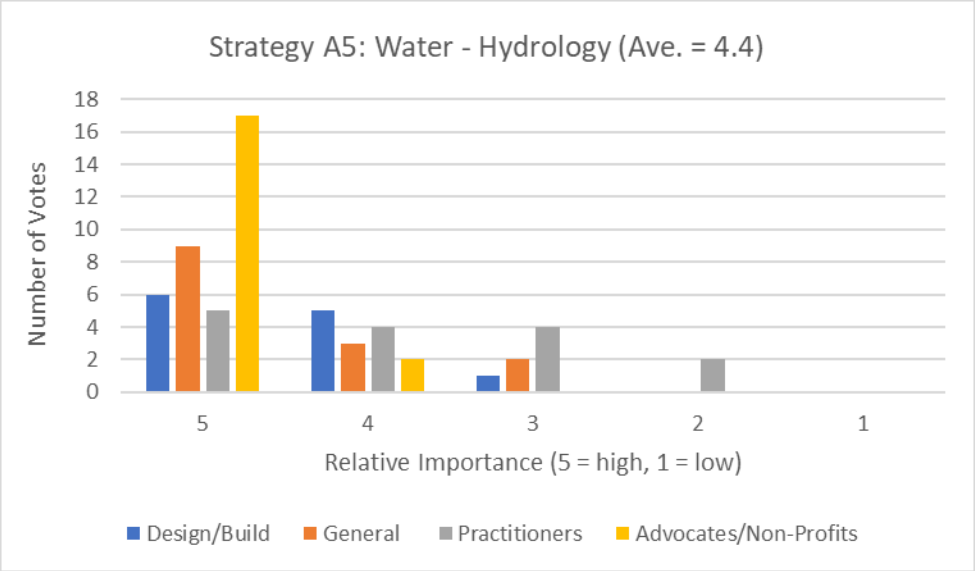


Fig. 5. Water, hydrology – manage forests to increase the infiltration rate of precipitation, increase soil water holding capacity, and decrease the rate of runoff. Participants did not identify barriers and solutions to this strategy, but it is reasonable to assume that those might be similar to the barriers/solutions for forest complexity, older trees, and soil health.

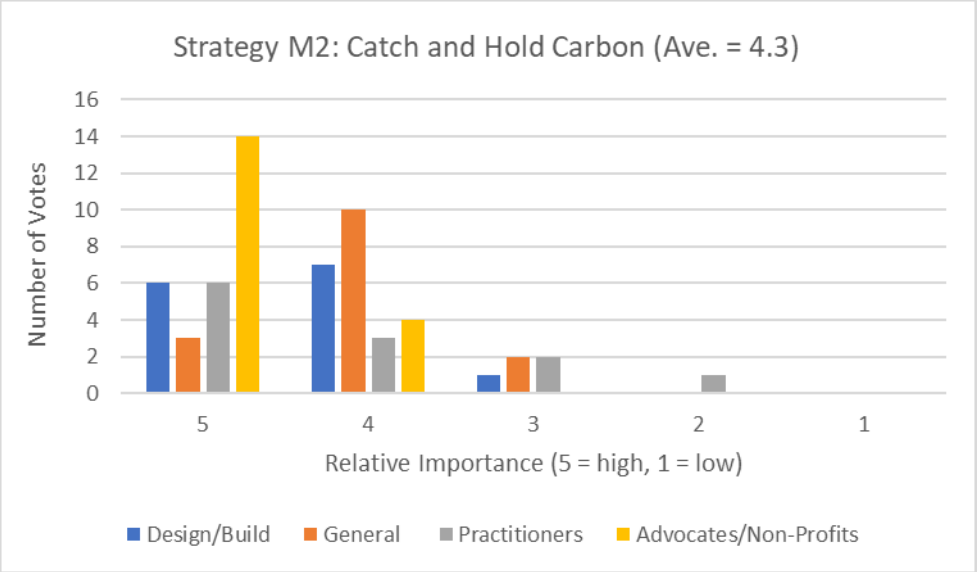


Fig. 6. Catch and hold carbon – increase net carbon sequestration in forest trees and soils. Participants identified collaboration, financial incentives, market evolution and development, public policies, and research as the solution categories for this strategy.

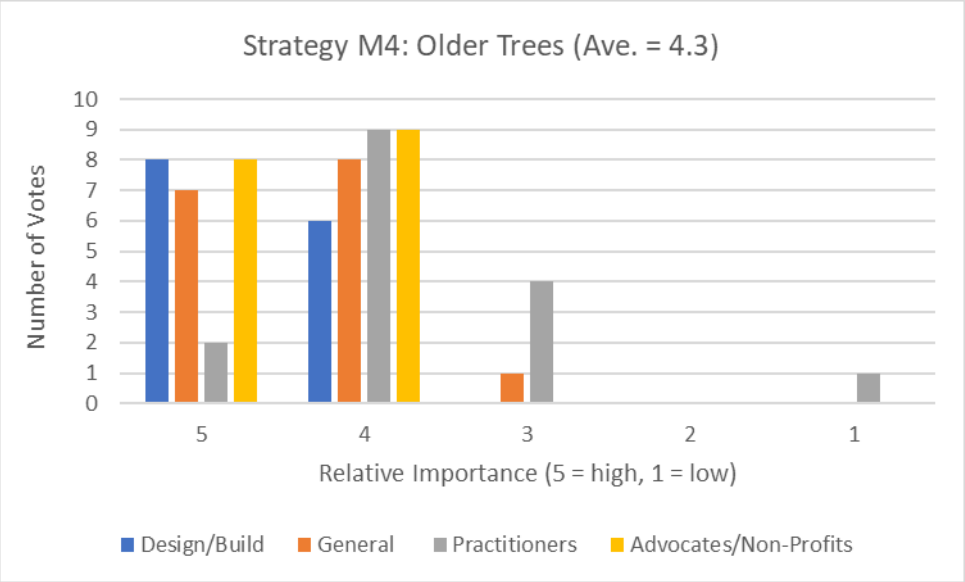


Fig. 7. Older trees – ensure that forests contain healthy older trees. Participants identified direct financial incentives and market evolution and development as the solution categories applicable to this strategy.

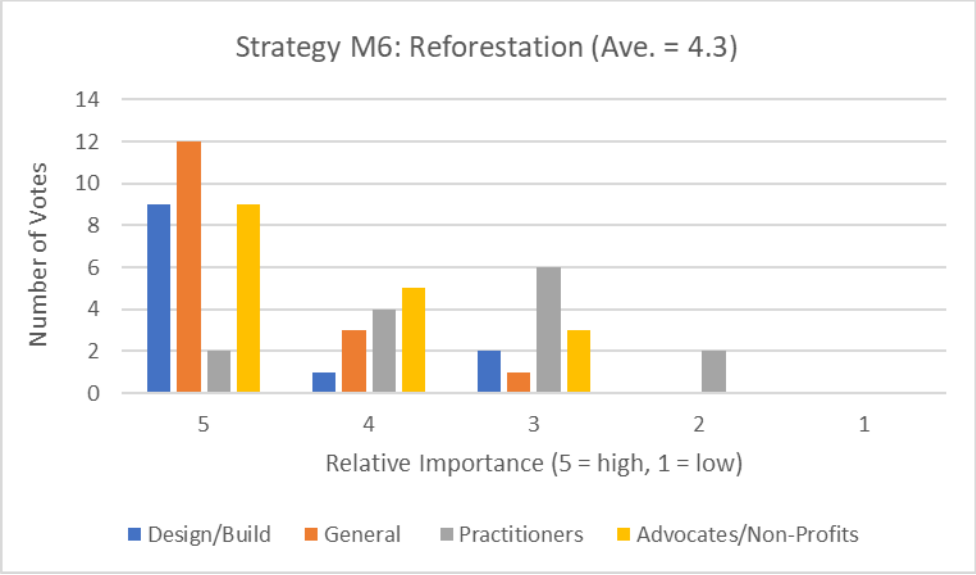


Fig. 8. Reforestation – establish forests on sites where trees are adapted but are not now growing due to deforestation in the past. Participants thought that direct financial incentives and market evolution and development were the main solution categories that apply to this strategy.

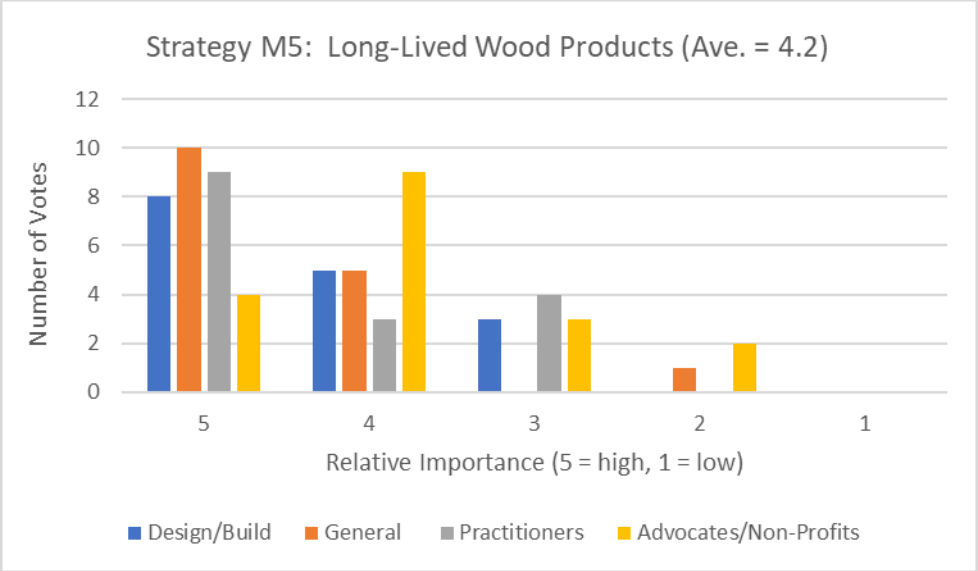


Fig. 9. Long-lived wood products – store carbon in wood products with a long useful life. Participants though the solution categories of education, market evolution and development, and research most applied to this strategy.

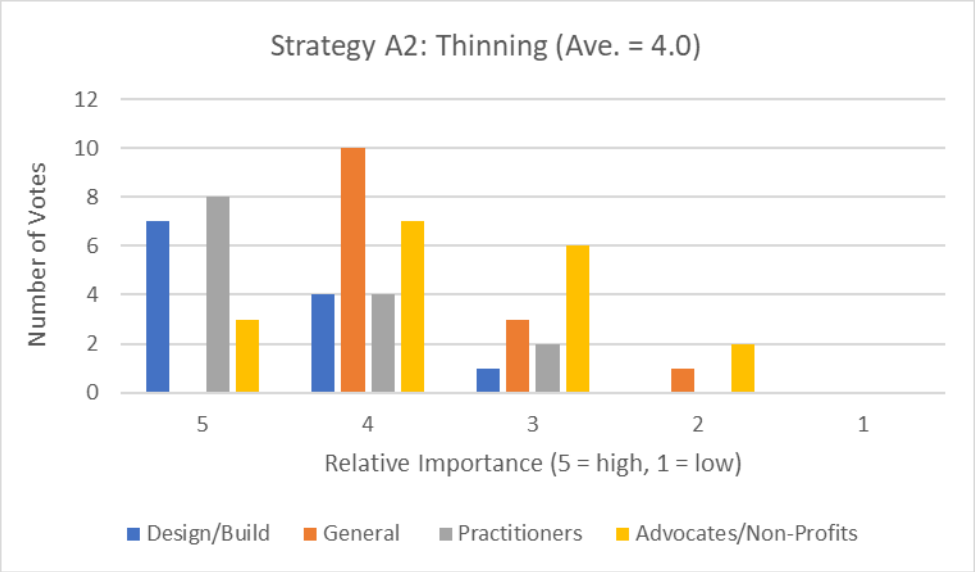


Fig. 10. Thinning – carefully reduce the density of trees when needed to improve forest health. Participants identified the solution categories of labor and technology, and market evolution and development as applicable to this strategy.

Medium and low priority strategies (average ratings 3.2 – 3.6)

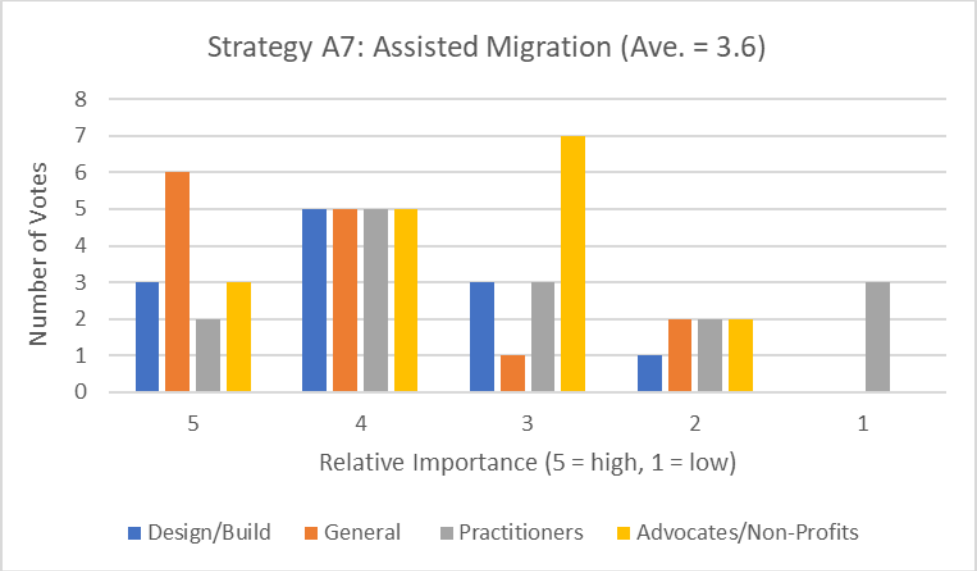


Fig. 11. Assisted migration – when indicated by scientific data, carefully explore planting tree species and genotypes adapted to future climate conditions. Participants did not identify barrier/solution categories for this strategy, but it is logical to assume that the category of research would apply.

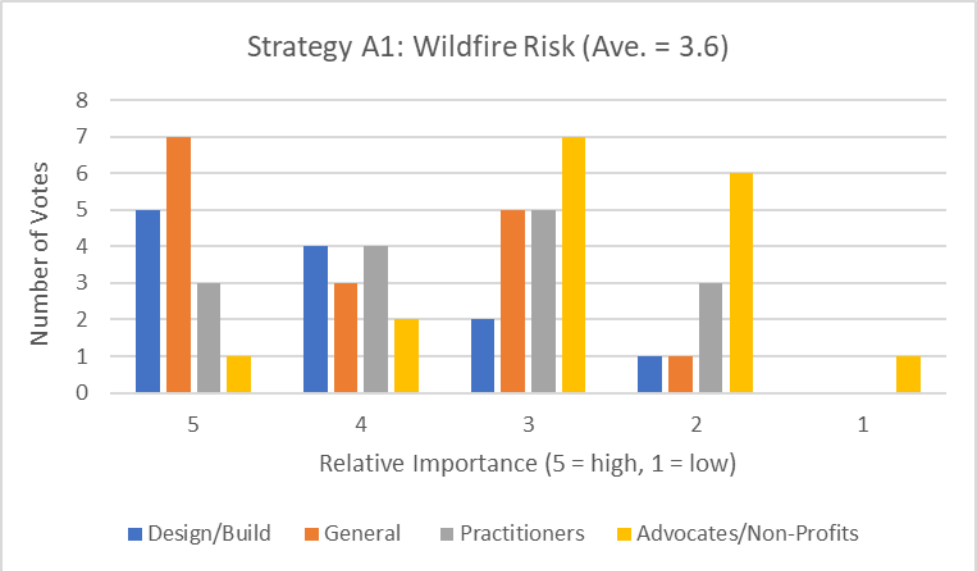


Fig. 12. Wildfire risk – reduce the incidence, severity, and extent of catastrophic forest fires. Participants did not identify barrier/solution categories to this strategy, but it is logical to assume that public policy, labor and technology, and collaboration would play a role.

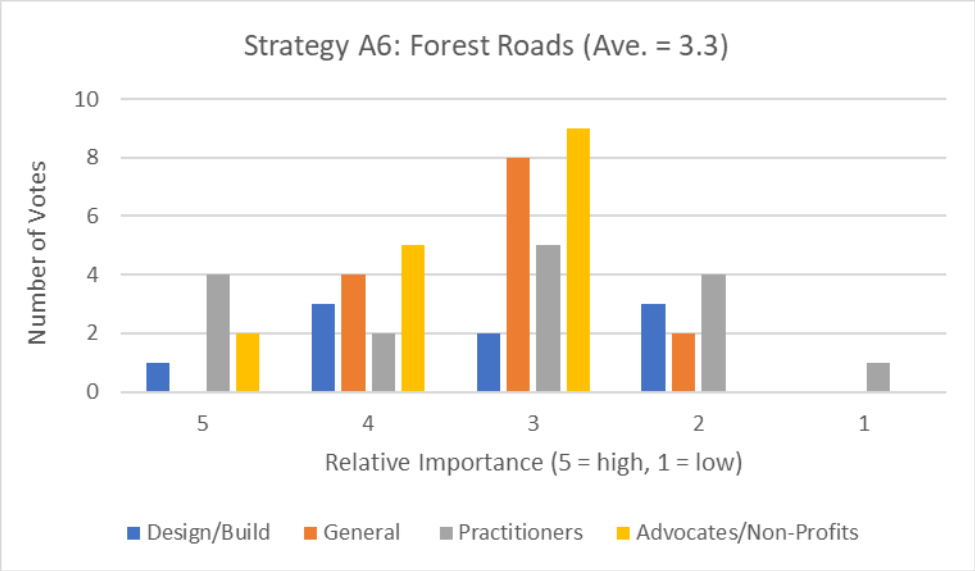


Fig. 13. Forest roads – construct and /or modify forest roads and associated bridges, culverts, and water bars in order to reduce erosion during runoff events. Participants did not identify barrier/solution categories to this strategy, but it is logical to assume that labor and technology, and direct financial incentives would play a role.

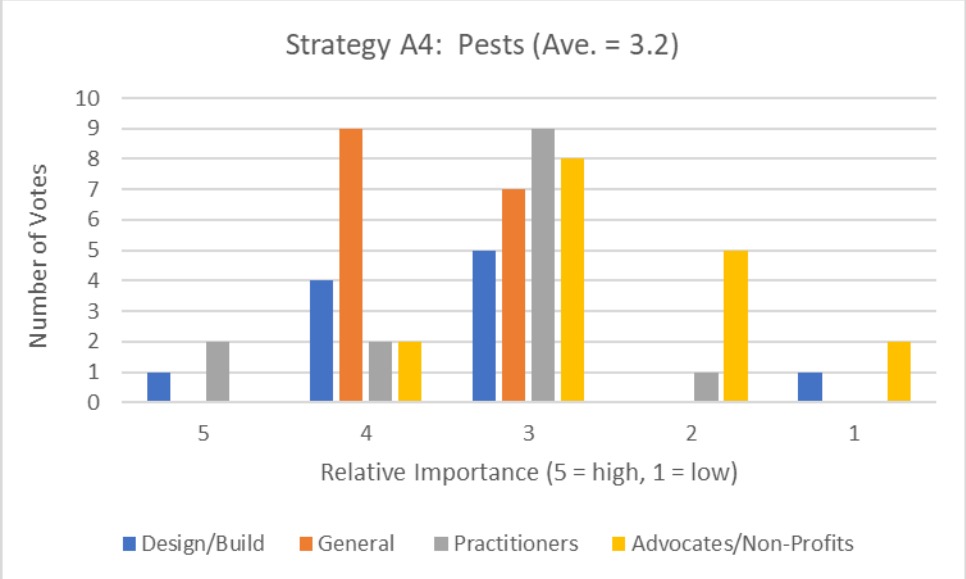


Fig. 14. Pests – plant and manage trees to minimize the risks and impacts of diseases, insect pests, and invasive species. Participants did not identify barrier/solution categories to this strategy, but it is logical to assume that labor, technology, and research would be applicable. Several participants voiced concern over the discovery of emerald ash borers and the likely devastation to ash trees across western Oregon.

Barriers and solutions

As noted in Figures 1-14, participants identified a variety of potential solutions to overcome barriers to climate-smarter forestry strategies. Proposed solutions can be sorted into the following categories and examples provided by participants. No attempt was made to achieve group consensus and, because the workshops were comprised of diverse participants, some proposed solutions may conflict with others. Due to the limited number of participants and time constraints in the workshops, the following list is not exhaustive – there are undoubtedly additional potential solutions to barriers that are not listed here.

- Collaboration:
    - Better define goals and priorities.
    - Acknowledge the importance of working in ways that don't harm those who are least advantaged.
    - Make better use of public/private partnerships.
    - Investigate, agree upon, and implement a high-quality system for assessing and tracking net carbon sequestration through a working lands inventory process.
    - Develop more accurate baselines for carbon inventories.
    - Develop a set of regional best practices for climate-smarter forestry

- Direct financial incentives:
    - Increased funding for conservation easements on forestland.
    - Increased funding for implementing climate-smarter forestry practices.

- Education and communication:
    - Do a better job of building and using common ground between factions.
    - Increase attention to connections between climate-smarter forestry and wildlife habitat.
    - Increase the public's awareness of where their wood comes from and the consequences of growing it.
    - Help people develop a stronger conservation ethic.
    - Educate architects about choices for where wood is produced.
    - Use forests to forge better links between urban and rural communities.
    - Strengthen people's connection to trees and forests.
    - Educate voters and elected officials about climate-smarter forestry.

- Labor and technology:
    - Improve the capacity of nurseries to provide needed planting stock.
    - Draw new workers into forestry work with conditions that encourage and support their involvement and ongoing professional growth.
    - Support the development of innovative forestry equipment.

- Market evolution and development:
    - Increase incentives for localized, transparent markets for quality products from climate-smarter forests (e.g., Build Local Alliance and Sustainable Northwest).
    - Strengthen Forest Stewardship Council (FSC) markets and provide a better link between climate-smarter forestry and FSC.

    - Diversify wood markets and milling capacities to incentivize growing old and big trees and the diverse mix of species that come from complex native forests.
    - Shift architectural design specifications to encourage the use of wood from climate-smarter forestry forests.

- Public policies:
    - Modify taxation systems to incentivize climate-smarter forestry.
    - Change building codes and zoning to encourage use of climate-smarter forestry wood products.
    - Establish policy that supports the use of wood where it is appropriate to replace less climate-smart materials.
    - Keep and strengthen land use laws to prevent the development of forestland.
    - Increase compensation to legislators to attract candidates who will implement public policy needs for climate-smarter forestry.
    - Consider a carbon tax.
    - Address resource problems caused by remote forestland investors.

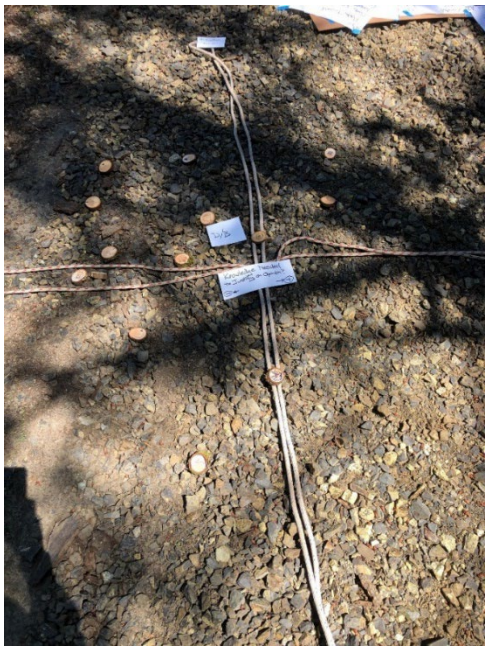
- Research:
    - Commit more resources to forest soils research and education.
    - Create forest management models that protect and enhance forest soils.

Qualitative perspectives

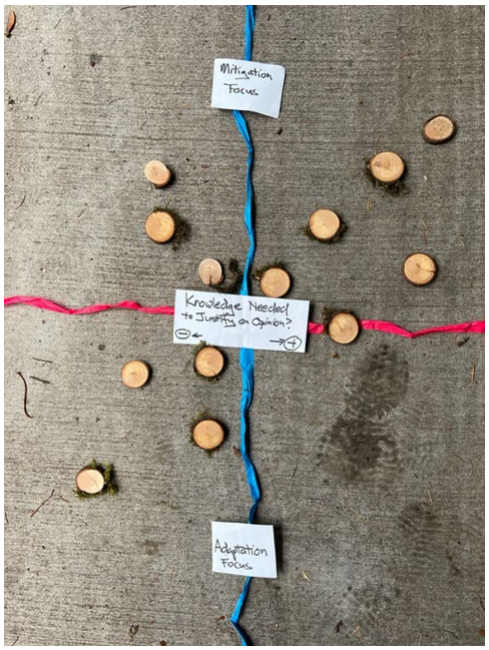
Participants shared their perspectives on two couplets of questions in a unique exercise in which each participant expressed their view using a wooden disk. The facilitators laid two ropes on the ground at a 90° angle to form four quadrants. In both couplets, the horizontal axis reflected answers to the question "do you know enough to have an opinion on this topic?" Participants were instructed to place their disk to the right side of the quadrants if they did know enough and to the left if they felt they didn't know enough.

The vertical axis reflected participant feelings about an aspect of climate-smarter forestry. In the first couplet, the vertical access indicated a participant's perception of the relative importance of forest adaptation to climate change (lower quadrants) versus mitigation (upper quadrants). In the second couplet, participants expressed their view on the appropriateness of carbon offset trading as a viable climate-smarter forestry component in western Oregon forests (assuming verifiable additionality and a minimum level of cheating). Participants placing their disk in the upper quadrants felt carbon offset trading should be used, while disks placed in the lower quadrant indicated offset trading should not be used.

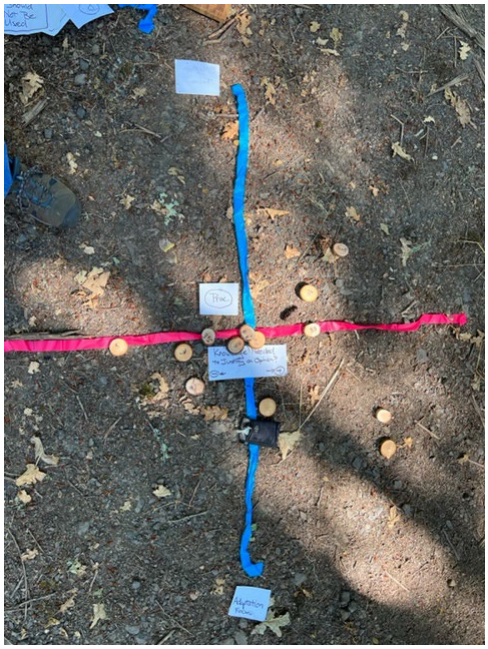
Although neither the horizontal nor the vertical lines had scales, participants could express their relative perspective on a question by placing their disk closer to or further from the intersection of the two ropes. For example, participants who felt strongly that they knew enough to answer a question placed their disk far to the right of the intersection, while those with less strong feelings placed their disks closer to the intersection. Photographs of the quadrants after participants placed their disks are provided in Figures 15 and 16.



Design/Build Group



General Group



Practitioner Group

Non-profit/Advocate Group

Fig. 15. Adaptation versus mitigation. Each participant placed one disk on the ground. Disks placed to the right of the vertical line indicate sufficient knowledge to judge the relative importance of adaptation versus mitigation. The vertical axis represents a participant's judgment of the relative importance of adaptation to mitigation. Disks placed above the horizontal line indicate the participant felt mitigation was more important than adaptation. Disks placed below the horizontal line indicate the participant favored adaptation over mitigation.

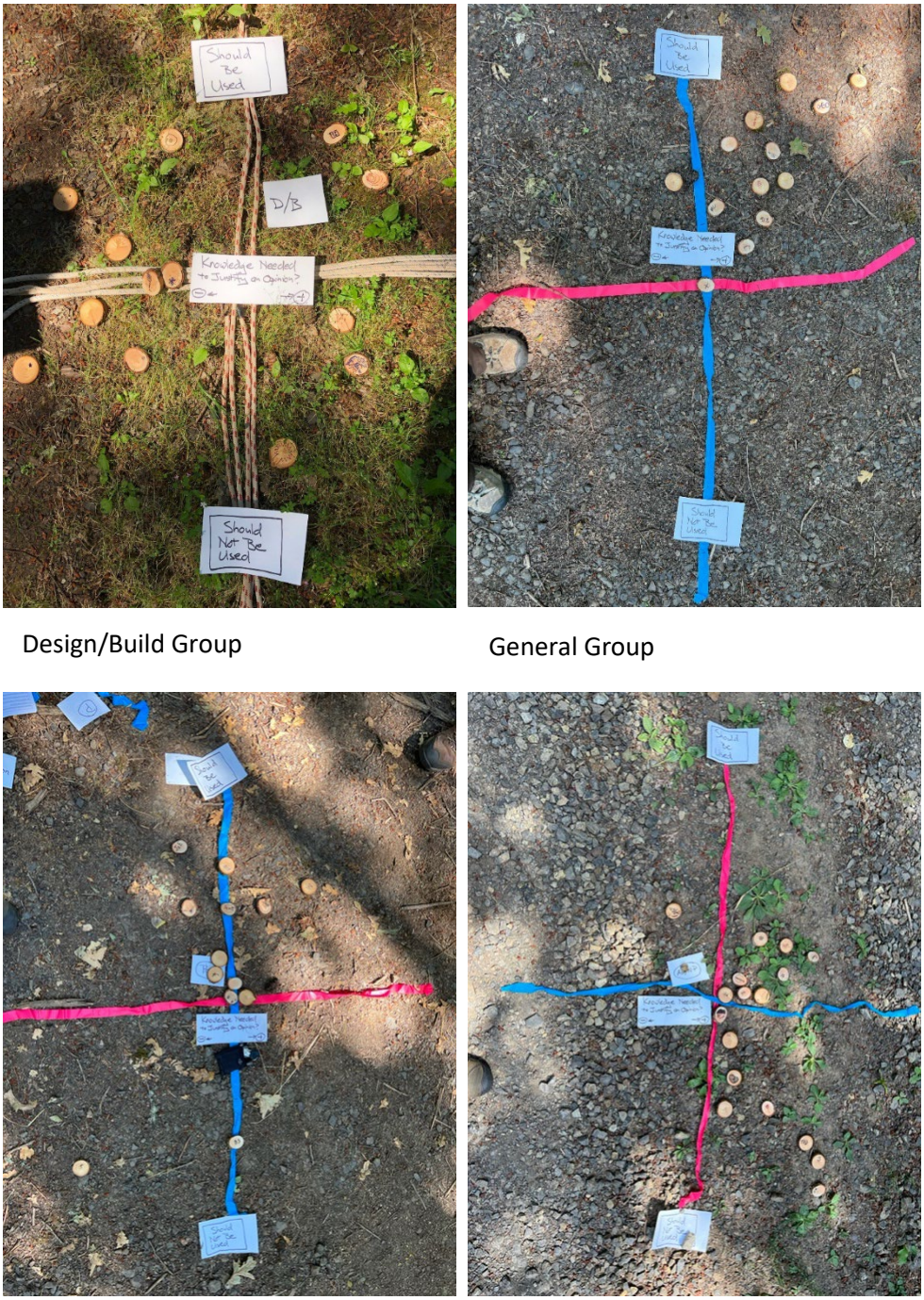


Fig. 16. Use of Carbon Offset Trading. Each participant placed one disk on the ground. Disks placed to the right of the vertical line indicate sufficient knowledge to judge whether carbon offset trading is a viable climate-smarter forestry strategy in western Oregon forests. Participants who believed offset trading should be used placed their disk above the horizontal line, while participants who opposed the use of offset trading in forests placed their disk below the horizontal line. The question of offset trading was perhaps the place of least agreement between groups.

Digging Deeper

The fourth and final workshop in this series was held on August 26, 2022. On October 10, representatives from each of the workshops met online and agreed that on-the-ground decisions made by forest managers (i.e., "practitioners") necessarily drive the implementation of climate-smarter forestry strategies. With this in mind, practitioners were invited to provide additional insights into climate-smarter forestry strategies via an email survey. Sixteen forest practitioners (family foresters, consulting foresters, land trust foresters, and U.S. Forest Service forester) shared their knowledge and opinions in this email survey. Those completing the survey included both practitioners who participated in the summer sessions and several who did not.

The survey asked practitioners to base their responses on a specific management situation that they felt was representative of their overall work. The survey included the fourteen climate-smarter forestry strategies discussed in the summer workshops plus three additional decarbonization (DC) strategies that were not discussed in the summer workshops due to time constraints:

- DC-1: Reduce the use of fossil fuels in forestry operations, for example by using more fuel efficient and more electric logging equipment.
- DC-2: Minimize transport distances and the number of links involved in transporting lumber to the mill.
- DC-3: Minimize logging-related carbon loss, for example by leaving logging slash on the ground rather than piling and burning it.

Email survey results were collected in November, 2022, and included three parts:

1. **Relative Importance of Strategies** - Practitioners identified the most important strategies to advancing climate-smarter forestry. The five strategies rated of highest importance in the email survey were catch and hold carbon in the forest, reduce the use of fossil fuels in forestry operations, minimize logging-related carbon loss, increase forest complexity, and assisted migration.

2. **Feasibility of strategies** – Practitioners rated each strategy relative to the current level of feasibility on the typical management situation they considered. The rating system was color-coded according to the following system:
    - **Green** = the practitioner was already implementing the strategy without significant barriers.
    - **Yellow** = the practitioner was partially implementing the strategy and would like to more fully implement it if barriers could be reduced or removed.
    - **Orange** = the practitioner was not currently implementing the strategy but would like to implement it if barriers could be reduced or removed.
    - **Red** = the practitioner had no interest in implementing the strategy because it was not applicable in their situation, regardless of removing barriers.

    Feasibility results are shown in Figures 17-19 and illustrate a variety of management situations. Except for Strategies DC-1 (reduce fossil fuel use) and DC-2 (minimize transport distances and links), each of the other strategies was already being implemented (a green score) by some of the practitioners without significant barriers. Each of the seventeen strategies was being at least

partially implemented by a majority of the practitioners (green plus yellow scores), but most of the strategies faced situations in which one or more practitioners were not currently implementing the practice at all or had no interest in implementing it (orange and red scores). In short, practitioner responses reflected a high diversity of responses to the feasibility of climate-smarter strategies.

3. **Barriers and Solutions** – As a final step in the email survey, practitioners were asked to offer solutions to overcome barriers to strategies (i.e., turning the orange and yellow ratings into green). These solutions sorted into the same seven categories as solutions proposed in the workshops. However, the email survey responses were not limited by time like the forest workshops. Thus, solutions proposed in the email surveys were explained in greater depth and often included references to specific situations the practitioners had encountered. The solutions proposed in the email survey results are provided in Table 4 of the Appendix.

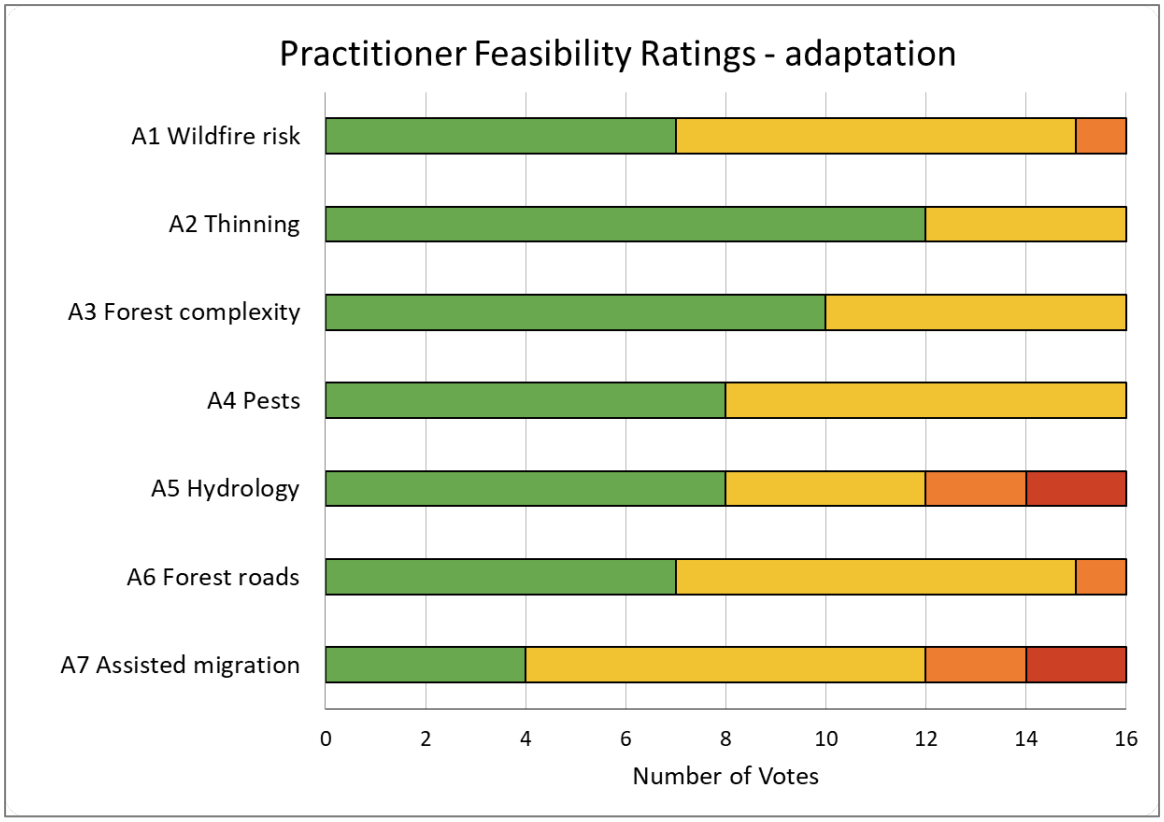


Figure 17. Practitioner ratings from an email survey regarding the feasibility of implementing climate-smarter forestry adaption strategies. Green = the practitioner was already implementing the strategy without significant barriers. Yellow = the practitioner was already partially implementing and would like to more fully implement the strategy if barriers could be reduced or removed. Orange = the practitioner was not currently implementing the strategy but would like to implement it if barriers could be reduced or removed. Red = the practitioner had no interest in implementing the strategy because it was not applicable in their situation, regardless of removing barriers.

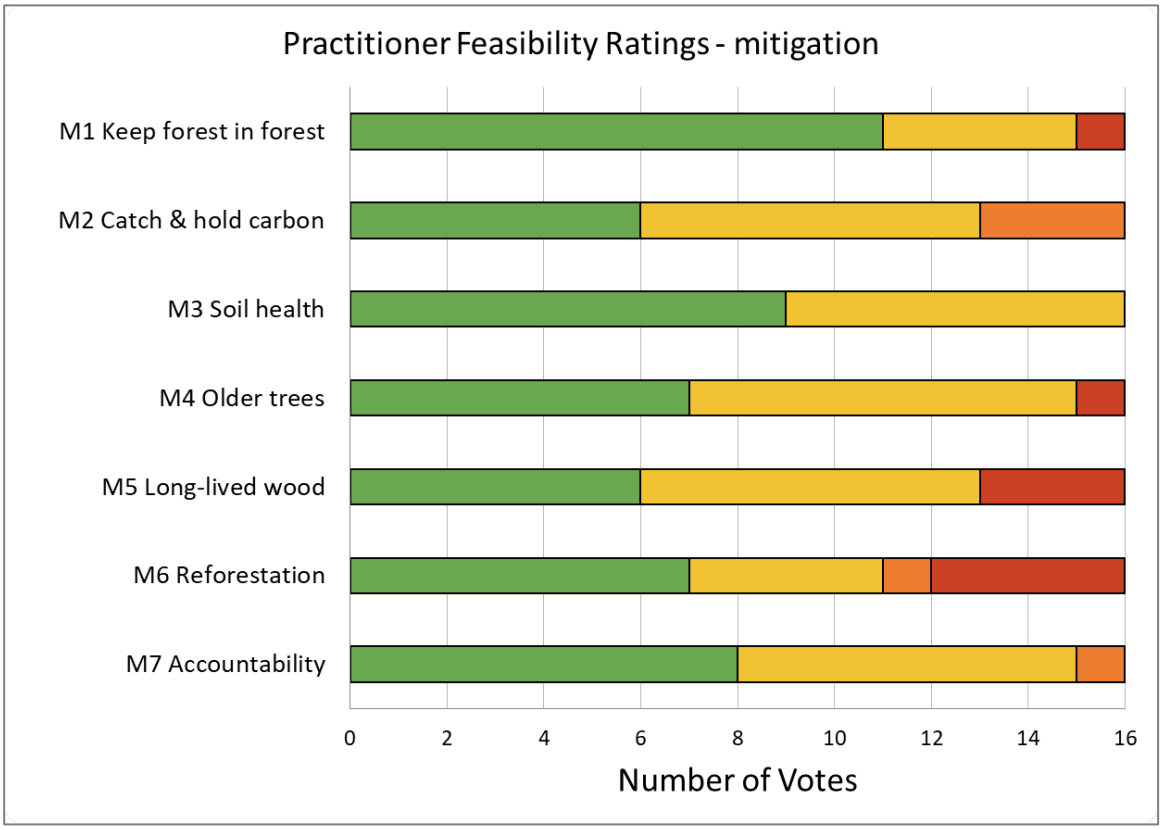


Figure 18. Practitioner ratings from an email survey regarding the feasibility of implementing climate-smarter forestry mitigation strategies. Green = the practitioner was already implementing the strategy without significant barriers. Yellow = the practitioner was already partially implementing and would like to more fully implement the strategy if barriers could be reduced or removed. Orange = the practitioner was not currently implementing the strategy but would like to implement it if barriers could be reduced or removed. Red = the practitioner had no interest in implementing the strategy because it was not applicable in their situation, regardless of removing barriers.

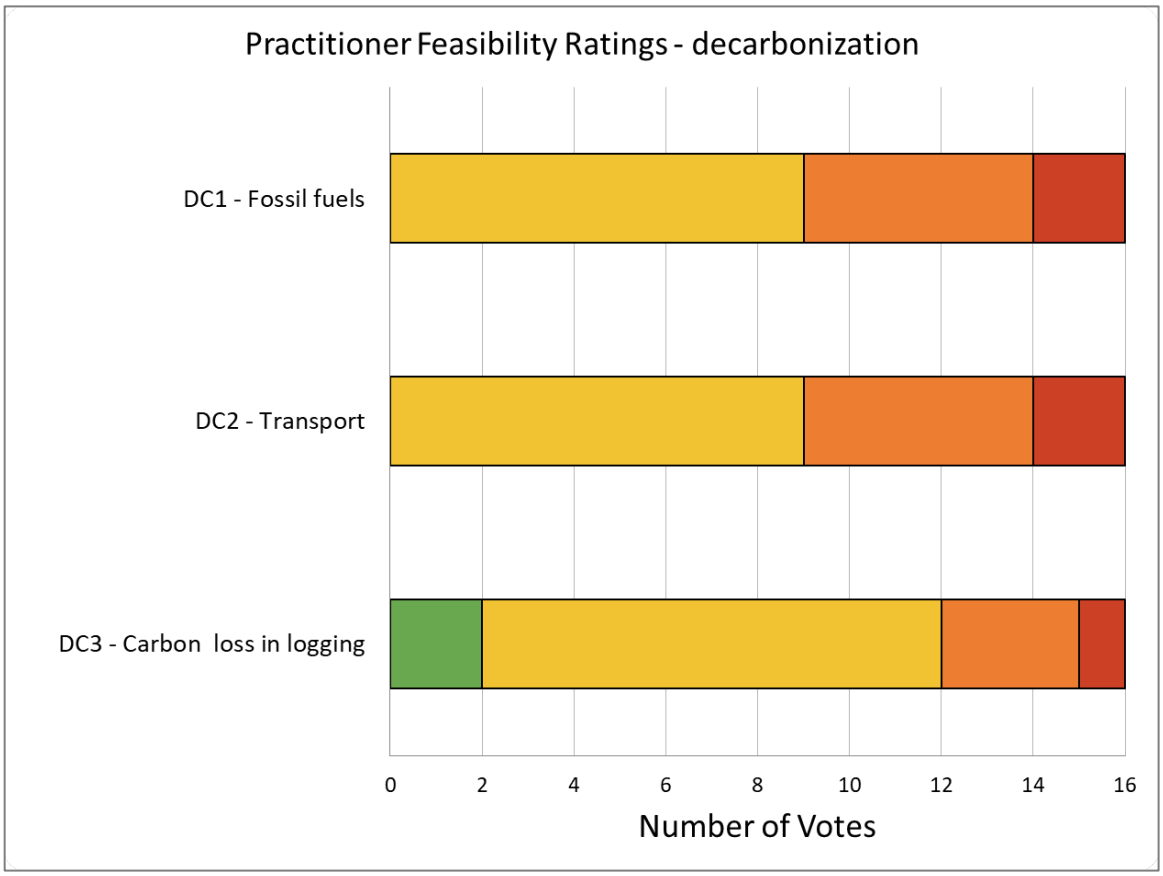


Figure 19. Practitioner ratings from an email survey regarding the feasibility of implementing climate-smarter forestry decarbonization strategies. Green = the practitioner was already implementing the strategy without significant barriers. Yellow = the practitioner was already partially implementing and would like to more fully implement the strategy if barriers could be reduced or removed. Orange = the practitioner was not currently implementing the strategy but would like to implement it if barriers could be reduced or removed. Red = the practitioner had no interest in implementing because it was not applicable in their situation, regardless of removing barriers.

Conclusion and Next Steps

Workshop participants brought a wide diversity of experience and perspectives on the topic of climate-smarter forestry. The four workshops varied in size from 13 (design/build group) to 18 (non-profit/advocate group). Workshops of this size appeared optimal for providing a diversity of opinions while also allowing each participant time to express their views. Not surprisingly, results varied from one group to another, but average ratings for strategies involving increased accountability, reducing the conversion of forestland to other land uses, increasing the complexity of forests, increasing the forests' ability to catch and hold carbon, enhancing forest soil quality, improving forest hydrology, keeping and caring for older forests, establishing forests on land that used to be but no longer is forested, storing carbon in long-lived wood products, and implementing careful thinning of existing forests were viewed overall (average of all groups) as important climate-smarter forestry strategies. Strategies that received lower average scores included assisted migration of tree species or genotypes, reducing the risk of wildfire, improving forest roads, addressing diseases and insect pests. The use of carbon offset markets as a component of climate-smarter forestry had perhaps the widest range of responses.

Because various groups have requested a chance to learn from and discuss these results, the following presentations and discussions have been planned or completed: Oregon Board of Forestry, Oregon Global Warming Commission, NW Innovative Forestry Summit, national-scale webinar for the Forest Stewards Guild, briefing for Oregon legislators coordinated by Senator Jeff Golden, and a session for regional architects to be coordinated by Lever Architects.

A group comprised of one or two participants from each workshop has met to discuss next steps, which might include bringing the groups together in a social event and inviting others to participate in additional workshops. That group recommended implementing an email survey of small woodland owners, forestry consultants, and forest managers to learn their thoughts on the feasibility of the fourteen climate-smarter strategies (plus an additional three strategies focused on decarbonizing forestry operations). That email survey was completed and the results are contained in this report.

The success of this project hinged on the valuable contributions and commitments made by many. Of these, three stand out: 1) the time, thought, care, and energy brought by each participant; 2) the critical role played by our anchor co-hosts (identified with an asterisk in Table 2), particularly in attracting and engaging with such a diverse range of Oregonians; and 3) the impressive engagement by the Oregon Department of Forestry, thanks to State Forester Cal Mukumoto, and by OSU Forestry Extension, thanks to Associate Dean Holly Ober.

The climate-smarter forestry workshops were facilitated by Dean Moberg (Director, Tualatin Soil and Water Conservation District) and Peter Hayes (Hyla Woods). For more information, contact Peter Hayes: peter_hayes@comcast.net

Appendix

Participants

Table 2. Participants in the 2022 Climate-Smarter Forestry workshops. Asterisks identify co-hosts of the workshops. Background information is provided for general information – the participants were not official representatives of the organizations listed.

Participant	Background
Jacob Dunn*	Architect, ZGF
Laila Seewang*	Professor, PSU Architecture
Ryan Temple*	President, Sustainable NW Wood
Athena Shepard	Student, PSU Architecture, Siletz tribal member
Sergio Palleroni	Professor, PSU Architecture
Aline Van Driessche	Visiting scholar from Belgium
Christine Ying Lu	Visiting scholar from Taiwan
Scott Mooney	Architect, Bora Architecture & Interiors
Rosemary Hill	Architect, Horst Architects
Ralph DiNola	Architect, New Buildings Institute
Josh Cabot	Architect, Sera Architects
Annabel Shephard	Project Engineer, PCS Structural Solutions
Laura Taylor	Forest Specialist, West Multnomah Soil and Water Conservation Dist.
Cal Mukumoto*	State Forester, ODF
Jim Kelly*	Chair, Oregon Board of Forestry
Holly Ober	Associate Dean, Forestry Extension, OSU
Brenda McComb	Board of Forestry, OSU Emerita Professor
Mike Cafferata	District Forester, ODF
Ben Deumling	Board of Forestry, Zena Forest Products
Tom DeLuca	Dean, OSU College of Forestry
Bettina Von Hagen	President, EFM Investments and Advisory
Josh Bernhard	Forest Resources Division Head, ODF
Ryan Gordon	Planning Branch Director, ODF
Cherie Kearney	Columbia Land Trust
Tom Tuchmann	US Forest Capital
Sarah Deumling	Zena Forest
Danny Norlander	ODF
Mike McKibbin	Director of Western Lands, Stimson Lumber Co.
Pam Hayes	Hyla Woods
Aaron Shaw	Tualatin Soil and Water Conservation District
Barry Sims*	Trout Mountain Forestry
Scott Hayes*	Family forestry
Brandy Saffell	Forest Specialist, Tualatin Soil and Water Conservation District
Mike Messier	Trout Mountain Forestry

Table 2, cont'd.

Participant	Background
Christine Buhl	Entomologist, ODF
Dave Ehlers	Family forestry
Kyle Smith	Forestry Director, The Nature Conservancy, Washington
Glenn Ahrens	Extension Forester
Steve Fitzgerald	Director of OSU Forests
Alex Gorman	Extension Forester
Don Everingham	State Forests, ODF
Edie Knight	Mason, Bruce & Gerard Natural Resource Consultants
Ed Easterling	Family forestry
Mark Harmon	OSU Professor Emeritus
David Bugni	Family forestry
Ken Nygren	White Oak Natural Resource Services
Debby Garman	350 Washington Co.
Lynn and Paulette Wittwer	Family forestry
Ralph Bloemers	Green Oregon
Brenna Bell*	350 PDX
Lisa Arkin*	Beyond Toxics
Lauren Anderson*	Oregon Wild
Kaola Swanson	The Conservation Fund
Sean Jacobson	Sunrise Movement PDX
Kahn Pham	State Representative
Ryan Huago	The Nature Conservancy, Oregon
Rose Graves	The Nature Conservancy, Oregon
Ryan Moore	Attorney
Mark Gamba	Mayor, City of Milwaukee
Josie Koehne	Family forestry
Cara Christofferson	Bark
Misha VanEaton	Bark
Christina Stephenson	Candidate, Labor Commissioner

Abbreviations:

- ODF = Oregon Department of Forestry
- OSU = Oregon State University
- PSU = Portland State University

Fig. 20. Design/build group. The workshop for this group was held on July 13, 2022.

Fig. 21. Practitioner group. The workshop for this group was held on August 16, 2022.

Fig. 22. Non-profit/Advocate Group. The workshop for this group was held on August 26, 2022.

No group photo was taken for the General Group, which met on July 19, 2022.

Proposed solutions from workshops

Table 3. Solution categories, solutions as proposed by participants during the workshops, and strategies to which they apply. Due to time constraints in the workshop settings, potential solutions to barriers were recorded as brief phrases. When similar solutions were proposed in different workshops, those solutions were combined for this table. Strategies are provided for general information – many proposed solutions apply to more than one strategy. Solutions were proposed by individuals and no attempt was made to achieve group consensus. Because the groups were deliberately comprised of diverse participants, some solutions conflict with others. Due to the limited number of participants and time constraints in the workshops, the following list is not exhaustive – there are undoubtedly potential solutions that are not listed here. Please also see Table 4, which lists potential solutions proposed by the practitioners via email.

Solution Category	Solution	Strategy
Collaboration	Room for broader definitions to complement Forest Stewardship Council certification.	A3-Forest Complexity
Collaboration	Adapt approaches to acknowledge and use more accurate baselines. Continue to research and communicate the true ecological potential of lands to catch and hold carbon.	M2-Catch and Hold Carbon
Collaboration	Implement a high quality system for assessing and tracking carbon through a natural and working lands inventory. Provide financial resources needed to establish and maintain.	M2-Catch and Hold Carbon
Collaboration	Better define goals and priorities.	M7-Accountability
Collaboration	Create a vocal middle.	M7-Accountability
Collaboration	Increased commitment to “getting to yes.”	M7-Accountability
Collaboration	Make better use of public/private partnerships.	M7-Accountability
Collaboration	Strengthen the middle. Address dismissiveness.	M7-Accountability
Collaboration	Acceptance that long-term change will be incremental rather than rapid.	M7-Accountability
Collaboration	Better acknowledge the importance of working in ways that don’t do further harm to those who are least advantaged.	M7-Accountability
Collaboration	Develop and use a set of regional best practices for climate-smarter forestry: federal, state, local.	M7-Accountability

Table 3, cont'd.

Solution Category	Solution	Strategy
Education and communication	Increased attention to connections between climate-smarter forestry and wildlife needs.	A3-Forest Complexity
Education and communication	Better educate architects to make forests part of literacy of taking stock of impacts.	M5-Long-Lived Wood Products
Education and communication	Increase awareness that the shift toward climate-smarter forestry is every Oregonian's problem and responsibility.	M7-Accountability
Education and communication	Help people develop a stronger conservation ethic.	M7-Accountability
Education and communication	Do a better job of building and using common ground.	M7-Accountability
Education and communication	Education: both younger children and architects.	M7-Accountability
Education and communication	Strengthen people's connection to trees and forests.	M7-Accountability
Education and communication	Use forests to forge better links between urban and rural.	M7-Accountability
Education and communication	Increase the public's awareness of where their wood comes from and the consequences of growing it.	M7-Accountability
Education and communication	Develop and implement improved education about forests and their connection to climate.	M7-Accountability
Education and communication	Inform voters. Elect legislators committed to providing necessary funding to support the work.	M7-Accountability
Education and communication	Better educate Oregon consumers of wood products about the choices available to them and the consequences of their choices.	M7-Accountability
Financial incentives for forest owners	Improve economics of using climate-smarter forestry strategies in all ways.	M2-Catch and Hold Carbon
Financial incentives for forest owners	Improved funding sources for easements to incentivize climate-smarter forestry.	M4-Older Trees
Financial incentives for forest owners	Meet need for more information and support.	M7-Accountability

Table 3, cont'd.

Solution Category	Solution	Strategy
Market evolution and development	Keep building diverse and distributed systems for wood processing and distribution.	A3-Forest Complexity
Market evolution and development	Strengthen FSC markets and better link standards to climate-smarter forestry. Develop and use wood procurement policies on all levels of government. Tell the stories of successes and leadership.	A3-Forest Complexity
Market evolution and development	Keep building markets for a wider diversity of wood products. Improve policy that supports use of mass timber.	A3-Forest Complexity
Market evolution and development	Make Forest Stewardship Council Certification systems work well as a way to incentivize climate-smarter forestry.	A3-Forest Complexity
Market evolution and development	Increase incentives for localized, transparent markets for quality products from diverse forests such as www.buildlocalalliance.org	A3-Forest Complexity
Market evolution and development	Rediversify wood markets and milling capacities to incentivize growing old and big trees and the diverse mix of species that come from complex, native forests.	A3-Forest Complexity
Market evolution and development	Improve market incentives for climate-smarter forestry.	M4-Older Trees
Market evolution and development	Diversify milling capacity to handle a larger range of diameters and species.	M4-Older Trees
Market evolution and development	Rediversify wood markets and milling capacities to incentivize growing old and big trees and the diverse mix of species that come from complex native forests.	M4-Older Trees
Market evolution and development	Shift design specifications to encourage good forestry.	M5-Long-Lived Wood Products
Market evolution and development	Develop better markets for more diverse wood species.	M5-Long-Lived Wood Products
Market evolution and development	Work to formalize approaches to forestry, link them to purchases.	M7-Accountability
Market evolution and development	Work to make visible and reduce forest and wood-related externalities.	M7-Accountability

Table 3, cont'd.

Solution Category	Solution	Strategy
Public policies	Shift policy to incentivize and reward, for example with habitat conservation plans.	A3-Forest Complexity
Public policies	Modernize tax policies.	M1- Keep the Forest in Forest
Public policies	Keep and strengthen our landuse laws and improve compensation of legislators to attract and support those who will do this.	M1- Keep the Forest in Forest
Public policies	Acknowledge and address the problems caused by Oregon forests being owned by remote investors. Better engage in the questions of "who owns the forests?" and "who will own them?"	M1- Keep the Forest in Forest
Public policies	Uphold land use policies.	M1- Keep the Forest in Forest
Public policies	Tax on embodied carbon. Change tax policies to account for levels of embodied carbon.	M2-Catch and Hold Carbon
Public policies	Reform building codes and zoning.	M7-Accountability
Public policies	Create and support better financial models, revise systems of taxation, and create a divestment campaign.	M7-Accountability
Public policies	Improve coordination and cooperation.	M7-Accountability
Research	Base work on stronger inventories and analysis.	M2-Catch and Hold Carbon
Research	Create and incentivize models of forestry that protect and enhance soils.	M3-Soil Health
Research	Commit more resources to forest soil research and education.	M3-Soil Health
Research	Improve and use systems for quantifying the embodied carbon and carbon consequences of Oregon wood products. Follow the examples of work being done in Europe and elsewhere.	M5-Long-Lived Wood Products
Research	Work to better understand how to best make a marginal difference with climate-smarter forestry.	M7-Accountability

Proposed solutions from email survey

Table 4. Solution categories, solutions as proposed by practitioners via an email survey, and strategies to which they apply. In the email survey, practitioners were asked to consider solutions to barriers for the 14 strategies considered during the forest workshops and were also asked to consider solutions to barriers for three decarbonization strategies. Strategies are provided for general information – many proposed solutions apply to more than one strategy. The practitioners had more time to develop and describe potential solutions via email than did workshop participants in the forest setting. Thus, the solutions shown in this table generally are worded as complete sentences with some context provided, rather than the brief phrases shown in Table 3.

Solution Category	Solution	Strategy
Collaboration	Forests are going to burn at some point – and there are going to be surprises. To the extent that weather and safety permit, land management objectives need to be included in fire suppression plans and fire suppression plans need to be part of forest management at a landscape scale.	A1- Wildfire Risk
Collaboration	In South Carolina, my brother-in-law's family was a small forestland owner (less than 40 acres). The state stewardship forester recommended thinning. They agreed. The forester contracted with a logger, the job was done and a check was delivered. Oregon should work with the Association of Consulting Foresters and Associated Oregon Loggers to develop a turn-key program where state stewardship foresters target small forestland owners and implement these strategies. Sweden uses a cooperative model to band small forestland owners together regionally with the Cooperative implementing their strategies. They even have sawmills! Oregon's Woodland Cooperative, formed in the 1960s to get better log prices, is a potential existing model.	A2-Thinning
Collaboration	Greater integration of indigenous practices into forest management	A3-Forest Complexity
Collaboration	Sharing of info by those who know more, who have the capacity to experiment more thoroughly.	A7-Assisted Migration
Collaboration	Honest and earnest engagement with forest products sector representatives should be prioritized, if it hasn't been already. Demonstrating the cost-savings in transitioning to low/no emissions equipment for example could be one strategy.	DC1-Fossil fuels
Collaboration	Re-evaluation of standard industry practices can be undertaken. Mitigation strategies that can demonstrate savings of cost/energy/efficiency in addition to the environmental benefits could resonate better with a more diverse set of stakeholders. Getting buy-in from large landowners or operators (the Walmarts or Fedexs of forest ownership) could demonstrate leadership and compel others to follow suit.	DC3-Carbon Loss in logging
Collaboration	Increased monitoring and evaluation and continuous improvement	M1- Keep the Forest in Forest
Collaboration	Spend time in relationships to overcome cultural divisions.	M1- Keep the Forest in Forest
Collaboration	The American Forest Foundation's Carbon Program is possibly a game-changer for small forestland owners. https://www.forestfoundation.org	M2-Catch and Hold Carbon

Table 4, cont'd.

Solution Category	Solution	Strategy
Education and communication	Incorporate key strategies in the soon to be developed climate-smarter forestry BMPs to teach practitioners about new and innovative practices. Strategies should be pragmatic and easy to incorporate for a wide variety of landowners.	A5-Water (hydrology)
Education and communication	Provide more technical information..	A5-Water (hydrology)
Education and communication	From my perspective, climate change and carbon information is not widely understood or accepted by the natural resource/landowner community. More information in the right format(s) is needed.	A7-Assisted Migration
Education and communication	Need extension publications for practitioners to manage for mycorrhiza, also OSU short course for practitioners.	M3-Soil Health
Education and communication	Recognize that, historically, forests were continuously impacted by fire, human interaction, weather, and other forces. "Old growth" occurred in groves where conditions allowed it to occur. It was not a landscape level forest condition. Identify where the probability of achieving this condition is high and those areas can be targeted to "old growth goals," but to expect to grow all forests into those conditions everywhere is not sustainable or desirable. Most people in this region have the idea that old growth means big trees - they are not synonymous. Some of the oldest trees in the world are barely more than brush height.	M4-Older Trees
Education and communication	I just don't know where to start with this. This sort of thing always gets backburnered for practitioners who usually always have pressing field problems, and time for self reflection is low. Usually we are held accountable with financial damages, IE whole unit of seedlings died in heat dome. Maybe send out a self survey at the end of every year to have people self report what worked and what didn't in their climate minded management.	M7-Accountability

Table 4, cont'd.

Solution Category	Solution	Strategy
Financial incentives for forest owners	Make NRCS EQIP funding recognize the value of logs left on the ground and be based on (increased to) recognize actual thinning costs.	A2-Thinning
Financial incentives for forest owners	Young stand thinning to improve forest health – by species selection, by retaining tree and stand vigor, are very low value, difficult jobs. NRCS support has made some of them possible, but all of them take significant landowner dedication with professional forester support.	A2-Thinning
Financial incentives for forest owners	Smaller, efficient equipment is expensive. A young person, graduating with a technical or a forestry degree, interested in starting a logging company most likely needs a huge capital investment. Oregon needs to focus on new startups with low interest loans (subsidies?), outreach to venture capitalists, cooperative funding.	A3-Forest Complexity
Financial incentives for forest owners	Increase grant funds.	A3-Forest Complexity
Financial incentives for forest owners	Financial incentives and education for this more complicated and time-consuming management that likely yields lower volume.	A3-Forest Complexity
Financial incentives for forest owners	For small forestland owners, it is a really big challenge to maintain high quality roads. Financial help would go a long way!	A6-Forest Roads
Financial incentives for forest owners	Offer incentives for biodiesel or other "cleaner" options where loggers and trucks are working toward clean fuel technologies.	DC1-Fossil fuels
Financial incentives for forest owners	Make EV trucks and tractors affordable.	DC1-Fossil fuels
Financial incentives for forest owners	Incentives needed to leave more biomass in the forest after harvest	M3-Soil Health
Financial incentives for forest owners	It would be nice if there were better funding for leaving logs on the ground for soil building and wildlife habitat, but we get small amounts from NRCS.	M3-Soil Health
Financial incentives for forest owners	Need to identify and prevent harvest of older forests through easements or purchase.	M4-Older Trees
Financial incentives for forest owners	I very rarely see land trade ownerships without clearcut timber harvest to remove the value. Timber harvest occurs either just before or just after open market land sales. There are efforts to manage this through land trusts, conservation easements, etc., but my sense is none of the current solutions are viable at scale for small ownerships.	M4-Older Trees
Financial incentives for forest owners	We have to find a way to reward rural properties for keeping trees – otherwise harvest will continue with every land sale… tax break, carbon markets, education, etc.… Lots of ways to approach this – just none are working well enough right now. I don't have any new ideas on this.. at least now right now.	M4-Older Trees
Financial incentives for forest owners	More straightforward financial assistance.	M6-Reforestation

Table 4, cont'd.

Solution Category	Solution	Strategy
Labor and technology	Developing large scale workforce options for people in the local communities to assist with this work much like the CCC back in the day to help meet the scale that is needed for restoration. These jobs would also help pay for college much like the Americorps programs. Also, find ways for low interest or no interest loans for people interested in getting into the logging business.	A2-Thinning
Labor and technology	Use more modern and energy-efficient logging equipment.	DC1-Fossil fuels
Labor and technology	Decreasing fossil fuels is the biggest one of all. Electrification is one step, but by no means the only step. We need to treat this as a systems problem, and find a systems solution. Shorten transport distances, improve logging practices and technology, and start to view logging operations through a carbon lens.	DC1-Fossil fuels
Labor and technology	Slash needs to be burned if possible so that area can be planted. It would be better if we could yard it all and chip it for biofuel, but fuel prices will almost always prevent that. Wouldn't it be amazing if in 20 years, each logging side had its own machine that would gasify the slash and their machines could run off of it?	DC3-Carbon Loss in logging
Market evolution and development	Improve the market for alternative species like pine and incense cedar.	A4-Pests
Market evolution and development	Efforts to disenfranchise mills that cut larger logs for specialty items may limit markets for larger logs. These mills are almost exclusively local family run ventures that share deep social ties to our community.	DC1-Fossil fuels
Market evolution and development	Better biomass markets might allow treating logging slash by other than piling and burning.	DC3-Carbon Loss in logging

Table 4, cont'd.

Solution Category	Solution	Strategy
Public policies	Neighboring Federal land managers do not share common forest health and wildfire containment strategies. Excessive dead, down and overcrowded forest conditions put our property at risk. Forest policies of more active intervention using harvesting and road improvements are necessary improve this situation.	A1- Wildfire Risk
Public policies	Especially in the Cascades and southern Oregon – more support of the "pods" concept, followed by aligning land ownerships with land objectives: land exchanges to consolidate lands that are growing wood into some areas, and lands that are being held to older ages in others. This has many benefits for Oregon and no detriments that I know of – it is just hard to do – an act of Congress no less. The current checkerboard ownership is the worst pattern for forest resiliency, carbon storage, fire management, prescribed fire use, etc.	A1- Wildfire Risk
Public policies	Managing across boundaries; understanding landscape vulnerability to stressors and where multiple stressors may interact.	A3-Forest Complexity
Public policies	Continued opposition to use of forest chemicals will make control of scotch broom and berries and other undesirable invasives more difficult.	A4-Pests
Public policies	Significant lobbying for both climate smart regulations on use of fossil fuels and financial assistance for those of us who would love to switch to other sources.	DC1-Fossil fuels
Public policies	Excessive taxation on fossil fuels to run forest machinery and transportation will discourage reinvestment in efficiencies. You must make money to spend money. Non-fossil fuel driven technology for machinery and trucks to perform forestry work at a commercial scale is not presently available. The tens, yes hundreds of thousands of dollars required for machinery with minimal upgrades is far beyond the budget of most small forest owners. Our newest forest harvest machine is mid 90's vintage. Our logs are hauled to the mill on trucks two decades old. They are safe, well maintained and perform the duties we require. Any mandated changes must be economically viable.	DC1-Fossil fuels
Public policies	I love locally produced lumber. Many of our family building projects feature lumber sawn from our own forests using a portable sawmill. Oregon is a global producer of wood products, and in 2021 nearly 40 % of America's lumber was produced in the west. Oregon is the largest western states producer. To facilitate use of Oregon's carbon friendly building products produced from Oregon's sustainable forests, we must not undermine the national transportation infra-structure.	DC2-Transport
Public policies	Make pile burning fees much more expensive. Public outreach campaign about retaining large wood, and leaving big logs and chunks out of burn piles.	DC3-Carbon Loss in logging
Public policies	Continued regulatory and taxation burdens make operating with a financial return continually more difficult for forest owners with commercial management goals. Forests that become a burden to the landowner may be sold to others with less emotional investment in their care. Out of towners building mega-mansions on large, forested tracts may not share the affinity for the forest as generational tree farmers.	M1- Keep the Forest in Forest
Public policies	There has been a trend in recent decades to promote older forest habitat, while prohibiting its harvest. This creates "perverse incentives" to cut forests at a younger age. Efforts to disenfranchise mills that cut larger logs for specialty items may limit markets for larger logs. These mills are almost exclusively local family run ventures that share deep social ties to our community.	M2-Catch and Hold Carbon

Table 4, cont'd

Solution Category	Solution	Strategy
Public policies	Protect the land bridges (connectivity) to ensure climate resilience.	M4-Older Trees
Public policies	Tax credits for large diameter wildlife tree retention (within reason). Would need a lot of oversight, may be difficult to implement.	M4-Older Trees
Public policies	Opposition to harvesting for manufacture of wood products limits innovative products such as mass timber and panels. Decreased use of wood building materials will increase the use of less climate friendly nonrenewable resources.	M5-Long-Lived Wood Products
Public policies	Have regulatory reviews and "throw out" regulations which are unsustainable (do not meet the economic, social, and biological feasibility or have unintended side effects).	M7-Accountability
Public policies	Do not write regulations which do not include or allow for incentives, adaptive strategies, professional judgement, and practitioner choice to achieve regulatory intent. This same statement can be made about adopting policies which are absolute, singular focused, and do not account for secondary or tertiary effects of the policy.	M7-Accountability
Public policies	Overzealous prescriptive rules that limit management opportunities or increase costs of doing business will not promote the maintenance of healthy forests. Beginning locally, society must acknowledge and accept the responsibility that virtually everyone requires and desires wood products in their daily lives. Trees must be harvested to fulfil these needs. Will these products come from sustainable well-managed forests in Oregon, or will building products be produced from distant less climate friendly sources?	M7-Accountability
Research	Would like to see more research on Douglas-fir root rot.	A4-Pests
Research	Emerald ash borer is of top concern right now, along with so many other real and potential threats. There is overlap here with assisted migration work. We need to be much more proactive about this. Surveying, documenting and quarantining is a reactive approach. We need to be actively exploring ways to combat these pests, as well as explore new/modified species that are more resilient to these pests.	A4-Pests
Research	Larger field trials and studies on migrating commercial tree species to different areas, not just in controlled settings, but out in forested areas. A long-term issue solution, may not solve more immediate concerns.	A7-Assisted Migration
Research	There is so much work to do here. We are currently employing a bit of a "throw everything at the wall and see what sticks" approach. We need to build dramatically on the existing research and crowdsource real world experience with assisted migration in order to inform what new species to plant where and when.	A7-Assisted Migration
Research	Look at biochar methods or long term storage of forest carbon.	DC3-Carbon Loss in logging
Research	Research synthesis spearheaded by a trusted organization such as the PacNW Research Station. Regular updates as the science changes. Mitigation strategies should be incorporated into the same BMPs for the region.	M3-Soil Health