McDonald-Dunn Forest Management Planning
June 5 Community Input Session
Questions & Answers

BACKGROUND:

As part of the development of a new plan for the McDonald-Dunn Forest, modeling exercises were conducted to enable assessment of tradeoffs associated with various management alternatives. The Community Input Session on June 5, 2024, was arranged with the goal of providing an opportunity for community members to provide feedback on the results of the first round of modeling, to be used to guide the second round. Although not the intent of the June 5 Community Input Session, public comments were accepted on all topics regarding the OSU Research Forests. Thus, questions in subsections I and II below pertain to the modeling. Questions in subsections III and IV concern the planning process and forest management more broadly.

For a glossary of key terms, refer to the end of this document (p. 14).

COMMUNITY INPUT SESSION Q&A:

I. Metrics used to represent forest values in round 1 modeling

Q: How is the metric called *resilience-density* calculated, and what is the rationale for assuming that tree removal would increase forest resilience?

A: *Resilience-density*, along with *Resilience-composition* (see below), is one of two metrics included in the modeling to help assess tradeoffs among different land allocation scenarios. Resilience is a measure of a forest's adaptability to a range of stresses. Given the complexity of forest ecosystems and unknown future climatic conditions, there is uncertainty as to which forest characteristics could promote resiliency to stressors anticipated to increase in frequency and/or severity due to changing conditions, such as drought, wildfire, insects, and pathogens. This metric reflects forest density and is defined as stand density index (SDI, a measure of the stocking of a stand of trees based on the number of trees per unit area and diameter at breast height of the tree of average basal area) relative to maximum possible stand density index in the region. Stand density is known to be influential to forest vulnerability to several stressors that may increase in response to changing climatic conditions (see Moreau et al. 2022 and references therein for more details). For the metric used in this modeling, lower values reflect dense stands that typically experience greater individual tree and stand stress, whereas higher values reflect more open spacing that can provide a greater pool of resources to individual trees to handle moisture stress and/or assault from insects or diseases, which require such resources to effectively repel. Raw values could range from 0 to 100%, and were converted to scores of 0 to 5 to simplify interpretation (see handout from Community Input Session). For more insight, see Heiderman and Kimsey 2023; North et al. 2022; Woodall and Weiskittel 2021; Withrow-Robinson and Maguire 2018.

Q: How is the metric called *resilience-composition* calculated, and what is the rationale for assuming that harvesting will increase forest resilience?

A: *Resilience-composition*, along with *resilience-density* (see above) is one of two metrics used in the modeling to help assess tradeoffs among land allocation scenarios. Resilience is a measure of a forest's adaptability to a range of stresses. Given the complexity of forest ecosystems and unknown future climatic conditions, there is uncertainty as to which forest characteristics could promote resiliency. The metric reflects the degree of dominance of the most common tree species in the region, Douglas-fir. It is derived as % of total basal area (a common way to describe stand density, calculated as the cross-sectional area of trees at breast height) that is some tree species other than Douglas-fir.

[% Non-Douglas-fir basal area = Non-Douglas-fir basal area / Total basal area x 100].

Raw values could range from 0 to 100%; these were converted to scores of 0 to 5 to simplify interpretation (see handout from Community Input Session). Lower values indicate forests are dominated by the dominant species (Douglas-fir), which may mean greater susceptibility to stressors associated with changing climatic conditions, such as drought and pressure from insects and pathogens, whereas higher values indicate greater prevalence of trees of other species, which may mean lower stand-level susceptibility to stressors if these other species have greater capacity to survive under changed conditions. Few stands in the region exceed 40% basal area in species other than Douglas-fir, so the maximum score of 5 reflects >40% basal are of any tree species other than Douglas-fir. For more insight, see Ammer 2018; Jactel et al. 2017.

Q: How is the metric called *recreation acceptability* calculated?

A: This metric included in the modeling to assess tradeoffs among land allocation scenarios is intended to serve as a reflection of forest condition preferences by recreational users of the forest. A group of five OSU faculty and staff developed a survey, informed by prior peer-reviewed studies, which was pre-tested in an OSU class before use. Respondents were shown 14 photos, always in the same order, some online and some at forest trailheads. Respondents who took the survey online were shown each photo in a compressed size with the option to enlarge it, whereas respondents intercepted at trailheads were shown individual 8.5"x11" laminated photos. Each photo represented a different forest stage with diverse tree sizes, densities, and ground cover at various times after disturbance. Individuals were asked to “rate how acceptable each scenic condition is for maintaining the desired quality of your recreational experience”. Ratings were on a scale of 1 to 5, with 1 being “very unacceptable” and 5 “very acceptable”.

This approach of showing photos and requesting recreation acceptability ratings has been in use for decades (Daniel & Boster 1976, Yang et al. 2021, Lupp et al. 2022). Steps were taken to ensure that the total number of individuals representing each recreation type was proportional to known recreational use of the McDonald-Dunn Forest (e.g., 31% mountain biking, 27% trail running, 23% walking or hiking, 12% dog walking, 4% horseback riding, and 4% hunting). After silvicultural experts estimated the length of time stands would be in conditions depicted by each photo for each of the 5 management strategies, photo scores were multiplied by the number of years spent in each, and then multiplied by the percent of acreage of each management strategy in each scenario. Data from 51 individuals was generated by asking members from the Forest Recreation Advisory Council to distribute the survey to members within their respective recreation community groups (e.g., mountain bikers, equestrians, runners), and to round out the sample, Research Forest staff intercepted visitors at trailheads and administered the survey to community trail work volunteers. The responses were anonymous and contained no personal identifying information.

To expand on this effort, a graduate student in the department of Forest Ecosystems and Society at OSU is now conducting a larger randomized and systematic survey, using the same set of photos, to examine visitor perceptions of forest management practices in the McDonald-Dunn Forest in greater depth, to inform future management decisions.

Q: How were expert opinions distilled into absolute numbers and percents for the biodiversity metric?

A: Biodiversity is a measure of the variety of life in an area. The metric used in these analyses to assess tradeoffs among land allocation scenarios is intended to reflect habitat suitability of several groups of organisms that depend on the forest: bees, early successional birds, late successional birds, red tree voles, ungulates like deer and elk, and amphibians like frogs and salamanders. Groups of experts on forest habitat relationships for each of these specific organisms in the Pacific Northwest were convened to provide insight into relationships between habitat quality and forest stand conditions. Each individual provided their expert knowledge on how habitat suitability would change over a 125-year period for each of the 5 proposed management strategies for the research forest, according to the guidelines derived to describe their management. The single number associated with each scenario reflects the average habitat suitability score across the 125-year period for each group of organisms, given the proportion of each management strategy in that scenario.

Q: How and why were the organisms included in the biodiversity metric chosen and why were other species of concern not included?

A: The groups of organisms included in the biodiversity modeling exercise were selected by experts knowledgeable about wildlife and fish in forests of the Pacific Northwest. Each of these organisms are known to occur within the McDonald-Dunn Forest. There is also considerable understanding of how stand characteristics (e.g., tree age, density) and forest management activities impact habitat quality for each of these groups. Organisms not currently known to use the forest were not included. Also, organisms were not included if there is substantial uncertainty about how stand characteristics or forest management may impact their habitat over time.

Q: Does the biodiversity metric include invasive and non-native species? Technically, biodiversity will increase with invasive and non-native species, too.

A: The organisms included in the biodiversity assessment were bees, early seral birds, late seral birds, red tree voles, amphibians like frogs and salamanders, and ungulates like deer and elk. Non-native or invasive species were not included.

Q: Why is there not more attention on biodiversity in the soil in the modeling, and how that biodiversity is affected with various forest management scenarios?

A: Soil microbiota (the bacteria, fungi, archaea, protists and algae living within soil) are undoubtedly an important element of forest biodiversity (see Anthony et al. 2023, Geisen et al. 2019). However, place-based understanding of relationships between forest management activities and stand age and habitat suitability for this microbiota is limited at the present time. Relationships between soil microbiota biodiversity and management activities is a topic that could be investigated through research on the McDonald-Dunn Forest in the future, to generate new understanding that helps inform management decisions, but is not available at the current time to be used in this modeling exercise.

Q: In the biodiversity metric, to what extent are the needs of species of concern and/or species expected to fare poorly in future conditions, weighted differently?

A: There was no weighting of any of the metrics reflecting the various groups of organisms that were included in the biodiversity metric. Unweighted scores provide a clearer understanding of how allocating more or less of the forest to any of the 5 management strategies might affect each group. Given uncertainty around future climatic conditions, it would be challenging to predict which of these organisms are likely to be affected most by changing conditions.

Q: In scenario E, why do red tree voles and amphibians decrease even though acreage of managed forest reserves increases? Likewise, if acreage of riparian areas, meadows, and managed reserves increases, why do amphibian numbers decrease?

A: Scenario E is comprised of 15% even-aged short rotation, 15% even-aged long rotation, 15% multi-aged/multi-species, 19% managed reserves, 19% ecosystems of concern, and 17% long-term learning and non-forest. This scenario contains a higher proportion of acreage in managed reserves relative to any other scenario modeled. These reserves are expected to provide high quality habitat for red tree voles. However, this scenario also includes more acreage for meadow, oak, and riparian areas than all others, which are all low-quality habitat for red tree voles. At a landscape scale, this means advantages gained by these organisms with more managed reserves are likely offset by disadvantages of more ecosystems of concern. Similarly, advantages gained by amphibians through more reserves and riparian are likely offset by disadvantages of more oak.

Q: Who are the experts involved in the biodiversity metric development?

A: The process being used to develop the McDonald-Dunn Forest Plan involves two committees, an Internal *Faculty Planning Committee* (FPC) and an external *Stakeholder Advisory Committee* (SAC).

As noted on the planning process website, the individuals on the Faculty Planning Committee (FPC) are:

- John Bailey, OSU, Department of Forest Engineering, Resources, and Management. Expertise: silviculture; fire; forest health and biodiversity; forest, wildlife and landscape ecology
- Kevin Bladon, OSU, Department of Forest Ecosystems and Society. Expertise: aquatic ecosystems; ecohydrology; hydrology; soil science; watershed hydrology
- Mindy Crandall, OSU, Department of Forest Engineering, Resources, and Management. Expertise: Forest economics; forest policy; human dimensions; rural development
- Vernita Ediger, OSU, Department of Forest Ecosystems and Society. Expertise: collaborative natural resource management
- Cristina Eisenberg, OSU, College of Forestry, Dean's office. Expertise: Traditional Ecological Knowledge; fire ecology; ethnobotany; soil ecology; wildlife ecology; restoration ecology; ecocultural restoration
- Tiffany Garcia, OSU, Department of Fisheries, Wildlife, and Conservation Sciences. Expertise: aquatic ecosystems; community ecology; conservation biology; herpetology
- Mark Kerstens, OSU, Department of Forest Engineering, Resources, and Management. Expertise: avian ecology; silviculture; fire ecology; forest health and biodiversity; forest ecology; forest management
- Dave Lewis, OSU, Department of Applied Economics. Expertise: environmental and resource economics; ecosystem services; conservation science; climate change and natural resources; non-market valuation
- Ian Munanura, OSU, Department of Forest Ecosystems and Society. Expertise: sustainable recreation and tourism; social science; policy and natural resources; integrated social and ecological systems
- Laurie Schimleck, OSU, Department of Wood Science and Engineering. Expertise: wood anatomy; wood property responses to silvicultural treatments

Individuals on the Stakeholder Advisory Committee (SAC) are:

- Jennifer Beathe, Starker Forests
- Dave Ehlers, Oregon Small Woodlands Association, Benton County

- Jim Fairchild, Audubon Society
- Trey Jackson, Forest Recreation Advisory Committee, Team Dirt
- Michael Karnosh, Confederated Tribes of Grand Ronde
- Elise Kelley, Oregon Department of Fish and Wildlife
- Mike Kennedy, Confederated Tribes of Siletz Indians
- Jessica McDonald, Greenbelt Land Trust
- Jesse Ott, Benton County Natural Areas and Parks
- Kaola Swanson, Sustainable Northwest
- John Taylor, forest neighbor, Oak Creek area
- Leo Williamson, Oregon Department of Forestry
- Faye Yoshihara, forest neighbor, Soap Creek area

Input on biodiversity modeling was provided by:

- Matt Betts, OSU, Department of Forest Ecosystems and Society. Expertise: landscape ecology; wildlife ecology; biodiversity conservation; avian species
- Meg Krawchuk, OSU, Department of Forest Ecosystems and Society. Expertise: conservation biology; landscape ecology; fire ecology
- Graham Frank, OSU, Department of Forest Ecosystems and Society. Expertise: plant and wildlife response to disturbance; early seral forest management
- Tiffany Garcia, OSU, Department of Fisheries, Wildlife, and Conservation Sciences. Expertise: aquatic ecosystems; community ecology; conservation biology; herpetology
- Joan Hagar, U.S. Geological Survey. Expertise: ecosystem ecology; forest ecology; natural resources; wildlife ecology; avian species
- Scott Harris, Institute for Applied Ecology. Expertise: stream and forest restoration; wildlife; ecological monitoring; community-based conservation
- Mark Kerstens, OSU, Department of Forest Engineering, Resources, and Management. Expertise: avian ecology; silviculture; fire ecology; forest health and biodiversity; forest ecology; forest management
- Katie Moriarty, National Council for Air and Stream Improvement. Expertise: biodiversity and conservation; forest ecology; animal movement; multi-scale habitat selection; novel tools and technologies
- Jason Piasecki, National Council for Air and Stream Improvement. Expertise: wildlife biology; data analysis
- Jim Rivers, OSU, Department of Forest Engineering, Resources, and Management. Expertise: wildlife ecology; disturbance ecology; conservation biology; ecology and conservation of native pollinators; wildlife conservation in managed forests
- Thomas Stokely, The Nature Conservancy. Expertise: forest ecology; conservation biology; forest management; silviculture
- Jimmy Taylor, National Wildlife Research Center. Expertise: social behavior; habitat utilization; trophic interactions; management of aquatic furbearers, bears, deer, elk, crows, gallinaceous birds, and rodents
- Dana Warren, OSU, Department of Forest Ecosystems and Society. Expertise: aquatic ecosystems; fish ecology
- Rachel Zitomer, Department of Forest Ecosystems and Society. Expertise: biodiversity conservation; community ecology; pollinators

Q: Are the metrics related to the eight forest values weighted and if so, how?
A: No, the metrics are not weighted in the current modeling. The eight forest values that were assessed (e.g., carbon, wildfire resistance, etc.) were selected to equip anyone who provides input on the scenarios with an understanding of how devoting more or less of the forest to any one of the five management strategies might affect the aspirations that they individually hold for the forest. The Community Input Session on June 5 was structured to allow anyone who wanted to weigh in on the first round of modeling to provide their opinion on which forest characteristics they most value. Input received will be used to select scenarios to model in the second round of analyses.

II. Scenarios Investigated and Assumptions and Constraints of the Model

Q: Why is harvest involved in each of the 5 scenarios?
A: The McDonald-Dunn Forest is an actively managed forest, and active management involves harvest. The vision of the OSU Research Forests is "to be globally recognized as a model for an actively and sustainably managed forest system that supports the College's desire to advance forestry through scientific inquiry, education, and the application of new knowledge to inform best practices of forest management." One of the three missions is "to demonstrate how an actively and sustainably managed forest fosters economic prosperity, biodiversity conservation, and resilience amidst disturbances and global change."

The missions of the research forest are rooted in honoring the intent of the original donation of the land. Oregon State University acquired each of the research and demonstration forest tracts through generous donations of land and/or gifted funds. The donations were offered with the expectation or requirement that the forests would be managed for specific purposes, such as the demonstration of forest management best practices, including sustainable timber harvest. In addition to serving the community through recreational access, providing ecosystem services, fostering biodiversity and habitat for native species, and myriad other values, the forests also provide sustainable resources and allow OSU to demonstrate and research the tradeoffs associated with various forest management approaches that help us educate students and landowners on best practices.

Q: Is the model being used a linear, static model with objective functions that are set to optimize, or is this a dynamic model?
A: The modeling uses linear programming, intended to allocate limited resources to competing activities in an optimal manner. The model optimizes a single objective function to determine an optimal solution. Constraints were added to the model to reflect resource and capacity limits. The model is deterministic. It assumes perfect information, linearity (additivity or proportionality), and divisibility. The modeling is being conducted by an external consultant with degrees in Forestry and Forest Management, who has been working on forest management planning software development and utilization for nearly 30 years. They were involved in the development of the Woodstock Forest Management planning software (i.e., the program being used for this modeling), and is a subject matter expert in forest management, spatial planning, optimization and combinatorics. More details on this type of modeling are available here.

Q: Why is it that a minimum threshold of 10 acres of oak savanna and meadow was set for restoration every 5 years, and that a maximum threshold of 750 acres was set for clearcut harvest every five years?
A: The minimum acreages for the restoration of oak and meadows were set to ensure that some effort is allocated to enhancement of these two *ecosystems of concern* within every five-year period. Restoration

is expensive and time-intensive, so the model accounts for the costs and the time needed (e.g., it takes approximately 4-5 years to complete oak restoration work because of the necessity for multiple treatments to ensure success). As for clearcut harvesting, this threshold matches the current use of this harvest technique on the research forest (approximately 100-150 acres are clearcut per year, less than 1.5% of the total forest acreage). The actual acreage harvested through this method will be influenced by the scenario ultimately selected.

III. Forest Plan Development Process

Q: Who are the modelers and experts involved in this process? Who chose and assigned them to this process?

A: The process being used to develop the McDonald-Dunn Forest Plan involves two committees, an internal *Faculty Planning Committee* (FPC) and an external *Stakeholder Advisory Committee* (SAC).

As noted on the website, the FPC has representation from five academic departments across two colleges at OSU, providing expertise on a wide variety of aspects of forest management. The FPC was appointed by the Dean of the College of Forestry and includes John Bailey, Kevin Bladon, Mindy Crandall, Vernita Ediger, Cristina Eisenberg, Tiffany Garcia, Mark Kerstens, Dave Lewis, Ian Munanura, and Laurie Schimleck.

Individuals on the SAC were appointed by the Dean of the College of Forestry and include Jennifer Beathe, Dave Ehlers, Jim Fairchild, Trey Jackson, Michael Karnosh, Elise Kelley, Mike Kennedy, Jessica McDonald, Jesse Ott, Kaola Swanson, John Taylor, Leo Williamson, and Faye Yoshihara. The SAC has representation from Tribal natural resource managers, state and local agencies, NGOs, private industry, and forest neighbors.

The modeling is being done by an external consultant with degrees in Forestry and Forest Management, who has been working on forest management planning software development and utilization for nearly 30 years. They were involved in the development of the Woodstock Forest Management planning software, and are a subject matter expert in forest management, spatial planning, optimization and combinatorics.

Q: Why don't you use more experts and professors from other colleges at OSU or fisheries and wildlife to do species surveys or gather data on the forests or to be on the Faculty Planning Committee as part of the forest plan development process?

A: The Faculty Planning Committee was designed to represent expertise across a wide variety of disciplines relevant to forest management, including fire ecology, forest health, silviculture, hydrology, forest economics, forest policy, Indigenous Knowledge, avian ecology, amphibian ecology, environmental economics, climate change, recreation, and wood products. Given that the College of Forestry has over 70 faculty who are experts on various aspects of forests and their management, a large number of individuals with the most pertinent expertise will come from this college rather than other units of the university. Two of the ten individuals on the committee (20%) are from departments external to the College of Forestry.

As for faunal surveys, such surveys are conducted on the McDonald-Dunn Forest by external consultants on an annual basis for owls and for fish.

Lastly, research is regularly conducted by faculty and students from various colleges across OSU beyond the College of Forestry. For example, research publications emerging from data collection on the Research Forests from just the past few years (2020-2023) includes these units outside the College of Forestry: *Animal and Rangeland Sciences*; *Biochemistry and Molecular Biology*; *Biological and Ecological Engineering*; *Fisheries, Wildlife and Conservation Sciences*; *Integrative Biology*; *Mechanical, Industrial, and Manufacturing Engineering*. More details on recent and historical research are available here and here.

Q: How do you deal with the conflicts of interest with the timber industry when creating this plan?
A: Oregon State University is Oregon's land grant university, and as such, we have an obligation to engage with respective industries, to not only produce skilled graduates, but to contribute research that is of service to and informs the work and policies of government and industry. Just as the College of Earth, Ocean, and Atmospheric Sciences works with the fishing industry, and the College of Agricultural Sciences works with the agricultural industry, the College of Forestry works with the forest industry—including the conservation, wildfire, timber and natural resource sectors. These industries do not control or dictate the work of the colleges or OSU, however. The disclosure of funding sources and potential conflicts is essential in conducting research. The CVs of our faculty, which transparently list the sponsors of all research, are posted publicly in the college directory.

Additionally, the Forest Management Plan committees are intentionally structured to provide a balance of influence across various disciplines and ways of thinking. Two committees have been working to develop the forest plan. One of these, the *Stakeholder Advisory Committee*, is comprised of individuals external to the university with representation from Tribal natural resource managers, state and local agencies, NGOs, private industry, and forest neighbors. Of the 13 members, there is one individual (i.e., 8% of the committee) representing private industry.

The new plan is grounded in five management strategies. Each of these strategies was developed to represent a different set of management objectives typical of forestland owners and managers in Oregon and beyond. These five management strategies reflect approaches currently in use across the Pacific Northwest, including by industry. By deploying them throughout the McDonald-Dunn Forest, we provide opportunities for research, teaching, and demonstration across a wide variety of forest management approaches.

Q: Can you provide information about the long-term research happening on the 90 stands within the research forests? How long has some of that research been going on there?
A: There are currently eight long-term research projects on the McDonald-Dunn Forest. These include (1) Pole Wood Preservation Study, (2) College of Forestry Integrated Research Project (CFIRP), (3) Stand Density Management Cooperative Douglas-Fir Spacing Study, (4) Urban Fringe Study, (5) Forest Peak Uneven-aged Study, (6) Mature Forest Study, (7) Purple Martin Study, and (8) Assisted Migration Study. One of these studies was initiated as early as 1925, many started in the 1980s and 1990s, and a few more recently. All but one have already been in place for over a decade. Collectively, they have resulted in dozens and dozens of publications, providing insight into many aspects of forest management.

Additional details on current research on the Research Forest is available here and older studies are described in the searchable database that begins with research from 1926.

Q: How do the availability and costs of saplings affect the revenue generation estimates in the model?
A: The research forest contracts with tree nurseries two years ahead of each harvest to secure the number of seedlings needed for post-harvest planting. Reforestation costs in the model include

expenses associated with site preparation, the purchasing of seedlings, the labor to plant seedlings, and herbicide application one year after planting to ensure seedling survival and growth. In some cases, additional costs are associated with tubing of seedlings to protect them from deer and elk browsing. All these costs are included as necessary management costs in the model. Successful reforestation is required by the Oregon Forest Practices Act and seedlings must be “free-to-grow” by year six following harvest, so all these expenses are required – not optional.

Q: Standard forest management modeling has led to a 60% decline in vertebrates since 1970. Why would a teaching institution continue to use standard models that have proven to be detrimental to health of forests and ecosystems?

A: *Forest simulation modeling* is a tool used to understand implications of forest management decisions over variable time scales. The modeling per se has no effect on forest resources. Rather, *forest management plans* are written documentation describing the goals and objectives for any given forested property, and the simulation modeling aids in making decisions on how and when to implement various actions so that those goals and objectives are achieved.

In the case of the McDonald-Dunn Forest, three missions and ten goals have been established. The missions are (1) to create opportunities for education, research, and outreach to address the economic, social, and environmental values of current and future generations of Oregonians and beyond; (2) to demonstrate how an actively and sustainably managed forest fosters economic prosperity, biodiversity conservation, and resilience amidst disturbances and global change; and (3) to support social and cultural values of forests, enhancing the wellbeing of local communities, Tribal communities, and our broader citizenship. The ten goals include learning/discovery/engagement, stewardship, research, resilient forests, working demonstration forests, recreation, community connection, financial sustainability, accountability, and continuous improvement.

The individuals responsible for developing the new management plan for the McDonald-Dunn Forest developed 5 management strategies with the intention of setting up the forest so that it contains conditions over time that provide opportunities for research, teaching, and outreach that addresses questions about how forest management actions affect a range of important values in Oregon and the PNW. The aim is to purposefully create a variety of conditions at all points in time so students or researchers could find the conditions they need for research, teaching, or outreach, while also providing conditions to support biodiversity.

Q: Why are the public comments about the research forest planning process not included or reflected in these meetings and in the presentations?

A: Input from the two Community Listening Sessions held in 2022 was considered by the two committees that have been working on developing the plan over the course of the past two years. The primary goal of these listening sessions was to hear from the community about what they wanted to see in the plan to ensure the forests provide learning opportunities, demonstrate balancing of multiple objectives, provide opportunities for recreation and community connections, and ensure sound management in the face of changing climatic conditions. The *Faculty Planning Committee* has met 22 times since summer 2022, and the *Stakeholder Advisory Committee* has met 9 times. In late 2022 and early 2023, the two committees drafted a document describing the overarching principles of the new forest plan, which included sentiments expressed at these 2022 listening sessions. This will be included as an appendix in the plan.

The Community Input Session held on June 5, 2024, was hosted specifically to solicit feedback regarding decisions about the allocation of land management strategies across the forest. The College of Forestry is grateful for the feedback provided on this topic.

The college is open to input from the public regarding on other research forest matters, and the forest management planning committees will consider the feedback that has been provided, but ultimately must choose what aligns with the forest management plan and fulfills the research, education and outreach missions of the university.

Q: Why is there no response or summary of the public comments about this planning process?
A: Anyone can provide comments at any time through the webform developed for this purpose: submit comments here. These comments are archived here so that anyone can read them at any time. Members of both committees involved in the plan development process (*Faculty Planning Committee* and *Stakeholder Advisory Committee*) are regularly encouraged to read these.

Q: Will the planning process reflect on the public comments and change course?
A: The college is open to input from the public, and we read and consider all feedback. Ultimately, the planning committees must develop a plan that aligns with the research, education and outreach missions of the university, and the established goals of the research forests that are rooted in the original donors' intent for the land to be used as a research and demonstration forest that provides a mix of forest values.

Q: Why will the protected stands become managed reserves? If trees can be removed for public safety or visual aesthetics, how can we trust that trees selected for removal need to be taken out?
A: Forest stands designated for the 'managed reserves' status would be managed under specific circumstances, such as reforestation after unexpected natural events (e.g., windstorm, wildfire), to remove invasive plants, and to promote and maintain historical older-forest structural and compositional diversity. Safety concerns could involve removal of "hazard trees" with structural defects that increase the likelihood of toppling which could cause personal injury to forest visitors and researchers. A full description of anticipated management can be found in these guidelines, which reflects growing recognition of the importance of managing older forests. For more insight, see USDA Forest Service FAQs.

IV. Research Forest Operations

Q: Why do you clearcut? Is there a science related to it and is it truly sustainable?
A: Clearcutting is a common forestry practice in many forest types across the globe. It entails harvesting most or all trees in a forest stand followed by either natural regeneration (natural seeding) or intentional planting of tree seedlings. Harvesting through clearcuts is useful in creating large openings (much like a natural disturbance) for regenerating trees species that require a lot of sunlight, like Douglas-fir. Clearcutting is not appropriate in all forest types, nor will it accomplish the desired forest management objectives for all forest owners. However, clearcutting is a particularly effective tool to regenerate shade-intolerant tree species, such as Douglas-fir, and to provide habitat for wildlife that require open, early-seral forest conditions.

Clearcutting is one of several silvicultural techniques used to manage the McDonald-Dunn Forest, applied to <1.5% of the forest each year. Clearcuts on the OSU Research Forests are designed differently than those in an industrial forestry setting. They are small – 30-acres or less, with the majority closer to 10-15 acres – and are designed to mimic a disturbance, much like what would be seen after a moderate fire. These clearcuts create an opening in the forest but leave a significant number of trees behind to protect legacy trees and maintain forest aesthetics, structure and habitat. The College of Forestry research forests are managed differs from current industry practices on purpose, so that new insight is gained through the testing of different techniques.

Oregon Department of Forestry stipulates that tree seedlings planted after a clearcut harvest need to be "free-to-grow" by year six following harvest. Clearcuts 25 acres and larger are required to have a minimum number of retained snags (dead trees), green trees (live trees), and downed logs to provide habitat and maintain forest structure. All clearcut harvests on the McDonald-Dunn Forest meet or exceed expectations of Oregon's Forest Practice Rules.

Clearcuts on the McDonald-Dunn contribute to sustainably ensuring the forest contains multi-aged stands across a landscape scale that support the forests' diverse ecosystems and research and demonstration missions for generations to come.

Q: What about the global carbon market and entering into the offset market? Carbon stored in the trees is worth more than can be captured in revenue by cutting them down.

A: Trees are certainly valuable for capturing carbon and could potentially provide revenue in an offset market to fund some of the maintenance and management of the Research Forests (Putney et al. 2023). That said, due to the way the carbon offset markets work at the present time, carbon revenue is not a viable option for the College of Forestry. Even if all timber harvest were stopped on the McDonald-Dunn Forest, the "carbon revenue" that would be earned would only cover a small fraction of the forest operational costs, such that many of the expenses required to keep the forest functioning as a learning environment could not be sustained (e.g., roads, buildings, signs, fuel reduction, invasive species reduction, etc.) would not be covered. Furthermore, active management will always remain a core tenet of the research forests' mission as a tool for research, teaching, and demonstration. As markets evolve, the College will continue to evaluate whether entering the carbon market aligns with our vision, mission, and goals, and is feasible and financially viable.

Q: What is the college doing to increase fire resilience in the forest and to protect surrounding homeowners?

A: The approach taken on the McDonald-Dunn Forest for the past decade is to make it more "fuel porous." This means reducing fuel loading, density, and continuity across the forest. That is accomplished through timber harvests, thinning, and fuel reduction projects, as well as restoration treatments. An excellent example of this is the Timberhill harvest scheduled for summer 2024. This harvest will reduce ladder fuels near a new housing development, while supporting the vigor of existing Oregon white oak. In addition, we reduce crown fuels adjacent to roads to provide fuel breaks, provide for better firefighter access and place to anchor firelines. The goal of these efforts is to reduce fuel overall and create a patchier forest that is less likely to sustain a crown fire. It is important to note that not all areas of the forest can be treated to reduce fuels, due to ongoing research efforts, forest reserves, or restrictions in other special areas. Our approach to increase wildfire resilience recognizes that both the Research Forest and the surrounding landowners have a shared responsibility to reduce the risk of wildfire ignition and spread.

Q: Why has the McDonald-Dunn Forest been managed so much more aggressively in the last 5 years compared to the previous 25? The amount of clearcuts, harvesting, closures, logging and activity seems to have increased.

A: As harvests rotate throughout the 11,500 combined acres of the McDonald-Dunn Forest, there are times where harvest activity is more visible to recreational forest users and community members because management is near popular trails or local roads, however, the overall harvest level has remained the same across the combined McDonald-Dunn Research Forest over time. Following the implementation of 2005 Forest Plan, there was more harvest activity on the *Dunn Forest* for about a decade and less on the McDonald. Because the two forests are managed collectively as the McDonald-Dunn Research Forest, sustainable harvest activity will vary over time on each of the two individual forests, but overall sustainable harvest will remain constant and below the anticipated harvest volume outlined in the existing 2005 Forest Plan of 6 million board feet per year.

Q: Does anyone at OSU teach "The Hidden Life of Trees"? Does any professor have any knowledge of the concepts covered therein? Has anyone at the College of Forestry ever looked at a tree or hugged a tree?

A: As with many books on trees and forests, the concepts from "The Hidden Life of Trees" are frequently discussed in classes and field labs for courses on general ecology, forest ecology, silviculture, forest soils, entomology, pathology, fire ecology, and tree physiology. Across the various research areas and disciplines within the College of Forestry, many of our staff, faculty and students have dedicated their lives and careers to the health and resilience of our forests, with a deep reverence for how trees support many aspects of our lives. And yes – there are many tree huggers among us!

Q: One of the goals of the research forest is to be financially sustainable and use the revenue to fund teaching, research and outreach but I thought that was what tuition was for?

A: The Research Forests receive no outside funding — not from OSU, the state, taxpayers or the College of Forestry. They are entirely self-sustaining. Revenue from harvests keeps the forests operational and open to recreational users. Financial sustainability is based on revenue generated from long-term sustainable timber harvests in the forest. Tuition is used to support the academic mission of the university (e.g., provides support for the faculty, graduate assistants, and staff that deliver academic programs; the physical infrastructure supporting those programs; and the service, support and administrative functions that allow those programs to work). Tuition does not fund research or outreach activities: support for these endeavors must come from other sources.

Q: Another goal of the research forests is accountability. Who was accountable for removing the old growth and eliminating the spotted owl in the McDonald-Dunn Forest?

A:: The McDonald-Dunn Forest has never had large concentrations of old growth Douglas-fir. Kalapuyan people cared for the land that is now the McDonald-Dunn for generations prior to Euro-American colonization. Under their stewardship, the majority of the lands that now make up the McDonald-Dunn were historically oak savannah and fairly open Douglas-fir conifer forest. When OSU began acquiring the McDonald-Dunn through a series of generous donations starting in 1926, the lands were largely cut-over fir plantations. The college has actively managed the forests since that time and currently, about 3.7% of land in the McDonald-Dunn Forests is old forest reserves. In addition, we strive to preserve the largest trees and legacy trees within harvest boundaries, unless they are structurally deficient and/or pose hazard to infrastructure (nearby roads and structures) or recreational forest users.

Surveys for owls are conducted annually across the McDonald-Dunn Forest. The last documented successful nest from northern spotted owls (*Strix occidentalis caurina*) occurred in 2008. Barred owls (*Strix varia*), historically resident of the eastern U.S., first appeared in the McDonald-Dunn Forest in the late 1990s and have been documented here nearly every year since 2000. Barred owls are slightly larger and more aggressive than northern spotted owls, have a wider dietary niche, and can exist at higher densities. It appears that northern spotted owls have been displaced by barred owls on the forest, a phenomenon that is occurring across much of the western U.S. (Long & Wolfe 2019; Wiens et al. 2021).

Q: What are the research questions driving the research on the OSU Research Forests?

A: One tenet of the new management plan for the McDonald-Dunn Forest is the 5 management strategies that were thoughtfully developed with the intention of setting up the forest so that it contains conditions over time that provide opportunities for research, teaching, and outreach that could address questions about how forest management actions affect a range of important values in Oregon and the Pacific Northwest. The aim is to purposefully ensure a variety of conditions at all points in time so a student or researcher could find appropriate conditions for whatever research, teaching, or outreach needs they have.

The research questions being addressed change over time. Here are some examples of topics currently being investigated:

- Measurements of the amount of standing carbon on the forest utilizing forest inventory and remote sensing techniques
- Forest management effects on above-ground carbon capture
- Historic fire frequency and intensity and effects on forest structure
- Restoration of meadows, prairies, oak woodland and oak savannah
- Role of snag characteristics in providing habitat for purple martins
- Forest-based recreation constraints for people of color
- Effects of forest management activities on habitat for bees
- Tradeoffs in drought tolerance and productivity in Douglas-fir forests

Additional details on current research on the Research Forest is available here and older studies are described in the searchable database that begins with research from 1926.

Q: How do I get connected with the recreation committee/ board at the OSU Research Forest to get more involved?

A: Individuals interested in being more involved in the Forest Recreation Advisory Council can contact the research forest Recreation and Engagement Manager, Jenna Baker.

GLOSSARY:

Basal area: This is the cross-sectional (circular) area of a tree. It is measured at breast height (4.5 feet above the ground) and taken on the uphill side of the tree. The sum of the basal area for all trees in the stand is the total basal area, a common measure of stand density and tree size.

Canopy: The forest cover of leaves, branches, and foliage formed by tree crowns. There may be several canopy layers.

Disturbance: 1. Change in environmental conditions that affects the structure or function of an ecosystem. 2. Any relatively discrete event in time that disrupts ecosystems, community, or population structure and changes resources, substrate availability, or the physical environment. Disturbance a) is a key driver of ecological dynamics and diversity; b) can be caused by natural or human factors, such as wind, fire, drought, disease, or land use; c) can occur over short or long periods of time; d) can have positive or negative impacts on biodiversity.

Dominant (crown class): Trees with crowns extending above the general level of the main canopy of even-aged stands or, in uneven-aged stands, above the crowns of the tree's immediate neighbors, and receiving full light from above and partly from the sides.

Early successional: Forest communities characterizing early stages of ecosystem development following a disturbance.

Late Successional Forests: Include a variety of structural features that require prolonged periods to develop following stand-replacing disturbances such as: large- diameter live trees, varied tree diameters, a multi-storied canopy structure, some trees with complex crowns and branching structures including broken tops and significant amounts of epicormic branching, a range of tree, shrub, and herbaceous species in varied densities and spatial patterns, high volumes of large-diameter deadwood, and varied canopy cover including canopy gaps and openings interspersed among patches of higher canopy cover with mean canopy cover > 40% at the stand-scale. Stands dominated by older trees (i.e., > 65 years old) or large-diameter trees, but otherwise lacking several listed features may be mature, but do not qualify as "complex" mature or late-successional forests.

Linear Programming: a mathematical technique for maximizing or minimizing a linear function of several variables, such as output or cost.

Resilience: The capacity of a plant community or ecosystem to recover pre-disturbance ecosystem structure and function following a disturbance.

Stand: A contiguous group of trees sufficiently uniform in age class distribution, composition, and structure, and growing on a site of sufficiently uniform quality, to be a distinguishable operational or management unit.

Stand density index (SDI): A measure of the stocking of a stand of trees based on the number of trees per unit area and DBH of the tree of average basal area. It can also be defined as the degree of crowding within stocked areas, using various ratios based on crown length or diameter, tree height or diameter, and spacing.

Structure: The horizontal and vertical distribution of components of a forest stand including the height, diameter, crown layers and stems of trees, shrubs, herbaceous understory, snags, and down woody debris.

Species composition: The number of different living organisms within a given ecosystem or management unit.

Taxa: A scientifically classified group of any rank, such as a species, family, or class.