

## **An Introduction to Draft Measurable Outcomes for the Draft Western Oregon State Forest Management Plan**

The Forest Management Plan (FMP) contains a number of planning terms – guiding principles, goals, and strategies. Additionally measurable outcomes, quantifiable targets, and standards can further define how resources will be managed and progress will be measured. Planning terms and associated definitions are described below in attachment 1: Planning Terms.

This document focuses on measurable outcomes. Measurable outcomes are being used in the revised Forest Management Plan (FMP) to both provide the basis for strategies and as well as test the effectiveness of those strategies in achieving FMP goals. For instance, an FMP goal of “Contribute to a range of wildlife habitat types” is quite broad, and means very different things to different people. Coupling this goal with measurable outcomes provides clarity:

- Maximize habitat extent for native wildlife species;
- Maximize within-stand physical and biological diversity;
- Maximize diversity of habitat types

These outcomes provide a basis for site-specific and landscape level strategies for the goal, they are measurable and can be further detailed and specified in monitoring plans.

This gives rise to an important distinction between measurable outcomes in the FMP and more specific objectives and monitoring questions identified through the Implementation Planning (IP) process. For instance, maximizing a diversity of habitat types (as balanced against other measurable objectives) will translate into identification of specific areas and management activities designed to promote complex habitat across seral stages. These objectives can be monitored for both compliance and the effectiveness of the management prescriptions.

In addition to IP design, standards related to FMP goals will be codified in State Forests Division Operational Policies, such as snag and green tree retention standards established to help maximize within-stand physical and biological diversity. Implementation and effectiveness of these standards will be monitored using the same monitoring plans.

ODF will actively engage the counties and stakeholders at all levels of these process, including involvement in the development of measurable outcomes, setting IP objectives and associated monitoring questions, and seeking input on operational policies that are related to the FMP. In doing so, ODF intends to build a more robust and meaningful engagement around the management of Board of Forestry Lands and continued support for the delivery of Greatest Permanent Value.

What follows are a set of Draft Measurable outcomes. These outcomes are all considered in the context of Greatest Permanent Mandate which calls for balancing multiple forest management objectives. As such, none of the measurable outcomes can be considered in isolation- but rather a collective measure

of striking the right balance and understanding policy tradeoffs intended to achieve social, economic, and environmental benefits over the long term and across the landscape.

**Draft Measurable Outcomes for the  
Draft Western Oregon State Forest Management Plan**

What follows are a set of Draft Measurable outcomes proposed to be included in the Draft Western Oregon State Forests Management Plan. These outcomes are all considered in the context of Greatest Permanent Mandate which calls for balancing multiple forest management objectives. As such, none of the measurable outcomes can be considered in isolation- but rather a collective measure of striking the right balance and understanding policy tradeoffs intended to achieve social, economic, and environmental benefits over the long term and across the landscape.

**Measurable Outcome for Recreation, Education, and Interpretation (REI)**

*Numbers are adjacent to Measurable Outcomes*

Minimize recreational impacts to resources

1. Minimize recreational impacts to resources near developed recreation sites
2. Minimize recreational impacts to resources away from developed recreation site

Increase user safety

3. Increase staffing levels for law enforcement, ODF, and camp hosts
4. Enhance safety of existing recreation sites and amenities

Maximize visit quality

Improve infrastructure

5. Increase quality of infrastructure for visitors
6. Increase availability of infrastructure

Improve accessibility

7. Increase access to recreational opportunities
8. Increase access to nature
9. Increase access to learning opportunities

## 10. Maximize diversity of REI options within a forest setting

### Greatest Permanent Value:

(1) As provided in ORS 530.050, “greatest permanent value” means healthy, productive, and sustainable forest ecosystems that over time and across the landscape **provide a full range of social**, economic, and environmental benefits to the people of Oregon. These benefits include, but are not limited to:

#### **(f) Recreation.**

(2) To secure the greatest permanent value of these lands to the state, the State Forester shall maintain these lands as forest lands and actively manage them in a sound environmental manner to provide sustainable timber harvest and revenues to the state, counties, and local taxing districts. This management focus is not exclusive of other forest resources, but must be pursued within a broader management context that:

#### **(d) Provides outdoor recreation opportunities.**

### Notes on Measurable Outcomes (MOs) for REI:

*All Measurable Outcomes are to be considered in the context of Greatest Permanent Value which calls for balancing multiple forest management objectives over the long term and across the landscape. As such, none of the measurable outcomes can be considered in isolation- but rather a collective measure to evaluate balance and tradeoffs. Numbers below refer to Measurable Outcomes listed above.*

MO 1 & 2: Recreational impacts may occur away from or around developed recreation sites. Management approaches may differ greatly between the two types of areas. Near developed recreation sites more control is possible (signage, facilities improvement, patrols, etc.) while away from developed recreation sites control is more difficult due to the area involved. Management may instead, for instance, discourage recreation near sensitive areas. These Measurable Outcomes are considered separately in this instance because their metrics (Quantitative Targets) may need to be different.

MO 3 & 4: User safety may be enhanced by providing sufficient infrastructure such as designated parking spaces, clean water, bathrooms, signage and ensuring that the provided infrastructure is in good repair. Visitor safety can also be improved by providing sufficient staffing of law enforcement, camp hosts, and ODF REI staff. The two Measurable Outcomes both relate to safety in different ways and therefore will be considered separately.

MO 5 – 9: The quality of a visit to State Forests by recreationists depends on several factors. Visits to State Forests have increased over the last few decades, likely at a pace that current investment in REI fails to match. Therefore, visit quality would probably improve with increased availability and quality of infrastructure such as parking spaces, bathrooms, campsites, etc. (Measurable Outcomes 5 and 6). Accessibility can be improved as well. Road improvements and other actions allow visitors to access

areas for recreation (Measurable Outcome 7). Improvements in trails and other actions also enable visitors to reach areas within State Forests with high natural capital (scenic areas, wetlands, rivers; Measurable Outcome 8). Improvements in signage, interpretive trails, availability of volunteer docents, and exhibits at the Tillamook Forest Center may all represent ways of improving access to learning opportunities (Measurable Outcome 9).

MO 10: Visitors come to State Forests for many reasons, including OHV usage, horseback riding, camping, hiking, fishing, birdwatching and others. It is valuable to ensure that management decisions around REI and other aspects of forest management enable a wide array of recreation opportunities within State Forests that are related to being within a forest setting (i.e., there is no interest in creating recreation opportunities that are not related to a forest environment, but there is interest in ensuring that a diversity of State Forest-related recreational options are available).

## Measurable Outcomes for Timber Production and Harvest

1. Maximize the probability of State Forests' financial viability
2. Minimize ODF expenditures
3. Return as much revenue as possible to Counties and local taxing districts
4. Maximize the value of timber available for harvest
5. Maximize the availability of timber for future harvests
6. Maximize local employment and indirect benefit to local economies

### Greatest Permanent Value:

(1) As provided in ORS 530.050, "greatest permanent value" means healthy, productive, and sustainable forest ecosystems that over time and across the landscape provide a **full range of social, economic, and environmental benefits** to the people of Oregon. These benefits include, but are not limited to:

(a) **Sustainable and predictable production of forest products that generate revenues for the benefit of the state, counties, and local taxing districts;**

2) To secure the greatest permanent value of these lands to the state, the State Forester shall maintain these lands as forest lands and actively manage them in a sound environmental manner to provide **sustainable timber harvest and revenues to the state, counties, and local taxing districts**. This management focus is not exclusive of other forest resources, but must be pursued within a broader management context

### Notes on Measurable Outcomes for Timber Production and Harvest:

*All Measurable Outcomes are to be considered in the context of Greatest Permanent Value which calls for balancing multiple forest management objectives over the long term and across the landscape. As such, none of the measurable outcomes can be considered in isolation- but rather a collective measure to evaluate balance and tradeoffs. Numbers below refer to Measurable Outcomes listed above.*

MO 1: Financial viability for managing state forests is a long term endeavor. It involves balancing expenditures with revenues such that the forest management plan and public engagement processes are successfully implemented. This does NOT equate to "maximizing revenue to the State Forests

Division.” Sustainably managing state forests requires adequate and long-term persistence of revenue that does not rely on long-term deviation from harvest plans in order to make up for budget shortfalls.

MO 2: The State Forest Division responsibly manages resources and controls expenditures over the long-term and short-term while providing for Greatest Permanent Value.

MO 3: Sustainably managing State Forests provides long-term and short-term revenue generation for counties and local taxing districts. These revenues support multiple services and schools in rural communities.

MO 4: Managing stands, at least in part, for future timber value enhances long-term benefits to communities and revenue to counties.

MO 5: Restoring, reforestation, and young stand management are paramount to assuring future timber harvest volume and associated revenue and benefits.

MO 6: This Measurable Outcome is included to capture GPV for social and economic benefits. Local employment includes jobs for operators and mill workers. Indirect benefits include forest service sector jobs, jobs paid for by tax revenue, and other affected employment. This Measurable Outcome may potentially be shared with Recreation Education & Interpretation (REI) as REI usage of State Forests results in tourism and service industry employment.

## Measurable Outcomes for Wildlife

*Numbers are adjacent to Measurable Outcomes*

Maximize wildlife habitat

Maximize habitat extent for native wildlife species

1. Habitat for species of concern & listed species
  2. Habitat for game species
  3. Maximize within-stand structural diversity
  4. Maximize within-stand biological diversity
  5. Maximize diversity of habitat types
6. Minimize probability of wildlife extirpation in the Plan area

Greatest Permanent Value:

(1) As provided in ORS 530.050, “greatest permanent value” means healthy, productive, and **sustainable forest ecosystems** that over time and across the landscape **provide a full range of** social, economic, and **environmental benefits** to the people of Oregon. These benefits include, but are not limited to:

**(c) Habitats for native wildlife;**

(2) To secure the greatest permanent value of these lands to the state, the State Forester shall maintain these lands as forest lands and actively manage them in a **sound environmental manner** to provide sustainable timber harvest and revenues to the state, counties, and local taxing districts. This management focus is not exclusive of other forest resources, but must be pursued within a broader management context that:

**(b) Protects, maintains, and enhances native wildlife habitats**

Notes on Measurable Outcomes (MOs) for Wildlife:

*All Measurable Outcomes are to be considered in the context of Greatest Permanent Value which calls for balancing multiple forest management objectives over the long term and across the landscape. As such, none of the measurable outcomes can be considered in isolation- but rather a collective measure to evaluate balance and tradeoffs. Numbers below refer to Measurable Outcomes listed above.*

MO 1-5: These five Measurable Outcomes are specifications of the more general objective of maximizing wildlife habitat. Habitat can be thought of as areas managed for wildlife (and possibly managed for other purposes as well). We can also consider habitat quality, and distribution of the habitat (is the habitat distributed in patches? Can the species of interest travel among patches?). Habitat management strategies may be designed to benefit multiple species or specifically developed to promote individual species. Management that promotes habitat for one species may promote habitat for a wide array of species that have similar habitat needs. Measurable outcomes 1 and 2 value the amount of habitat available for species of concern, listed species, and game species.

Measurable Outcome 3 - 5 relate to valuing habitat diversity, which may be measured in different ways. Measurable Outcome 3 values the structural diversity of a stand while Measurable Outcome 4 values stand biological diversity. For instance, a stand with different aged and sized trees that provides a mixture of physical structures will likely be inhabited by a wider variety of species than stands with one age class of similarly sized trees. A diversity of tree and shrub species will additionally boost the overall biological diversity of a stand as the stand becomes attractive to a wider variety of plant, animal, fungal, and microbial species. Biological diversity can be increased regionally, at a landscape level, if we manage for a variety of habitat types (Measurable Outcome 5).

MO 6: Wildlife require more than a given type of habitat to persist regionally. They must have sufficient amounts of optimal and marginal habitat in which to reproduce successfully. Wildlife must also be able to move through the landscape to colonize or repopulate habitat patches. Therefore, species need certain amounts of available habitat (measured in acres and/or availability of specific structures, features, and attributes) to breed as well as habitat that supports movement (e.g., offers refuge from the elements and predators). Large habitat patches support more breeding individuals than smaller patches and are therefore more likely to remain populated. Immigration rates of individuals from nearby patches will be higher if habitat patches are near to one another and connected via habitat that allows movement. Conceivably, merging the management of green tree, snag, and large wood retention could boost the amount of available habitat or marginal habitat for many species. Managing these retention practices so that they produce trees that are allowed to grow large, die, and provide biologically meaningful numbers of snags and amounts of large wood could result over time in virtually all of State Forests supporting a wealth of species at higher densities than are seen in privately managed timber. More snags and large wood would boost fungal, insect, mammal, terrestrial amphibian, and bird species diversity. Retention of these elements also promotes complex and diverse future stands. This retention approach in areas not specifically managed for wildlife may, depending on the species, provide lesser quality habitat than areas that are managed for wildlife. However, these areas would provide valuable services by enabling species movement across the landscape and potentially supporting breeding.

## Measurable Outcomes for Aquatic Resources

1. Minimize short-term impacts of Climate Change on aquatic resources
2. Minimize long-term impacts of Climate Change on aquatic resources
3. Maximize stream habitat conditions and access to high quality habitat to support a full range of native aquatic species
4. Minimize loss of wetlands and wetland functions

### Greatest Permanent Value:

(1) As provided in ORS 530.050, “greatest permanent value” means healthy, productive, and sustainable forest ecosystems that over time and across the landscape provide a full range of social, economic, and **environmental benefits** to the people of Oregon. These benefits include, but are not limited to:

#### **(b) Properly functioning aquatic habitats for salmonids, and other native fish and aquatic life;**

2) To secure the greatest permanent value of these lands to the state, the State Forester shall maintain these lands as forest lands and actively manage them in a sound environmental manner to provide sustainable timber harvest and revenues to the state, counties, and local taxing districts. This management focus is not exclusive of other forest resources, but must be pursued within a broader management context that:

#### **(a) Results in a high probability of maintaining and restoring properly functioning aquatic habitats for salmonids, and other native fish and aquatic life**

### Notes on Measurable Outcomes (MOs) for Aquatic Resources:

*All Measurable Outcomes are to be considered in the context of Greatest Permanent Value which calls for balancing multiple forest management objectives over the long term and across the landscape. As such, none of the measurable outcomes can be considered in isolation- but rather a collective measure to evaluate balance and tradeoffs. Numbers below refer to Measurable Outcomes listed above.*

MO 1 and 2: Relationships between forest management and climate change are occurring in both short and long-term environments. Examples include increases in temperatures, and altered disturbance regimes such as fire frequency and complexity, precipitation and extreme weather patterns. Management actions can be modified to address impacts of climate change such as employing variable riparian protection strategies around streams that are more vulnerable to climate change.

Over the longer-term impacts include changing riparian vegetation communities and long-term degradation of stream temperature regimes. Actions that address these shifts can address other riparian functions such as long-term recruitment of wood to the stream. For instance, a senescing alder riparian stand may be replaced by a shrub-dominated community and cease to provide adequate shading canopy for the stream. Replanting a species mix appropriate for a given site may accelerate the process of developing a shading canopy for the stream as well as improve a long-term supply of wood to the stream. Replanting trees may allow establishment before climatic shifts occur that could affect recruitment of young trees.

MO 3: We wish to increase the quantity and quality of stream conditions to support the habitat requirements of aquatic species (e.g., fish and amphibians) for the range of life-stages. For fish, these conditions include measures of habitat complexity (quantified by assessing percent pools, availability of side channels, and large wood volume), water quality (sediment and stream temperature), shade, and others. This Measurable Outcome values increasing habitat complexity and shade and improving water quality where needed. Monitoring will assist in determining areas with shortcomings and/or potentials for improvement. Access to high quality habitat can be improved through removing barriers to fish passage at road stream crossings.

MO 4: The State Forest currently lacks a comprehensive wetland inventory. Wetland protection and loss will initially be evaluated at the harvest level with a move to a more comprehensive approach at larger temporal and landscape scales.

## Measurable Outcome for Air Quality

1. Minimize smoke impacts to air quality

Greatest Permanent Value:

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(d) Productive soil, and **clean air** and water;

(2) To secure the greatest permanent value of these lands to the state, the State Forester shall maintain these lands as forest lands and actively manage them in a sound environmental manner to provide sustainable timber harvest and revenues to the state, counties, and local taxing districts. This management focus is not exclusive of other forest resources, but must be pursued within a broader management context that:

(c) **Protects** soil, **air**, and water

### Notes on Measurable Outcome (MO) for Air Quality:

*All Measurable Outcomes are to be considered in the context of Greatest Permanent Value which calls for balancing multiple forest management objectives over the long term and across the landscape. As such, none of the measurable outcomes can be considered in isolation- but rather a collective measure to evaluate balance and tradeoffs. Numbers below refer to Measurable Outcomes listed above.*

MO 1: This Measurable Outcome values minimizing the impact of smoke from forest management (e.g., burning piles of slash). Management actions include timing burns such that smoke is unlikely to affect urban areas and sensitive human populations. Manage slash prepares areas for reforestation. We will consider whether to pile and burn slash or leave the slash on the ground to minimize impacts on air quality.

## Measurable Outcomes for Carbon

1. Minimize total forest carbon emissions
2. Maximize storage of carbon in forest land
3. Maximize utilization of timber sale outputs in durable materials

### Greatest Permanent Value:

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(a) **Sustainable and predictable production of forest products** that generate revenues for the benefit of the state, counties, and local taxing districts;

(d) Productive soil, and **clean air** and water;

(2) To secure the greatest permanent value of these lands to the state, the State Forester shall maintain these lands as forest lands and actively manage them in a sound environmental manner to **provide sustainable timber harvest and revenues** to the state, counties, and local taxing districts. This management focus is not exclusive of other forest resources, but must be pursued within a broader management context that:

(c) Protects soil, **air**, and water

### Notes on Measurable Outcomes (MOs) for Carbon:

*All Measurable Outcomes are to be considered in the context of Greatest Permanent Value which calls for balancing multiple forest management objectives over the long term and across the landscape. As such, none of the measurable outcomes can be considered in isolation- but rather a collective measure to evaluate balance and tradeoffs. Numbers below refer to Measurable Outcomes listed above.*

MO 1: Forest carbon emissions may result from wildfire as well as decay from decadent stands and other sources. Note that this Measurable Outcome, particularly from a wildfire perspective, may be important to a host of State Forests management interests – predictable timber production, forest health (water-stressed and diseased trees may be more flammable and burned trees more prone to hosting pests and pathogens), recreation, air quality, and wildlife.

MO 2: The purpose of this Measurable Outcome is to value management decisions that result in improving carbon storage on the landscape, whether in trees, soil, or other vegetation.

MO 3: This Measurable Outcome values management decisions that result in carbon storage via durable wood products. For instance, carbon is more likely to reside longer in dimensional lumber, plywood, and other similar products than in other forest products such as paper.

## Measurable Outcomes for Forest Health

*Numbers are adjacent to Measurable Outcomes*

Maximize long-term forest productivity and resilience

1. Minimize extent and severity of diseases
2. Minimize the susceptibility of stands to stress from prolonged (and potentially worsening) heat and drought
3. Minimize impacts of novel exotic pests

Greatest Permanent Value:

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(a) **Sustainable and predictable production** of forest products that generate revenues for the benefit of the state, counties, and local taxing districts;

2) To secure the greatest permanent value of these lands to the state, the State Forester shall maintain these lands as forest lands and actively manage them in a sound environmental manner to provide **sustainable timber harvest** and revenues to the state, counties, and local taxing districts. This management focus is not exclusive of other forest resources, but must be pursued within a broader management context

Notes on Measurable Outcomes (MOs) for Forest Health:

*All Measurable Outcomes are to be considered in the context of Greatest Permanent Value which calls for balancing multiple forest management objectives over the long term and across the landscape. As such, none of the measurable outcomes can be considered in isolation- but rather a collective measure to evaluate balance and tradeoffs. Numbers below refer to Measurable Outcomes listed above*

Overall: The main Measurable Outcome is to “maximize long-term forest productivity and resilience”. These concepts are vague, so they are broken into more useful, actionable components.

MO 1: This Measurable Outcome applies to the management of existing diseases such as Laminated Root Rot and Swiss Needle Cast. If management reduces the impacts of these diseases, forest productivity (e.g., annual tree growth rates) and resilience (reduced susceptibility to other diseases) will likely be greater than if the extent and severity of these diseases were not minimized.

MO 2: This Measurable Outcome was constructed to capture the importance of management for producing stands that are more resilient to pathogen outbreak by reducing future stresses to trees.

Management actions may include considering geography (south sides of slopes vs. north sides) for planting densities, planting species compositions, pre-commercial thinning, etc.

## Measurable Outcome for Roads and Access

*Numbers are adjacent to Measurable Outcomes*

1. Minimize unsafe conditions for road users

Minimize road-related sediment entry into Waters of the State

2. Minimize road connectivity to streams at crossing and adjacent to streams

Maximize long-term cost effectiveness for road maintenance and construction

3. Maximize cost effectiveness of timber harvest access
4. Maximize cost effectiveness of road system

Greatest Permanent Value:

(1) As provided in ORS 530.050, “greatest permanent value” means healthy, productive, and sustainable forest ecosystems that over time and across the landscape **provide a full range of social, economic, and environmental benefits** to the people of Oregon. These benefits include, but are not limited to:

(a) **Sustainable and predictable production of forest products that generate revenues for the benefit of the state, counties, and local taxing districts;**

(b) **Properly functioning aquatic habitats for salmonids, and other native fish and aquatic life;**

(d) Productive soil, and **clean** air and **water**;

(e) **Protection against** floods and **erosion**; and

(2) To secure the greatest permanent value of these lands to the state, the State Forester shall maintain these lands as forest lands and actively manage them in a **sound environmental manner** to **provide sustainable timber harvest and revenues** to the state, counties, and local taxing districts. This management focus is not exclusive of other forest resources, but must be pursued within a broader management context that:

(a) **Results in a high probability of maintaining and restoring properly functioning aquatic habitats for salmonids, and other native fish and aquatic life;**

(c) **Protects soil, air, and water**

Notes on Measurable Outcomes (MOs) for Roads and Access:

*All Measurable Outcomes are to be considered in the context of Greatest Permanent Value which calls for balancing multiple forest management objectives over the long term and across the landscape. As such, none of the measurable outcomes can be considered in isolation- but rather a collective measure to evaluate balance and tradeoffs. Numbers below refer to Measurable Outcomes listed above*

MO 1: Forest roads have different uses, such as access by the public to recreation sites, transporting pole logs from harvest units (affecting logging truck turn sweep radius), etc. The surfacing, grade, turnout availability, and vegetation clearing on the side of the roads affect road safety. This Measurable Outcome indicates the value of ensuring that roads are safe to users, with safety specifications depending on the uses of individual roads.

MO 2 : This Measurable Outcome is concerned with minimizing sediment entry into Waters of the State, focusing on chronic issues like poor road drainage and filtration. Sediment input from acute events, such as road-related landslides, is covered in Geology and Soils Measurable Outcome 1.

MO 3: Timber harvest access ease may improve dramatically with road construction, increasing the profitability of a harvest. However, the cost of road construction, maintenance (keeping the road clear of brush and seedlings), production timberland loss, and resource protection (adequate drainage, culvert installation) will result in short-term and long-term costs. Therefore, this Measurable Outcome values the consideration of the cost effectiveness of road building and improvement for timber harvest access.

MO 4: This Measurable Outcome values ensuring that the overall road network in State Forests represents a good investment. Vacating unneeded roads, for instance, would reduce road maintenance costs and enable more timber to grow on the landscape. Vacating roads may also reduce the risk of environmental impacts from road-related hydrologic connectivity and impeded culverts.

## Measurable Outcomes for Geology and Soils

*Numbers are adjacent to Measurable Outcomes*

Minimize road-related sediment entry into Waters of the State:

1. Minimize sediment delivery from road-related landslides
2. Maximize probability of landslide-delivered large wood
3. Minimize negative impacts to soils and Waters of the State from management activities.

Greatest Permanent Value:

(1) As provided in ORS 530.050, “greatest permanent value” means healthy, productive, and sustainable forest ecosystems that over time and across the landscape **provide a full range of social, economic, and environmental benefits** to the people of Oregon. These benefits include, but are not limited to:

(a) **Sustainable and predictable production of forest products that generate revenues for the benefit of the state, counties, and local taxing districts;**

(b) **Properly functioning aquatic habitats for salmonids, and other native fish and aquatic life;**

(d) Productive soil, and **clean air and water;**

(e) **Protection against floods and erosion;** and

(2) To secure the greatest permanent value of these lands to the state, the State Forester shall maintain these lands as forest lands and actively manage them in a **sound environmental manner** to **provide sustainable timber harvest and revenues** to the state, counties, and local taxing districts. This management focus is not exclusive of other forest resources, but must be pursued within a broader management context that:

(a) **Results in a high probability of maintaining and restoring properly functioning aquatic habitats for salmonids, and other native fish and aquatic life;**

(c) **Protects soil, air, and water**

Notes on Measurable Outcomes (MOs) for Geology and Soils:

*All Measurable Outcomes are to be considered in the context of Greatest Permanent Value which calls for balancing multiple forest management objectives over the long term and across the landscape. As such, none of the measurable outcomes can be considered in isolation- but rather a collective measure to evaluate balance and tradeoffs. Numbers below refer to Measurable Outcomes listed above.*

MO 1: Landslides are natural processes, but poorly constructed roads can increase the likelihood of landslides occurring and delivering sediment to streams. This Measurable Outcomes values reducing the probability of such landslides occurring. Appropriate road construction techniques, road improvement and maintenance procedures, and road removal actions for problematic older roads are all examples of management actions that can reduce the risk of road-related landslides. Note that the broader Measurable Outcome, “Minimize road-related sediment entry into Waters of the State”, is shared with Roads and Access. For Roads and Access, Measurable Outcome 2 concerns road connectivity to streams.

MO 2: Landslides are part of the natural geologic process on forest lands, and are important sources for in-stream gravels, boulders, and cobble. Landslides are also an important conduit for delivering large wood to streams. Maintaining these processes where possible assists aquatic species in of State Forests streams, including salmonids. State Forests currently selects leave-tree areas in harvest units to coincide with areas that are likely to experience a landslide event and deliver large wood to streams.

MO 3: Ground-based timber activities such as yarding may result in soil compaction or leave ruts in the soil. Soil compaction can reduce the productivity of sites. Ruts may become gullies, potentially directing sediment to Waters of the State. This Measurable Outcome values minimizing soil impacts from such activities. This Measurable Outcome does not pertain to attempting to prevent in-unit landslides as a consequence of harvest, except for road-related landslides (MO 1).

## Appendix A

The Forest Management Plan contains a number of planning terms – guiding principles, goals, and strategies. Additionally measurable outcomes, quantifiable targets, and standards can further define how resources will be managed and progress will be measured. Planning terms provide a common language by which to organize how the plan is structured, establish management concepts, and a common point of reference for decisions. An important requirement in the planning process is to establish a shared understanding of the meaning and use of planning terms. Planning terms and associated definitions are described below and an example application of the terms is provided in the FMP Content Table 1.

**Guiding Principle** – Principles that guide development of the management plan, including both legal mandates and Board of Forestry policies. Required by the Forest Management Planning rule (OAR 629-035-0030).

**Goal** – Goals are statements of what the State Forester intends to achieve for each forest resource within the planning area consistent with the Greatest Permanent Value rule (OAR 629-035-0020). Required by the Forest Management Planning rule (OAR 629-035-0030).

**Strategy** – Strategies describe how the State Forester will manage the forest resources in the planning area to achieve the goals articulated in the plan. Strategies identify management techniques the State Forester may use to achieve the goals of the plan during the implementation phase of the plan. Required by the Forest Management Planning rule (OAR 629-035-0030).

**Measurable Outcome** – Measurable outcomes are quantifiable results of strategies. These outcomes may also be referred to as Performance Measures.

**Quantifiable Target** – Quantifiable targets are established to measure progress towards a desired outcome and may change as the body of knowledge around specific requirements change. In this manner, adaptive management can be applied to both management practices and the outcomes that they are intended to achieve.

**Standard** – Standards are actions required to comply with a given strategy. Standards have a higher level of specificity than strategies and outcomes. Standards will be codified in State Forests Division Operational Policies, and the Division will engage stakeholders in the review and revision of those policies.

For example, if the *goal* is to contribute to a range of wildlife habitat types, a *measurable outcome* might be the number of large trees, of different size classes, across the landscape, and over time. We know that large, legacy trees provide necessary structures for wildlife habitat, and related numeric *quantifiable targets* can be established. However, there may be uncertainty as to the sufficient number needed, in specific size classes, and at which scales.

While the correct quantifiable targets may not be known, it is important to establish a beginning target that can be monitored and adapted over time.

Table 1. Forest Management Plan Content Table with an example set of Guiding Principles, Goals, Strategies, Measurable Outcomes, Quantifiable Target, and Standards related to the GPV element of maintaining, protecting, and enhancing native wildlife habitats.

GPV	Guiding Principle*	Goal*	Strategy*	Measurable Outcome	Quantifiable Target	Standard
(2)(b) Protects, maintains, and enhances native wildlife habitats.	Protect, maintain, and enhance native wildlife habitats.	Contribute to a range of wildlife habitat types.	Incorporate legacy structure at a landscape level.	Maximize within-stand structural diversity	Average of $\geq 3$ TPA $\geq 32''$ DBH and $\geq 1$ TPA $\geq 40''$ DBH within individual management basins.	Retain live green trees: <ul style="list-style-type: none"> <li>• Average of 5 TPA over regen units in an AOP, Some units less, some more</li> <li>• Additional retention (&gt;5 TPA) where needed to meet snag and down wood recruitment goals</li> <li>• Variety of species, both with and without defect</li> <li>• Variety of arrangements within harvest units</li> </ul>

