MEASURABLE OUTCOMES WORKSHOP

Western Oregon State Forests Management Planning
September 2019

Final Report
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Oregon Department of Forestry
State Forests Division

Introduction

FMP Project History

The Oregon Board of Forestry concluded in 2012 that the current approach for managing state forests was not financially viable and a Board of Forestry subcommittee was formed to address the issues. A financial analysis concluded that if the Division continued to rely on timber revenue to fund all operations, recreation, and education programs there would need to be a 30% increase in harvest levels, a significant increase in stumpage rates, or some combination of the two. The findings also confirmed that current operational budgets do not allow for adequate investments and provide the bare minimum work force to implement Forest Management Plans. Therefore, additional cuts in personnel were not recommended by the workgroup. Outcomes included directing the State Forests Division to examine alternatives to the current Forest Management Plan (FMP) for Northwest Oregon. The Board directed the Financial Viability Subcommittee to refocus on the FMP Alternatives project with twin goals to develop a new forest management plan that is both financially viable and improves conservation outcomes in state forestlands.

At the March 9, 2016 Board Meeting, the Division gave an update on the Alternative FMP process. Given the urgency of ODF's financial situation, the complexity of analysis needs, and the uncertainty posed by multiple Notices of Intent to sue, the Division shifted the focus to other key priorities. This change to State Forests' priorities put the Alternative Forest Management Plan project on pause.

The FMP project was re-initiated in January 2018, with a new workplan and framework for the Board to develop the FMP elements required by the Planning Rule (OAR 629-035-0030) in the context of the Greatest Permanent Value (GPV) Rule (OAR 629-035-0020). This approach is intended to efficiently develop an FMP that meets the requirements of the Planning Rule, is operationally feasible, and is found to meet GPV by the Board.

Measurable Outcomes

Measurable outcomes are quantifiable results of strategies. These outcomes may also be referred to as Performance Measures. Measurable outcomes are being used in the revised FMP to both provide the basis for strategies 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.

What follows are a set of Draft Measurable outcomes. These outcomes are all considered in the context of the Greatest Permanent Value 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 Outcomes Workshop

The measurable outcomes workshop was held on September 25, 2019 in Salem, Oregon. The meeting was open to the public and was announced through a press release to all of Oregon's major media outlets, the Flash Alerts system, and through the Division's email distribution list for stakeholders who have opted-in to receive notices about State Forests. The intent was to engage with stakeholders on the proposed measurable outcomes in the Forest Management Plan (FMP). A similar workshop with the Forest Trust Land Advisory Committee (FTLAC) was scheduled for September 19, 2019, but was canceled at the FTLAC Chair's request due to current litigation between the counties and ODF.

Following brief introductions of everyone in the room, participants of the workshop were presented with a brief background on the FMP project and the overarching goals of the Board of Forestry – to improve financial and conservation outcomes. Next the participants were given a presentation (Appendix A) by Dr. Jeremy Groom on Structured Decision Making (discussed in more detail in the following section), how this process implements adaptive management, and the role of measurable outcomes in the process.

After the presentation, participants were asked to provide feedback on the proposed measurable outcomes. The vast majority of the time at the workshop was allocated to this interactive portion. Participants were asked to provide feedback in two primary ways: first, by commenting on the existing proposed measurable outcomes, and second, by proposing additional measurable outcomes. Worksheets were provided to participants to facilitate drafting new measurable outcomes, along with an informational packet (Appendix B) containing the proposed measurable outcomes.

The Division's proposed measurable outcomes were printed up on posters, organized by resource (e.g. timber harvest, wildlife, air quality) and hung around the room. Participants were asked to write their feedback on sticky notes and attach them to the relevant poster. Notes with feedback related to a proposed measurable outcome were placed next to the measurable outcome, while notes with ideas for new proposed measurable outcomes were placed at the bottom of the posters. This allowed staff and participants to see at-a-glance where there was a high degree of interest and if that interest is on the proposed or new measurable outcomes.

When the participants were finished providing written feedback, Division staff lead a facilitated discussion for each resource poster. Comments on Measurable Outcomes not directly related to measurable outcomes were documented (Table 1), but are not addressed.

Comments captured on the posters and through the discussion are presented in Tables 2 – 10, and the responses to the feedback are reflected in Tables 11 – 19. A list of all Measureable Outcomes proposed prior to the workshop and the final list of Measureable Outcomes included in the draft Forest Management Plan is found in the final section of the report.

Structured Decision Making

Measurable Outcomes play two roles in the FMP. They will be tracked by the State Forest staff to serve as high-level indicators of the FMP's performance at meeting Greatest Permanent Value. If a potentially contentious management decision needs to be made, Measurable Outcomes will also serve as decision objectives for the Structured Decision Making process used to inform the decision.

Structured Decision Making is a process that provides decision-makers with a set of carefully considered decision alternatives. The alternatives are crafted by stakeholders and constructed to account for important values affected by the management decision. The process of Structured Decision Making leads stakeholders through a set of steps that ensure that the decision problem and decision space are well defined, the set of objectives – or what matters – are clearly understood, and that the alternatives are truly different from one another. The group presents the alternatives to decision makers, explains their strengths and weakness, and provides information on which alternatives are most supported by different stakeholders and why. The decision-maker is then poised to make an informed decision.

Measurable Outcomes represent management outcomes that matter to stakeholders. In a Structured Decision Making process the stakeholders consider the FMP decision at hand and decide which Measurable Outcomes will likely be affected by it. The stakeholders then consider different management alternatives and the effect each alternative will have on the selected Measurable Outcomes. The group updates the decision alternatives as they learn about the consequences of the alternatives on the Measurable Outcomes. The group seeks win-win alternatives but also recognizes and highlights trade-offs that each alternative makes among the Measurable Outcomes. Once the decision-maker decides on a course of action, the management outcomes are monitored to see how well they align with the expectations of the Structured Decision Making group. The process is very much like Adaptive Management in that when the decision needs to be made again in the future, monitoring results should better inform the subsequent decision.

The Structured Decision Making process offers a change to stakeholder and agency dynamics. The process is not positional but collaborative, as stakeholders work together to construct decision alternatives and understand their effects on Measurable Outcomes. The process is transparent: the stakeholder group carefully explains the expected impacts of each alternative. Structured Decision Making also results in efficient, focused monitoring. The process identifies exactly where decision uncertainty lies and the importance of reducing that uncertainty through monitoring.

Stakeholder Feedback

Stakeholder participants provided a wide variety of feedback on the proposed measureable outcomes. The types of feedback received ranged from edits to proposed measureable outcomes, addition of new measurable outcomes, splitting or consolidating proposed measureable outcomes, and requests to provide clarification on the intent. Some measureable outcomes received no feedback, while others received multiple comments. Feedback outside of the scope of the workshop was also given, and is shown in Table 1.

Table 1. Feedback considered out-of-scope for the workshop.

Feedback unrelated to a specific resource	
Measurable Outcome	*Stakeholder Feedback*
ODF/BOF Decision-Making	• Adopt fundamental goal – maximize net results (*See federal principles, regulations & guidelines regarding water)* • Recognize that you already know enough to make some decisions (e.g., the carbon cost, if logging exceeds value of log, so don't log unless you can prove the opposite) • Account fully for effectiveness, efficiency, and equity • Provide public with harvest information regarding benefits and costs of actions, especially logging • Explicitly make decisions to recognize, assess, and manage risk (e.g., anticipate net climate costs will be higher)
Foundational Statement	Recognize the original intent and the need for primacy of the land transfer – trust responsibility to balance all other aspects with timber harvest
Other	Eliminate use of *minimize* and *maximize* in outcomes

Table 2. Proposed recreation, education, and interpretation measureable outcomes and the related stakeholder feedback.

Recreation, Education, and Interpretation	
Measureable Outcome	*Stakeholder Feedback*
Minimize recreational impacts to resources near developed recreation sites	
Minimize recreational impacts to resources away from developed recreation sites	
Increase staffing levels for ODF, law enforcement and camp hosts	
Enhance safety of existing recreation sites and amenities	

Recreation, Education, and Interpretation	
Measureable Outcome	*Stakeholder Feedback*
Maximize diversity of REI options within a forest setting	
Increase quality of infrastructure	
Increase availability of infrastructure	
Increase access for recreational opportunities	• To include hunting opportunities • Habitat?
Increase access to nature	Youth – underserved (Gov. Task Force Outdoor Rec.)
Increase access to learning opportunities	• Education and Interpretation Opportunities • Maximize opportunities for public to learn about active forest management & the value of wood products in the face of climate change and a sustainable society

Table 3. Proposed aquatic resource measureable outcomes and the related stakeholder feedback.

Aquatic Resources	
Measureable Outcome	*Stakeholder Feedback*
Minimize short-term impacts of climate change on aquatic resources	• Why not relevant to all resources? • Mitigate impacts of climate change that degrade water quality • Maximize resilience of aquatic species to impacts of climate change
Minimize long-term impacts of climate change on aquatic resources	These are the same thing, two different metrics potentially (with arrow to short-term)
Maximize stream habitat conditions and access to high-quality habitat to support a full range of native aquatic species	• Suggest breaking up with a little more specificity • Sufficient quantity and quality of water to support aquatic habitat and meet regulatory standards • Maximize access to available or potential habitat • Removal of unnatural barriers
Minimize loss of wetlands and wetland functions	• No. 1 loss (especially given climate change & past loss) • Maximize functionality and values of wetland habitats • Loss v. function - which is more important?

Table 4. Proposed geology and soils measureable outcomes and the related stakeholder feedback.

Geology and Soils	
Measureable Outcome	*Stakeholder Feedback*
Minimize sediment delivery from road-related landslides	Maintain background rates of mass-wasting (i.e., no increased from either roads or harvest, etc.)
Maximize probability of landslide-delivered large wood	• Eliminate this one → increase LWD by utilizing a conservation fund idea for in-stream placement of LWD in deficient riparian areas and report out annually → connection w/ aquatic resources? • Deliver large wood to achieve habitat necessary for aquatic resources • Maintain natural background rates of landslide-delivered wood • Consider natural background rates of sediment delivery • Clarify: Intent not to increase landslides, rather to increase (or maximize) delivery of large wood when a landslide occurs
Minimize negative impacts to soils and Waters of the State from management activities	• Change disaggregate compaction/site-level soil impacts from delivery to waters • Minimize soil disturbance & compaction & risk of sediment delivery to Waters of the State

Table 5. Proposed wildlife measureable outcomes and the related stakeholder feedback.

Wildlife	
Measureable Outcome	*Stakeholder Feedback*
Maximize habitat for species of concern & listed species	• All native terrestrial & riparian dependent species • Minimize likelihood of take • Maximize take avoidance • Eliminate creation of ESA habitat by utilizing a departure strategy
Maximize habitat for game species	
Maximize within-stand structural diversity	Will require thinning or patch cuts
Maximize within-stand biological diversity	
Maximize diversity of habitat types	For co-equal management goals – looking back to different species – don't prioritize one over the other
Minimize probability of wildlife extirpation in the Plan area	Change to maximize viability of wildlife species in plan area

Table 6. Proposed carbon measureable outcomes and the related stakeholder feedback.

Carbon	
Measureable Outcome	*Stakeholder Feedback*
Minimize total carbon forest emissions (need to clarify)	• Not sure what "total" is intended to mean in this sentence • What's included in total? Just the forest or also human activities
Maximize storage of carbon in forest land	
Maximize utilization of timber sale outputs in durable materials	• Maximize value of carbon stand in forest and durable wood products, with full recognition of interests of future generations (*use a very small discount rate)* • Maximize growth of newly established stands to ensure optimal carbon storage for young stands – max rate of sequestration in young stands • Clarify – sequestration v. carbon storage • Quantify goal of max sequestration v. storage • Clarify "Durable Wood Products" • Maximize sequestration • Maximize storage in forests & products

Table 7. Proposed forest health measureable outcomes.

Forest Health	
Measureable Outcome	*Stakeholder Feedback*
Minimize extent and severity of diseases	• Restore Swiss needle cast stands to site capable productivity • Maximize restoration of areas of Zombie alder & Swiss needle cast
Minimize susceptibility of stands to stress from prolonged (and potentially worsening) heat and drought	
Minimize impacts of novel exotic pests	

Table 8. Proposed air quality measureable outcomes and the related stakeholder feedback.

Air Quality	
Measureable Outcome	*Stakeholder Feedback*
Minimize smoke impacts to air quality	• Optimize opportunities for burning while minimizing air quality impacts from wildfire • Include balance of controlled v. uncontrolled fire & associated smoke impacts • Burning is a tool – want to manage the tool to limit smoke impacts

Table 9. Proposed timber production and harvest measureable outcomes and the related stakeholder feedback.

Timber Production and Harvest	
Measureable Outcome	*Stakeholder Feedback*
Maximize probability of State Forests' financial viability	• Achieve a ROAV of 5% per year (average) & report ROAV annually to FTLAC & BOF • Maximize financial viability for trust counties & ODF • Is this a commonly held way of determining probability of financial viability? • Question = Is this really measurable?
Minimize ODF expenditures	• Optimize expenditures recognizing the need for investment in improving forest productivity and long-term forest health for current and future generations of Oregonians • Spend $ to make $ - make mgt. investments – cannot do nothing • Diversify revenue sources to ODF • Maximize net revenue per acre available for harvest
Return as much revenue as possible to counties and local taxing districts	• The importance of funding local taxing districts with ODF harvesting of state-managed forests cannot be underestimated • "as possible" is not meaningful measurement
Maximize value of timber available for harvest	• Unit of measure? Include both volume & value • Maximize the merchantable wood fiber volume per acre available for harvest • "Maximize value" is not the best measurement for sustained yield management volume is more appropriate • Maximize the volume and value of timber available for harvest

Timber Production and Harvest	
Measureable Outcome	*Stakeholder Feedback*
	• Monitor/measure forest growth and overall inventory and report out to FTLAC & BOF • Short-term changes in markets v. longer term mgt. goals – how balance?
Maximize availability of timber for future harvests	• Maximize the available acres for timber harvest – Forest Health • What is maximize the availability of timber for future??? • Achieve restoration of SNC & Zombie alder stands at the rate of 7,500 acres treated per year with all restorations completed in 20 years
Maximize local employment and indirect benefit to local economies	• Wouldn't "optimize" be more appropriate than maximize? • Maximize as much revenue as possible to counties & local taxing districts, recognizing the original intended purpose of the lands and long-term sustainability • Improve the social fabric of communities through monitoring and measurement of changes in poverty, employment, subsidized lunches, etc. and report out annually
Other: Support & Maintain Customers	• Maximize the benefits to social-economic fabric of local communities • Benefits to the social fabric of a community from having a working state forest in the community needs to have its own "resource" sheet • Outcomes specific to counties/taxing districts (Coos/Curry County report) • Never log unless prove that benefits exceed costs, with accounting for carbon costs, and risks

Table 10. Proposed roads and access measureable outcomes and the related stakeholder feedback.

Roads and Access	
Measureable Outcome	*Stakeholder Feedback*
Minimize unsafe conditions for road users	

Minimize road connectivity to streams at crossings and adjacent to streams	• Design road system drainage to minimize hydrologic connectivity & withstand expected storm event, next 100 years & remediate or remove roads that increase likelihood of landslides that would deliver to WOTUS
	• Minimize overall hydrology impacts of road system
	  • Connectivity
	  • Instability
	  • Crossings/fill, etc.

Maximize cost effectiveness of timber harvest access	
Maximize cost effectiveness of road system	

Responses to the feedback

Division staff have attempted to respond affirmatively as much as possible to stakeholder feedback, and where this wasn't possible, to provide an explanation. Some of the feedback was general in nature, rather than suggesting an edit to measureable outcomes. These comments are considered out-of-scope for this report, but where possible will be addressed elsewhere.

Table 11. Proposed recreation, education, and interpretation measureable outcomes, related stakeholder feedback, and staff response to the feedback.

Recreation, Education, and Interpretation		
Measurable Outcome	*Stakeholder Feedback*	*Response*
Increase access for recreational opportunities	To include hunting opportunities	"Recreational opportunities" includes many different types of semi-primitive recreation, including hunting. For the sake of brevity, the MO is unchanged; however, the FMP does address hunting and other recreational uses.
	Habitat?	Unclear what is being referenced here.
Increase access to nature	Youth – underserved (Gov. Task Force Outdoor Rec.)	Edited: *Increase access to nature, especially for underserved populations.*
Increase access to learning opportunities	Education and Interpretation Opportunities	Edited: *Increase access to education and interpretation opportunities.*
	Maximize opportunities for public to learn about active forest management & the value of wood products in the face of climate change and a sustainable society	Edited: *Increase access to education and interpretation opportunities, especially in the context of a working forest, climate change, and renewable resources.*

Table 12. Proposed aquatic resource measureable outcomes, related stakeholder feedback, and staff response to the feedback.

Aquatic Resources		
Measurable Outcome	*Stakeholder Feedback*	*Response*
Minimize short-term impacts of climate change on aquatic resources	Why not relevant to all resources?	Climate Change has been incorporated into Aquatic Resources and Wildlife, and was already addressed in Forest Health.

	Mitigate impacts of climate change that degrade water quality	Edited: *Minimize short-term impacts of climate change on aquatic resources and water quality.*
	Maximize resilience of aquatic species to impacts of climate change	Added: *Maximize resilience of aquatic species to impacts of climate change.*
Minimize long-term impacts of climate change on aquatic resources	These are the same thing, two different metrics potentially (referencing "short-term")	Combined with 1st MO: *Minimize short- and long-term impacts of climate change on aquatic resources and water quality.*
Maximize stream habitat conditions and access to high-quality habitat to support a full range of native aquatic species	Suggest breaking up with a little more specificity	Edited and divided: *Maximize stream habitat conditions to support a full range of native aquatic species and meet regulatory standards.*
	Sufficient quantity and quality of water to support aquatic habitat and meet regulatory standards	*Maximize high water quality to support native aquatic species and meet regulatory standards.*
	Maximize access to available or potential habitat	*Maximize access to high-quality habitat to support a full range of native aquatic species*
	Removal of unnatural barriers	Didn't add "removal of barriers" – because that is the action to achieve the measurable outcome
Minimize loss of wetlands and wetland functions	No. 1 loss (especially given climate change & past loss)	Comment only, does not suggest a change to the measureable outcome
	Maximize functionality and values of wetland habitats	Added: *Maximize functions and values of wetland habitats.*
	Loss v. function - which is more important?	Comment only. This is likely an important monitoring question, evaluating trade-offs.

Table 13. Proposed geology and soils measureable outcomes, related stakeholder feedback, and staff response to the feedback.

Geology and Soils		
Measurable Outcome	*Stakeholder Feedback*	*Response*
Minimize sediment delivery from road-related landslides	Maintain background rates of mass-wasting (i.e., no increased from either roads or harvest, etc.)	Background rates vary across the landscape and are not known with a high degree of certainty, so do not provide a useful metric.
Maximize probability of landslide-delivered large wood	Eliminate this one → increase LWD by utilizing a conservation fund idea for in-stream placement of LWD in deficient riparian areas and report out annually → connection w/ aquatic resources?	Conservation fund is out of scope for the FMP
	Deliver large wood to achieve habitat necessary for aquatic resources	This speaks to the purpose of the strategies.
	Maintain natural background rates of landslide-delivered wood	Background rates vary across the landscape and are not known with a high degree of certainty, so do not provide a useful metric.
	Consider natural background rates of sediment delivery	Background rates vary across the landscape and are not known with a high degree of certainty, so do not provide a useful metric.
	Clarify: Intent not to increase landslides, rather to increase (or maximize) delivery of large wood when a landslide occurs	Edited: *Maximize probability of delivery of large wood during landslide events.*
Minimize negative impacts to soils and Waters of the State from management activities	Change disaggregate compaction/site-level soil impacts from delivery to waters	Edited: *Minimize negative impacts to soils.* *Minimize risk of sediment delivery to Waters of the State.*
	Minimize soil disturbance & compaction & risk of sediment delivery to Waters of the State	Edited: *Minimize negative impacts to soils, including soil disturbance & compaction.* *Minimize risk of sediment delivery to Waters of the State.*

Table 14. Proposed wildlife measureable outcomes, related stakeholder feedback, and staff response to the feedback.

Wildlife		
Measurable Outcome	*Stakeholder Feedback*	*Response*
Maximize habitat for species of concern & listed species	All native terrestrial & riparian dependent species	Edited: *Maximize habitat for all native wildlife species*
	Minimize likelihood of take	Added: *Maximize Compliance with Federal and State Endangered Species Acts* How to maximize compliance with ESAs. Section 9 vs. 10 is an ODF business decision.
	Maximize take avoidance	Added: *Maximize Compliance with Federal and State Endangered Species Acts* How to maximize compliance with ESAs. Section 9 vs. 10 is an ODF business decision.
	Eliminate creation of ESA habitat by utilizing a departure strategy	This is not in alignment with GPV and may increase the likelihood of future ESA listings
Maximize within-stand structural diversity	Will require thinning or patch cuts	Agreed. This does not suggest a change to MO
Maximize diversity of habitat types	For co-equal management goals – looking back to different species – don't prioritize one over the other	Agreed. This does not suggest a change to MO
Minimize probability of wildlife extirpation in the Plan area	Δ maximize viability of wildlife species in plan area	Population viability is more related to population viability (e.g. demographics, fecundity) rather than habitat. Forest management has a direct effect on habitat. *Added: Minimize short- and long-term impacts of climate change on wildlife and habitat.*

Table 15. Proposed carbon measureable outcomes, related stakeholder feedback, and staff response to the feedback.

Carbon		
Measurable Outcome	*Stakeholder Feedback*	*Response*
Minimize total carbon forest emissions (need to clarify)	Not sure what "total" is intended to mean in this sentence	The five forest carbon pools discussed in the plan (see FMP Table 9) are: live trees, standing dead trees, fallen dead trees, forest floor, and soil. The focus of this measureable outcome is on the flow of carbon to and from the forest. Edited: *Maximize carbon sequestration in forest land.*
	What's included in total? Just the forest or also human activities?	Human activities are not included.
Maximize storage of carbon in forest land	Maximize value of carbon stored in forest and durable wood products, with full recognition of interests of future generations (*use a very small discount rate*)	Choice of discount rate is out of scope.
Maximize utilization of timber sale outputs in durable materials	Maximize growth of newly established stands to ensure optimal carbon storage for young stands – max rate of sequestration in young stands	Addressed through the revision of the first measurable outcome. Maximizing growth of young stands is a strategy to achieve this measureable outcome.
	Clarify – sequestration v. carbon storage	Addressed through the revision of the first measurable outcome.
	Quantify goal of max sequestration v. storage	Addressed through the revision of the first measurable outcome.
	Clarify "Durable Wood Products"	*Durable wood products are wood products that persist for a relatively long period of time. Dimensional lumber is an example of a durable wood product, while paper is not.*
	Maximize sequestration	Addressed through the revision of the first measurable outcome.

	Maximize storage in forests & products	This combines the second and third measurable outcomes, which we've elected to keep separate.

Table 16. Proposed forest health measureable outcomes, related stakeholder feedback, and staff response to the feedback.

Forest Health		
Measurable Outcome	*Stakeholder Feedback*	*Response*
Minimize extent and severity of diseases	Restore Swiss needle cast stands to site capable productivity	*Swiss needle cast is included in the diseases addressed by the measureable outcome.*
	Maximize restoration of areas of Zombie alder & Swiss needle cast	*Minimizing the extent is considered the same as maximizing restoration in this context.*
Minimize susceptibility of stands to stress from prolonged (and potentially worsening) heat and drought		
Minimize extent and severity of diseases		

Table 17. Proposed air quality measureable outcomes, related stakeholder feedback, and staff response to the feedback.

Air Quality		
Measurable Outcome	*Stakeholder Feedback*	*Response*
Minimize smoke impacts to air quality	Optimize opportunities for burning while minimizing air quality impacts from wildfire	The overall approach will seek to optimize outcomes, using controlled burning as appropriate.
	Include balance of controlled v. uncontrolled fire & associated smoke impacts	The overall approach will seek to optimize outcomes, using controlled burning as appropriate.
	Burning is a tool – want to manage the tool to limit smoke impacts	The overall approach will seek to optimize outcomes, using controlled burning as appropriate.

Table 18. Proposed timber production and harvest measureable outcomes, related stakeholder feedback, and staff response to the feedback.

Timber Production and Harvest		
Measurable Outcome	*Stakeholder Feedback*	*Response*
Maximize probability of State Forests' financial viability	Achieve a ROAV of 5% per year (average) & report ROAV annually to FTLAC & BOF	This is a report request, and does not suggest a change to the MO.
	Maximize financial viability for trust counties & ODF	Financial viability of counties is beyond the control of the Board or ODF
	Is this a commonly held way of determining probability of viability?	
	Q = Is this really measurable?	
Minimize ODF expenditures	Optimize expenditures recognizing the need for investment in improving forest productivity and long-term forest health for current and future generations of Oregonians	Expenditure levels will be guided by the implementation and asset management guidelines of the FMP.
	Spend $ to make $ - make mgt. investments – cannot do nothing	Investment levels will be guided by the implementation and asset management guidelines of the FMP.
	Diversify revenue sources to ODF	Out of scope for the FMP
	Maximize net revenue per acre available for harvest	Added: *Maximize net revenue per acre available for harvest*
Return as much revenue as possible to counties and local taxing districts	The importance of funding local taxing districts with ODF harvesting of state-managed forests cannot be underestimated	Comment only, does not suggest a change to the measureable outcome

	"as possible" is not meaningful measurement	Comment only, does not suggest a change to the measureable outcome
Maximize value of timber available for harvest	Unit of measure? Include both volume & value	Edited: *Maximize volume of merchantable wood fiber available for harvest* Volume is what we regulate, so agree with focus there, as well as definition of merchantable wood fiber. The units of measure are not dealt with at this level, as they can potentially change over time depending on the focus of the market. It may not always be a board foot metric. That can evolve over implementation planning cycles.
	Maximize the merchantable wood fiber volume per acre available for harvest	
	"Maximize value" is not the best measurement for sustained yield management volume is more appropriate	
	Maximize the <u>volume</u> and value of timber available for harvest	
	Monitor/measure forest growth and overall inventory and report out to FTLAC & BOF	This is a report request, and does not suggest a change to the MO.
	Short-term changes in markets v. longer term mgt. goals – how balance?	This is a question, and does not suggest a change to the MO.
Maximize availability of timber for future harvests	Maximize the available acres for timber harvest – Forest Health	Addressed by existing measurable outcome: *Minimize extent and severity of diseases*
	What is maximize the availability of timber for future?	Ensuring healthy well-stocked stands.
	Achieve restoration of SNC & Zombie alder stands at the rate of 7,500 acres treated per year with all restorations completed in 20 years	Addressed by existing measurable outcome: *Minimize extent and severity of diseases*
Maximize local employment and indirect benefit to local economies	Wouldn't "optimize" be more appropriate than maximize?	The overall outcomes of the management of the forests will be an optimized solution.

	Maximize as much revenue as possible to counties & local taxing districts, recognizing the original intended purpose of the lands and long-term sustainability	This does not respond to the MO, as it is focus on direct contributions to local government, which is addressed elsewhere.
	Improve the social fabric of communities through monitoring and measurement of changes in poverty, employment, subsidized lunches, etc. and report out annually	Out of scope for the FMP and beyond the span of control of State Forests (i.e. there are many exogenous factors that will impact poverty, employment, subsidized lunches)
Other: Support & Maintain Customers	Maximize the benefits to social-economic fabric of local communities	Suggested MO lacks specificity around components of social-economic fabric. This is captured by the previous measurable outcome: Maximize local employment and indirect benefit to local economies
	Benefits to the social fabric of a community from having a working state forest in the community needs to have its own "resource" sheet	Comment only, does not suggest a change to MO.
	Outcomes specific to counties/taxing districts (Coos/Curry County report)	Reporting request, does not suggest a change to MO. County revenue addressed by MO: Return as much revenue as possible to counties and local taxing districts.
	Never log unless prove that benefits exceed costs, with accounting for carbon costs, and risks	Comment only, does not suggest a change to MO.

Table 19. Proposed roads and access measureable outcomes, related stakeholder feedback, and staff response to the feedback.

Roads and Access		
Measurable Outcome	*Stakeholder Feedback*	*Response*
Minimize road connectivity to streams at crossings and adjacent to streams	Design road system drainage to minimize hydrologic connectivity & withstand expected storm event, next 100 years & remediate or remove roads that increase likelihood of landslides that would deliver to WOTUS	Strategy described to achieve measureable outcome.
	Minimize overall hydrology impacts of road system • Connectivity • Instability • Crossings/fill, etc	These aspects are addressed in the geology and soils section.

Revised List of proposed Measureable Outcomes

The following lists are the revised measureable outcomes that are included in the draft Forest Management Plan.

Recreation, Education, and Interpretation

1. Minimize recreational impacts to resources.
    a. Minimize recreational impacts to resources near developed recreation sites.
    b. Minimize recreational impacts to resources away from developed recreation site.
2. Increase user safety.
    a. Increase staffing levels for law enforcement, ODF, and camp hosts.
    b. Enhance safety of existing recreation sites and amenities.
3. Maximize visit quality.
    a. Improve infrastructure.
        i. Increase quality of infrastructure for visitors.
        ii. Increase availability of infrastructure.
    b. Improve accessibility.
        i. Increase access to recreational opportunities.
        ii. Increase access to nature, especially for underserved populations.
        iii. Increase access to education and interpretation opportunities, especially in the context of a working forest, climate change, and renewable resources.
4. Maximize diversity of REI options within a forest setting.

Aquatics, Landslides, and Roads

1. Minimize short- and long-term impacts of climate change on aquatic resources and water quality.
2. Maximize stream habitat conditions to support a full range of native aquatic species and meet regulatory standards.
3. Maximize high water quality to support native aquatic species and meet regulatory standards.
4. Maximize access to high-quality habitat to support a full range of native aquatic species.
5. Minimize loss of wetlands and wetland functions.
6. Maximize resilience of aquatic species to impacts of climate change.
7. Maximize functions and values of wetland habitats.
8. Minimize road-related sediment entry into waters of the state.
9. Minimize road connectivity to streams at crossing and adjacent to streams.
10. Maximize probability of delivery of large wood during landslide events.
11. Minimize sediment delivery from road-related landslides
12. Minimize negative impacts to soils.
13. Minimize risk of sediment delivery to Waters of the State.

Wildlife

1. Maximize wildlife habitat for all native wildlife species
    a. Maximize habitat extent for native wildlife species
        i. Habitat for species of concern & listed species
        ii. Habitat for game species
    b. Maximize within-stand structural diversity
    c. Maximize within-stand biological diversity
    d. Maximize diversity of habitat types
    e. Minimize probability of wildlife extirpation in the plan area
2. Maximize Compliance with Federal and State Endangered Species Acts
3. Minimize short- and long-term impacts of climate change on wildlife and habitat.

Carbon

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

Air Quality

1. Minimize smoke impacts to air quality.

Forest Health

1. Maximize long-term forest productivity and resilience.
    a. Minimize extent and severity of diseases.
    b. Minimize the susceptibility of stands to stress from prolonged (and potentially worsening) heat and drought.
    c. Minimize impacts of novel exotic pests.

Timber Production and Harvest

1. Maximize the probability of State Forests' financial viability.
2. Minimize ODF expenditures.
3. Maintain or increase revenue to counties and local taxing districts.
4. Maximize volume of merchantable wood fiber available for harvest.
5. Maximize the availability of timber for future harvests.
6. Maximize local employment and indirect benefit to local economies.
7. Maximize net revenue per acre available for harvest.

Roads and Access

1. Minimize unsafe conditions for road users.
2. 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.

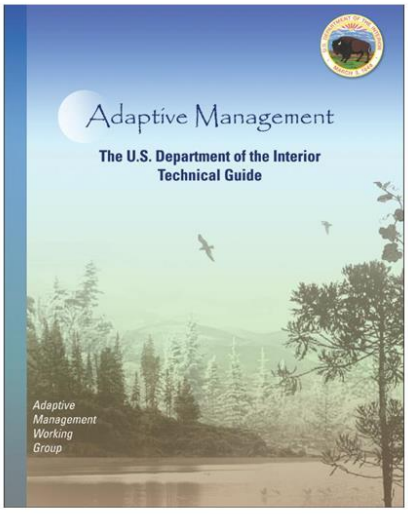
Appendices

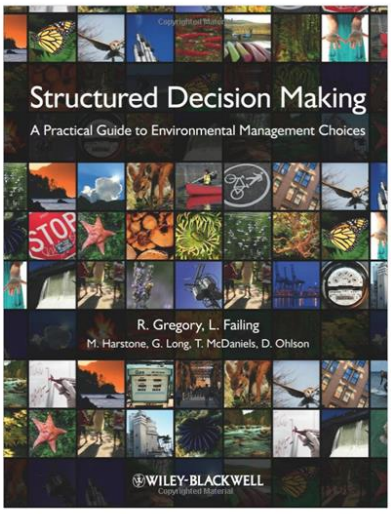
A. Powerpoint Presentation

The AMP: Adaptive Management may not be enough

- Adaptive management reduces quantitative uncertainty
  Data = information Decisions = value based
- AM by itself does not link findings with decisions in a useful way
  - Not integrated well with real decision process
- (AM can be a useful part of a decision-making process!)
- Need a tool that integrates information, helps decision process

Structured Decision Making (SDM)





What is Structured Decision Making?

- Wordy definition: "Collaborative and facilitated application of multiple objective decision making and group deliberation methods to environmental management and public policy problems"

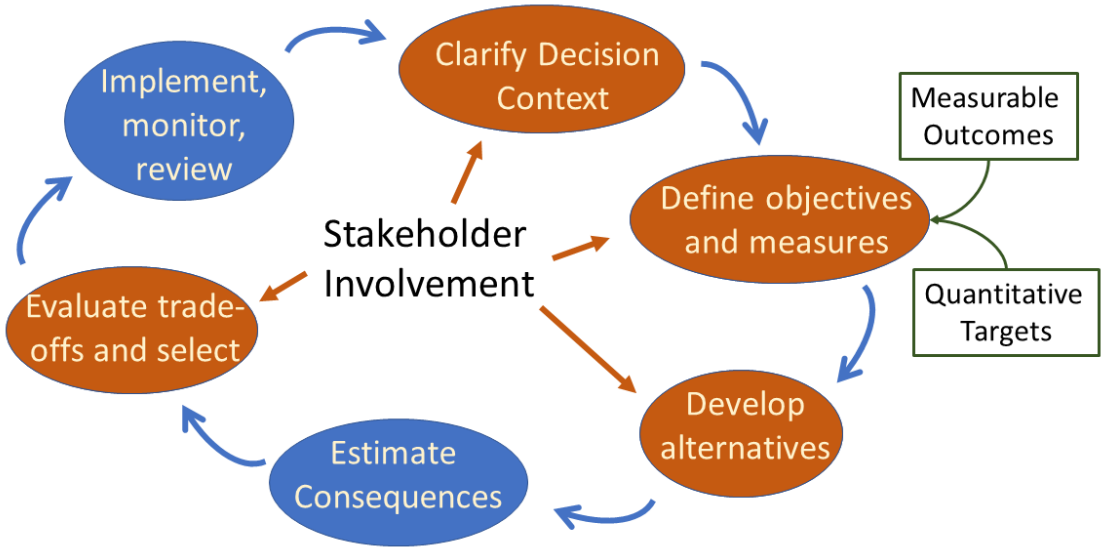
- Decision Analysis approach
  - Heavily facilitated. Social science considerations
  - Considers practical needs/constraints facing natural resource managers
  - Clarifies areas of agreement and disagreement

- Collaborative approach – neither negotiation nor litigation
  - Focuses on learning about decision
  - Can build trust & understanding

Structured Decision Making Examples:

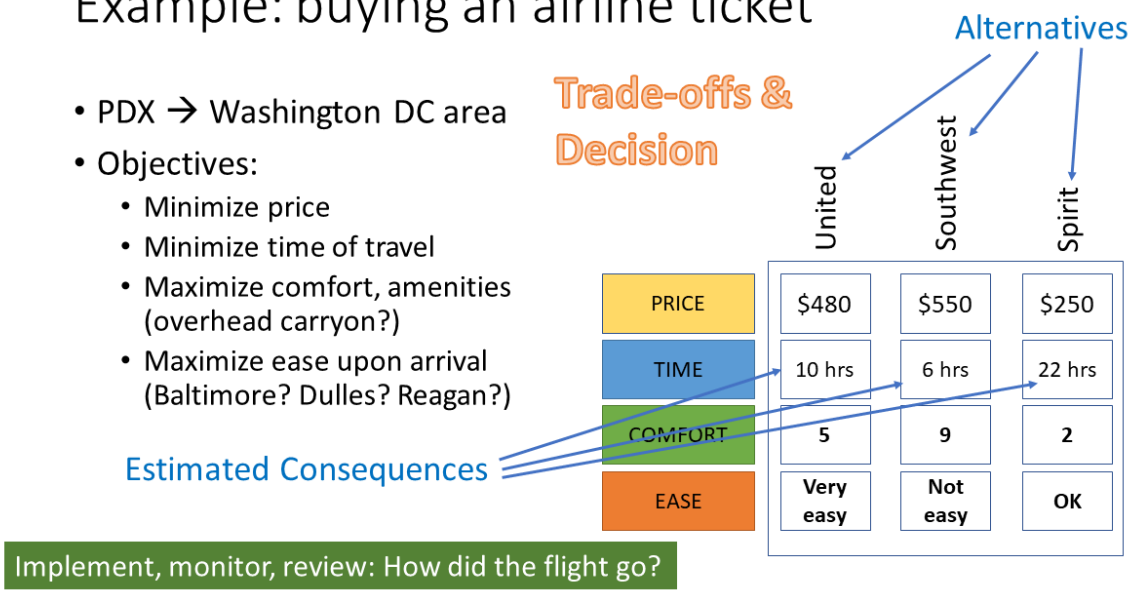
- Recreational fisheries management (Irwin et al. 2011)
- Hydroelectric dam release decisions (Gregory & Failing 2002)
- Endangered species management (Gregory & Long 2009)
- Forestry and climate change adaption (Ohlson et al. 2005)
- Dolphin recovery (Conroy et al. 2008)
- Tillamook Bay watershed management (Gregory 2000)

How does Structured Decision Making work?



Example: buying an airline ticket

- PDX → Washington DC area
- Objectives:
  - Minimize price
  - Minimize time of travel
  - Maximize comfort, amenities (overhead carryon?)
  - Maximize ease upon arrival (Baltimore? Dulles? Reagan?)



Implement, monitor, review: How did the flight go?

Benefits of Structured Decision Making in the AMP

- Enables decisions now, may benefit decisions in the future
- Focuses monitoring
- Transparency
- Clarity
- Potentially reduces decision conflict

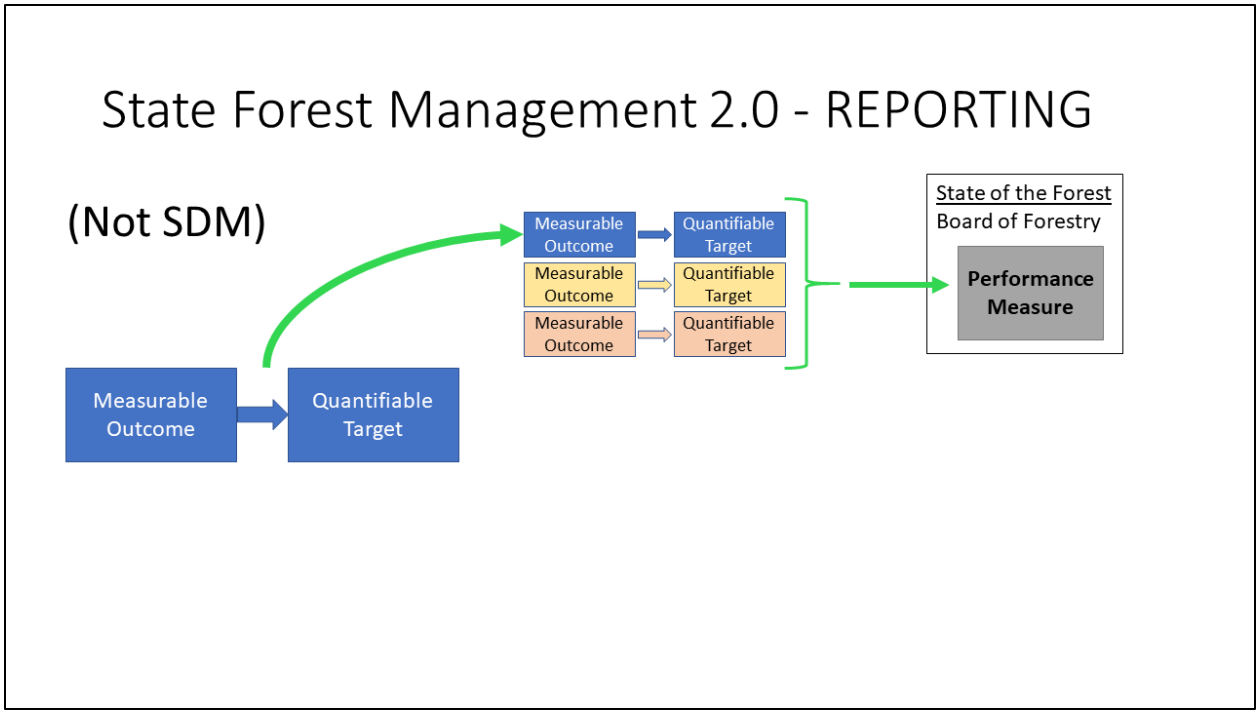
"Stakeholder involvement"?

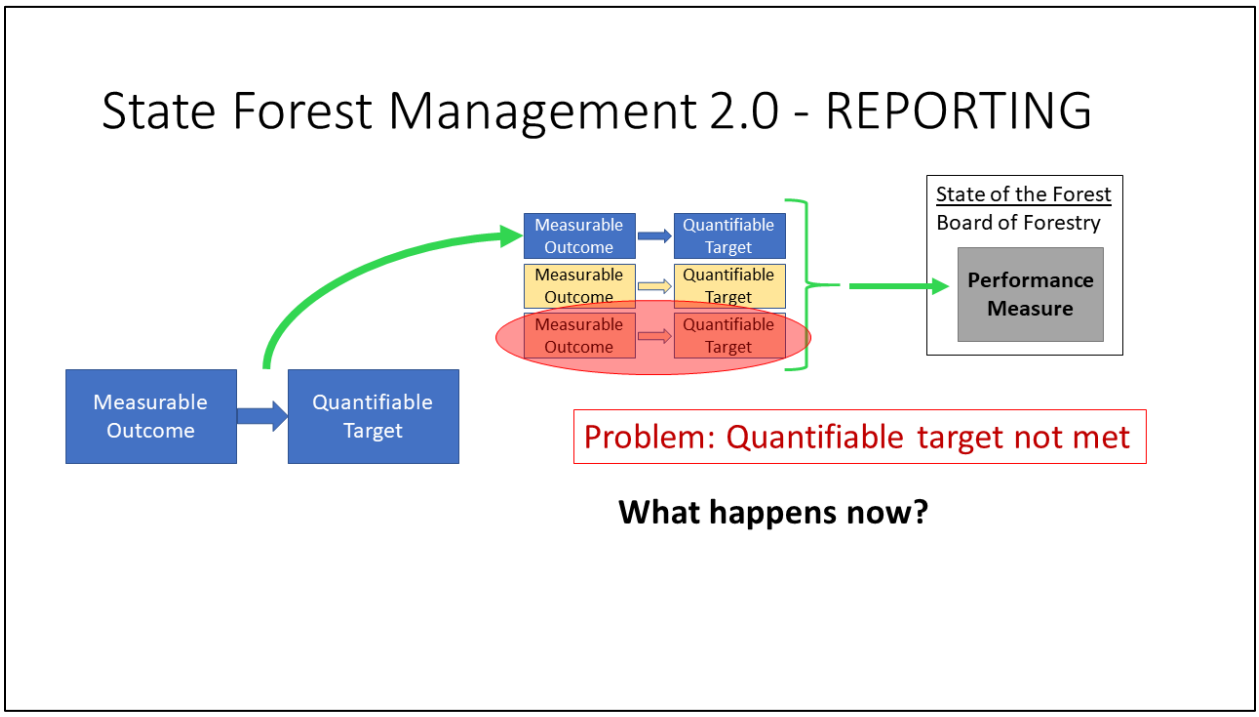
- Who: Decision makers, staff, those affected by decision
- How: facilitated collaboration
- 7-30 individuals
- Multiple meetings (5-9?)
- Goal: inform the decision
- Clarify decision, build objectives & measures, develop alternatives
- Evaluate trade-offs
- Refine
- **Power: alternatives development & exploration**

How will the Division implement Structured Decision Making?

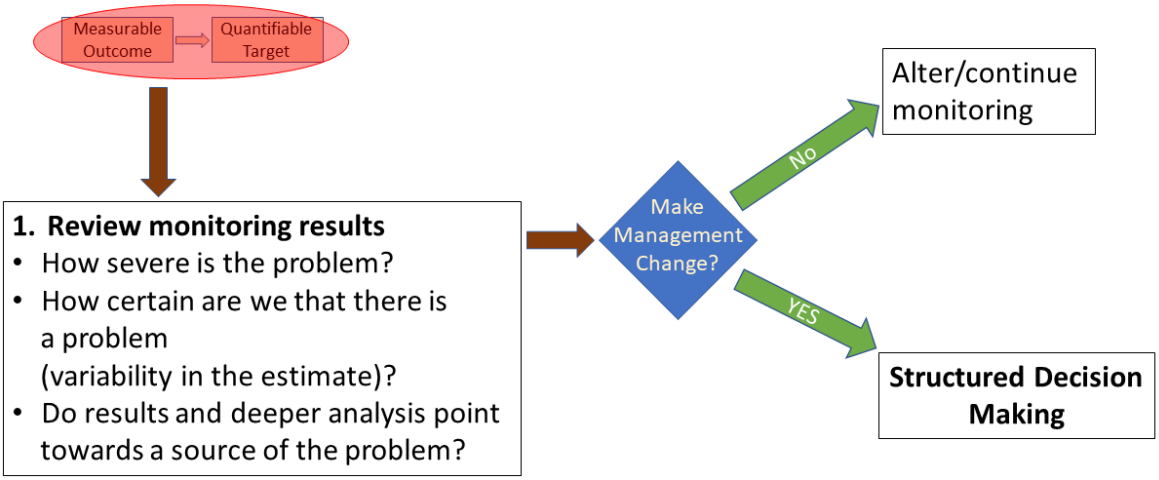
Larger subject: timeline for enacting the Adaptive Management Plan (TBD)

- Explore, break down decisions State Forests makes
- Conduct 1-2, Structured Decision Making processes at a time
  - Timeliness
  - Contention
  - Information availability
  - Size/complexity of decision
  - Group overlap
- Future: revisit earlier decisions with monitoring information


State Forest Management 2.0 - REPORTING
(Not SDM)
Measurable Outcome
Quantifiable Target
Measurable Outcome
Quantifiable Target
Measurable Outcome
Quantifiable Target
Measurable Outcome
Quantifiable Target
State of the Forest
Board of Forestry
Performance Measure


State Forest Management 2.0 - REPORTING
Measurable Outcome
Quantifiable Target
Measurable Outcome
Quantifiable Target
Measurable Outcome
Quantifiable Target
Measurable Outcome
Quantifiable Target
State of the Forest
Board of Forestry
Performance Measure
Problem: Quantifiable target not met
What happens now?

What happens if a Quantifiable Target is not met?

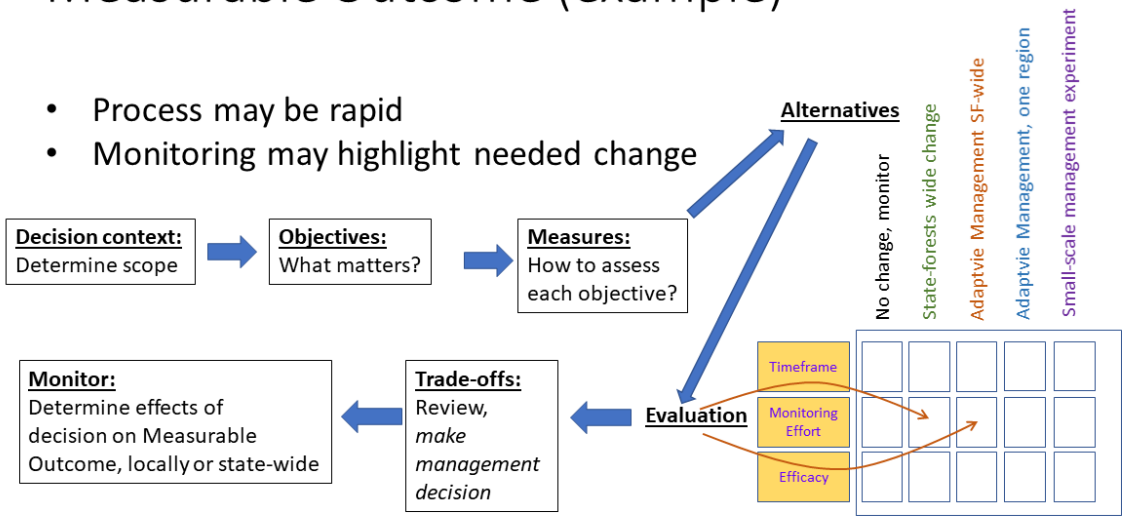


What can ODF change to address a poor Measurable Outcome finding?

- Improve standards compliance (ODF)
  - ODF internal auditing
- Change implementation of standards (ODF)
  - Stakeholder involvement in IP
- Change standards (ODF)
  - Stakeholder input
- Change strategies (BOF)
  - FMP revision

Structured Decision Making to improve Measurable Outcome (example)

- Process may be rapid
- Monitoring may highlight needed change

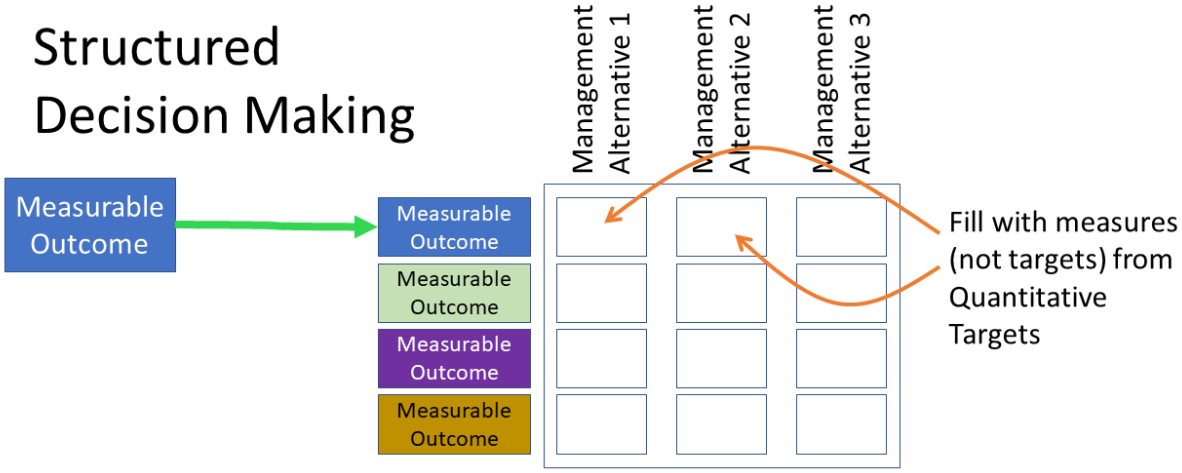


State Forest Management 2.0 – MANAGEMENT DECISION

- Some State Forests management decisions involve multiple Measurable Outcomes
- Goals for the decisions going forward:
  - Transparency
  - Defensibility
  - Support
  - Achieve Greatest Permanent Value
- Initially, decisions complex and daunting
  - Technical complexity
  - Diversity of stakeholders, Measurable Outcomes

State Forest Management 2.0 – MANAGEMENT DECISION

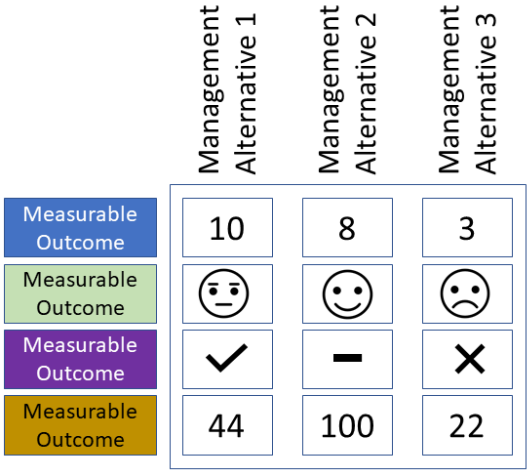
Structured Decision Making



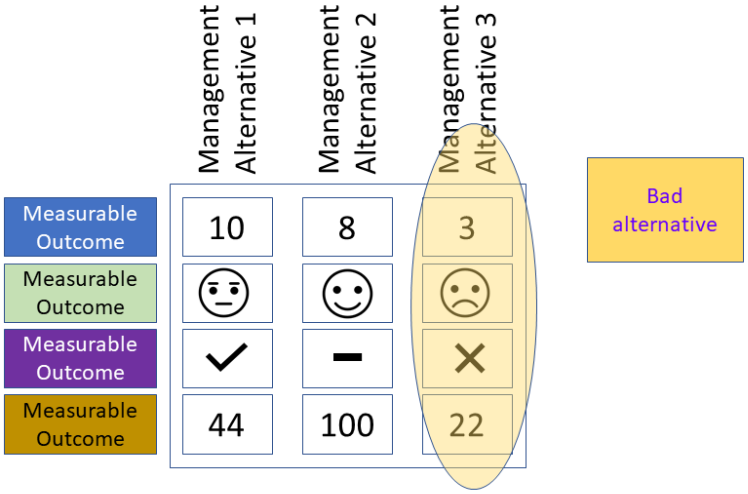
State Forest Management 2.0 – MANAGEMENT DECISION

GOAL OF SDM PROCESS:

- Develop creative alternatives that best meet all objectives (Measurable Outcomes)
- I.E., try to maximize or minimize the consequences for all Measurable Outcomes & other objectives



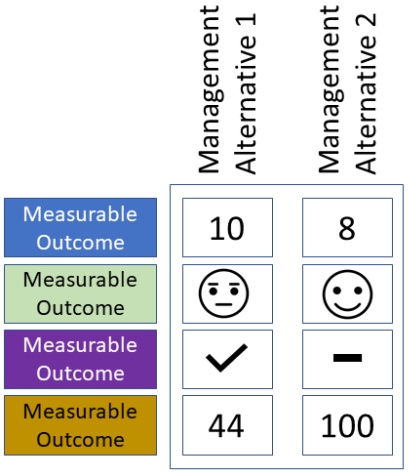
State Forest Management 2.0 – MANAGEMENT DECISION

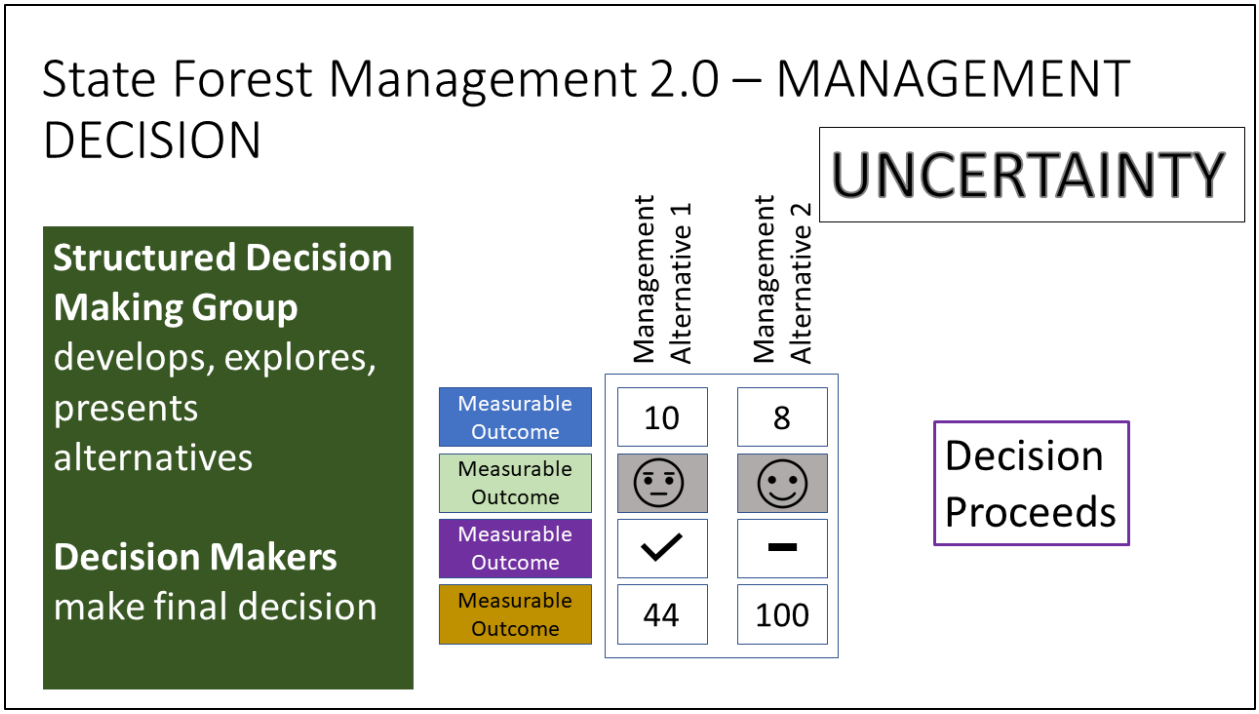


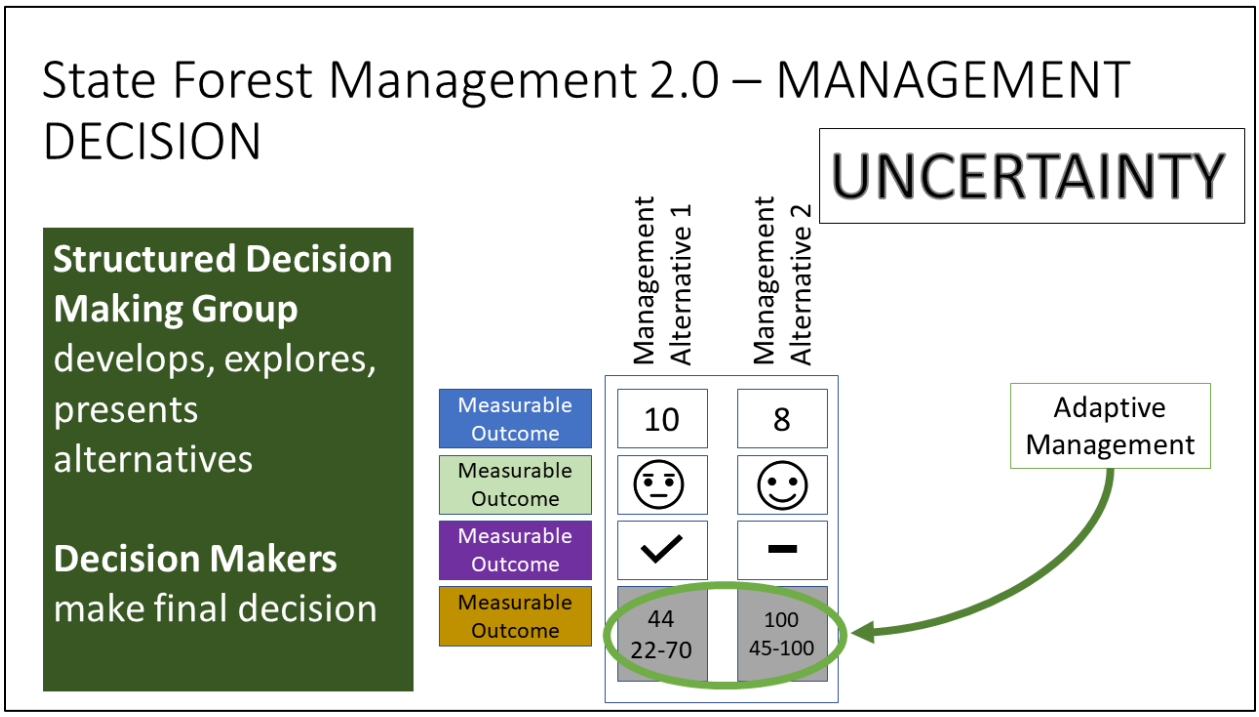
State Forest Management 2.0 – MANAGEMENT DECISION

Structured Decision Making Group develops, explores, presents alternatives

Decision Makers make final decision




State Forest Management 2.0 – MANAGEMENT DECISION
UNCERTAINTY
Structured Decision Making Group develops, explores, presents alternatives
Decision Makers make final decision
Management Alternative 1
Management Alternative 2
Measurable Outcome
Measurable Outcome
Measurable Outcome
Measurable Outcome
10
8
44
100
Decision Proceeds


State Forest Management 2.0 – MANAGEMENT DECISION
UNCERTAINTY
Structured Decision Making Group develops, explores, presents alternatives
Decision Makers make final decision
Management Alternative 1
Management Alternative 2
Measurable Outcome
Measurable Outcome
Measurable Outcome
Measurable Outcome
10
8
44
22-70
100
45-100
Adaptive Management

Measurable Outcome

Measurable Outcome:

- What Matters? (Refine by asking: Why does that matter?)
- Directional verb: clarity on which direction decision makers want it to go (GPV)

  Maximize revenue to counties
  Maximize area of spotted owl habitat
  Minimize costs

- Can State Forests directly impact the proposed Measurable Outcome?

Example: buying an airline ticket

- PDX → Washington DC area
- Objectives:
  - Minimize price
  - Minimize time of travel
  - Maximize comfort, amenities (overhead carryon?)
  - Maximize ease upon arrival (Baltimore? Dulles? Reagan?)

	United	Southwest	Spirit
PRICE	$480	$550	$250
TIME	10 hrs	6 hrs	22 hrs
COMFORT	5	9	2
EASE	Very easy	Not easy	OK

Quantifiable Target

QT = Agreed upon measure of Measurable Outcome + target

- Quantifiable targets live within the AMP
  - Refine target based on best available science
  - Change measure based on decision needs
- Measurable Outcomes live in the FMP and are not easily changed

Measurable Outcomes

Timber Production and Harvest

- Maximize the probability of State Forests' financial viability
- Minimize ODF expenditures
- Maximize revenue to counties
- Maximize the value of timber available for harvest
- Maximize the availability of timber for future harvests
- Maximize local employment and indirect benefit to local economies

Aquatics

- Minimize short-term impacts of Climate Change on aquatic resources
- Minimize long-term impacts of Climate Change on aquatic resources
- Promote stream conditions such that they support a full range of native aquatic species
- Minimize loss of wetlands and wetland functions

Forest Health

Maximize long-term forest productivity and resilience

- Minimize extent and severity of diseases
- Minimize the susceptibility of stands to stress from prolonged (and potentially worsening) heat and drought
- Maximize stand production potential
- Minimize impacts of novel exotic pests

Carbon

- Minimize risk of wildfire
- Maximize storage of carbon in forest land
- Maximize utilization of timber sale outputs in durable materials

  (i.e., saw logs)

Recreation, Education, Interpretation

- Minimize recreational impacts to resources near developed recreation sites
- Minimize recreational impacts to resources away from developed recreation site

Increase user safety
  - Increase staffing levels for law enforcement, ODF, and camp hosts
  - Enhance safety of existing physical infrastructure

Maximize visit quality
  - Increase availability of infrastructure
  - Increase accessibility
  - Increase quality of infrastructure for visitors
  - Increase access to nature
  - Increase access to learning opportunities

- Maximize diversity of REI options within a forest setting

Roads and Access

- Minimize road connectivity to streams at crossing and adjacent to streams
- Minimize unsafe conditions for road users
- Maximize cost effectiveness of timber harvest access
- Maximize vacating of unneeded roads

Geology and Soils

Minimize delivery of sediment to streams:

- Minimize sediment delivery from road-related landslides
- Minimize sediment delivery from in-unit harvests

- Maximize probability of landslide-delivered large wood
- Improve soil productivity

Wildlife

Maximize wildlife habitat

Maximize habitat extent for native wildlife species

- Habitat for species of concern & listed species
- Habitat for game species
- Habitat for aquatic species

- Maximize within-stand physical and biological diversity
- Maximize diversity of habitat types

- Minimize probability of wildlife extirpation in the Plan area

Air Quality

- Minimize smoke impacts to air quality

B. Handout packet

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:

(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:

(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:

(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;

(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:

(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 (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.

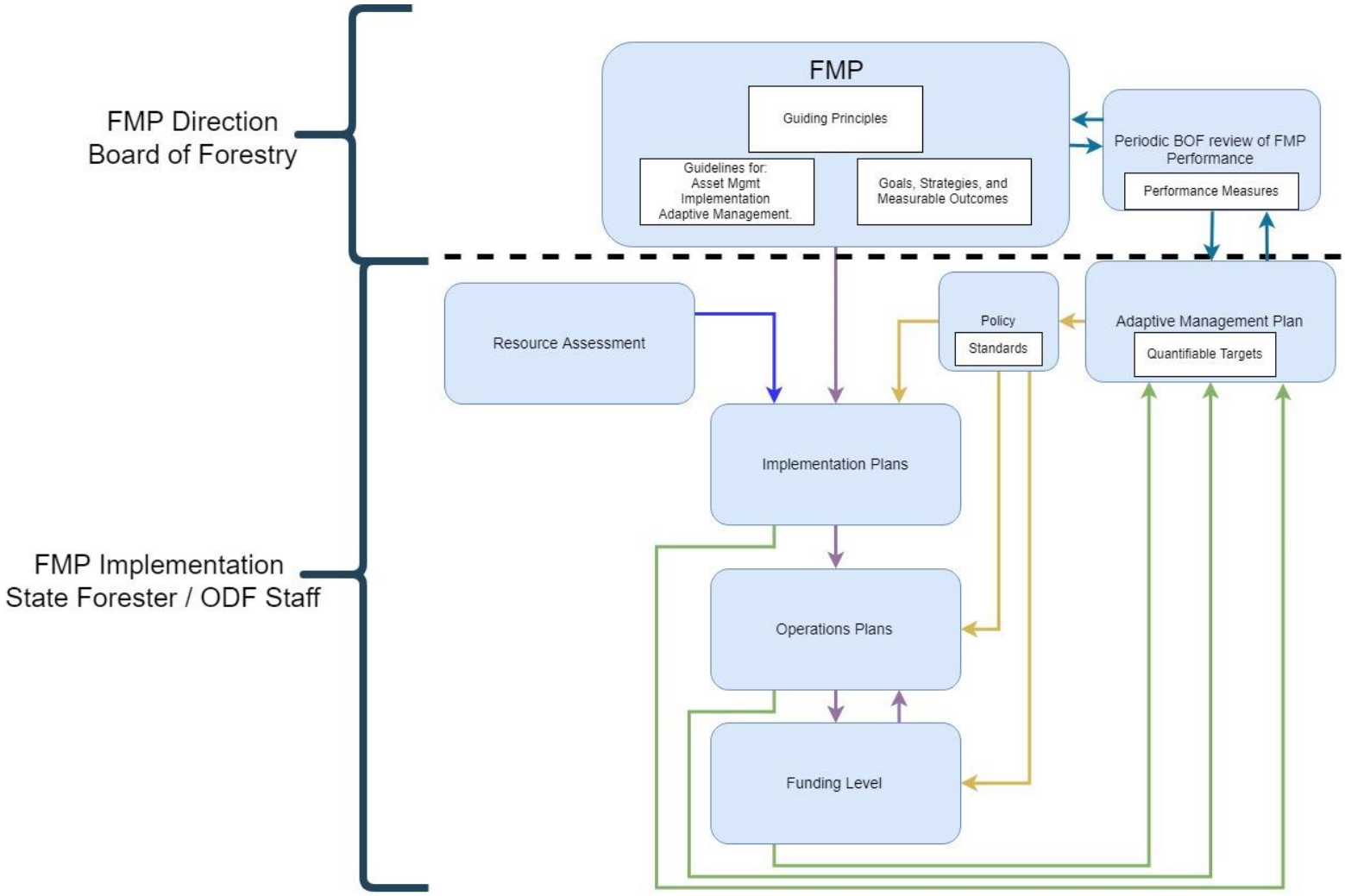
Quantifiable Target – Quantifiable targets are established to measure progress towards a desired outcome and may change as the body of knowledge around specific requirements change. In this manner, adaptive management can be applied to both management practices and the outcomes that they are intended 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 *measureable 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 20. 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: • Average of 5 TPA over regen units in an AOP, Some units less, some more • Additional retention (>5 TPA) where needed to meet snag and down wood recruitment goals • Variety of species, both with and without defect • Variety of arrangements within harvest units


FMP Direction
Board of Forestry
FMP Implementation
State Forester / ODF Staff
FMP
Guiding Principles
Guidelines for:
Asset Mgmt
Implementation
Adaptive Management.
Goals, Strategies, and
Measurable Outcomes
Periodic BOF review of FMP
Performance
Performance Measures
Resource Assessment
Policy
Standards
Adaptive Management Plan
Quantifiable Targets
Implementation Plans
Operations Plans
Funding Level