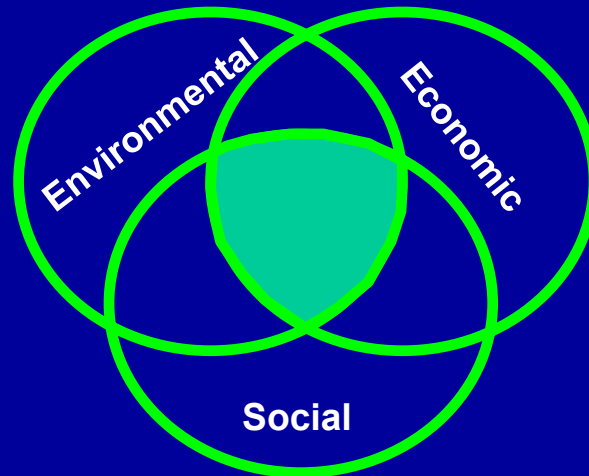


Reference Material



Sustainable Forest Management

Background Information:

Board of Natural Resources

December Workshop 2003

Proposed Decision Process for Selecting the Preferred Alternative

Incorporates:

- Past Board discussion
- Modeling and technical analysis
- EIS results
- Public comment

Decision Process: Steps towards establishing a Preferred Alternative for Sustainable Forestry

December 2 BNR Workshop	January 8 BNR Workshop	February 2 BNR Workshop	February 17 BNR Workshop
<ul style="list-style-type: none"> • An example of compiling and modeling a “mix and match” alternative. • Review of the completed Policy & Outcome Matrix • Proposed timelines and processes leading to selection of the Preferred Alternative 	<ul style="list-style-type: none"> • Overview of the DEIS public comments • BNR to create one or more “mix and match” draft alternatives for their consideration on 2/2/03. 	<ul style="list-style-type: none"> • Present model results for the new BNR “mix and match” alternative(s) • BNR dialogue on the key policy features for the Preferred Alternative • BNR selects key policy features that provides necessary guidance for the DNR to construct the Preferred Alternative. 	<ul style="list-style-type: none"> • Preferred Alternative model results presented to the BNR. • BNR dialogue on the policy considerations and implications of the Preferred Alternative. • Decision: BNR selects a Preferred Alternative, starting the Final EIS process. • Spring 2004: development of the model and the completion of the Final EIS. • June/July 2004: FEIS presented to BNR for final policy action.

Direction from BNR on the Proposed Decision Process

1. Identifying the key outcomes
2. Identifying key policy issues
3. Create discussion matrix to aid in the understanding of how policy issues influence key outcomes

What does the BNR see as Key Outcomes?

1. Revenue
2. Variability of income
3. Structurally Complex Forest Structure
4. Implementation considerations
5. Long-term standing inventory
6. Others?

Key Policy Choices for the BNR

1. Volume vs. Value Regulation
2. Type of Silviculture
3. Timber Harvest Flow
4. Ownership Groups
5. Amount of “on-base” land
6. Older Forests

Key Policy Choices for the BNR

1. Volume vs. Value Regulation
2. Type of Silviculture
3. Timber Harvest Flow
4. Ownership Groups
5. Amount of “on-base” land
6. Older Forests

These policy choices are independent of each other. A separate decision can be made for each. Thinking about them as individual decisions allows us to use them as building blocks for a preferred alternative.

However, the building blocks interact with each other and their combined impact on the outcomes will be modeled and analyzed in the Final EIS.

Matrix: Background Reference Material for Policy Choices

Compared to current conditions and Alternative 1 future projections

		a	b	c	d	g	f	g	h
<u>Policy Issues</u>		Outcomes							
		Alternative	Revenue		Income variability	Amount of Structurally Complex forest beyond that required by the HCP	Implementation		Long-term standing inventory increases under Alt. 1
			Near-term	Long-term			Costs	Timing	
<u>Volume & Value</u>									
1	Volume	1,2,3,4							
2	Value	5,6							
<u>Silviculture</u>									
3	DNR current Silviculture	1, 2, 3							
4	Minimum Silviculture	4							
5	Intensive Silviculture	5, 6							
6	Bio Diversity	6							
<u>Timber Harvest Flow</u>									
7	Even-flow	1,4							
8	Relative Non-declining	2							
9	Relatively Unconstrained	3							
10	Modulating	5,6							
<u>Ownership Groups</u>									
11	24	1,2,4							
12	20	3,5,6							
13	1	3							
<u>Available "On-base" land</u>									
14	Maintain procedures & deferrals	1							
15	Change procedures & deferrals	3,4,5,6							
16	Change procedures	2							
<u>Older Forests</u>									
17	Basic Protection Only	1,2,3							
18	Specific site Protection	4							
19	Landscape Targets	5,6							

The Matrix: a tool to illustrate the likely outcomes of various policy choices

- Contains qualitative information about the likely outcomes that may result from a single change in the policy variable
- Information is not quantitative – in terms of number of \$, or acres of increase and does not describe “shadow prices/values” for the individual policy variables
- Qualitative information is a result of DNR modeling, professional judgment and literature review

Calculating the Timber Harvest of Fiduciary Trusts

Value vs. Volume

- Using a limited definition, volume and value are just measurements of important outputs of the forest
 - Volume is an expression of a production function
 - i.e. it is a measure of how much wood is produced
 - Value is an expression of volume times price
 - i.e. it relates to the production function to economics
- However, with boarder definition, the management of the forest resource is influenced by what we decide to measure as output(s). For example:
 - With volume, we will concentrate on optimizing volume over time, subject to other objectives and constraints
 - With value, we will concentrate on optimizing revenue over time, subject to other objectives and constraints

A conceptual construct: Viewing the Policy issues as a Decision tree

DNR forest management objectives

- Trust mandate
- Habitat Conservation Plan goals

Volume

Board feet
(maximize volume
subject to...)

Value

Dollars
(maximize value
subject to...)

Silviculture

Timber Harvest Flow

Ownership Groups

Amount of "on-base" land

Older Forests

DNR current silviculture

Minimum silviculture

Intensive silviculture

Biodiversity silviculture

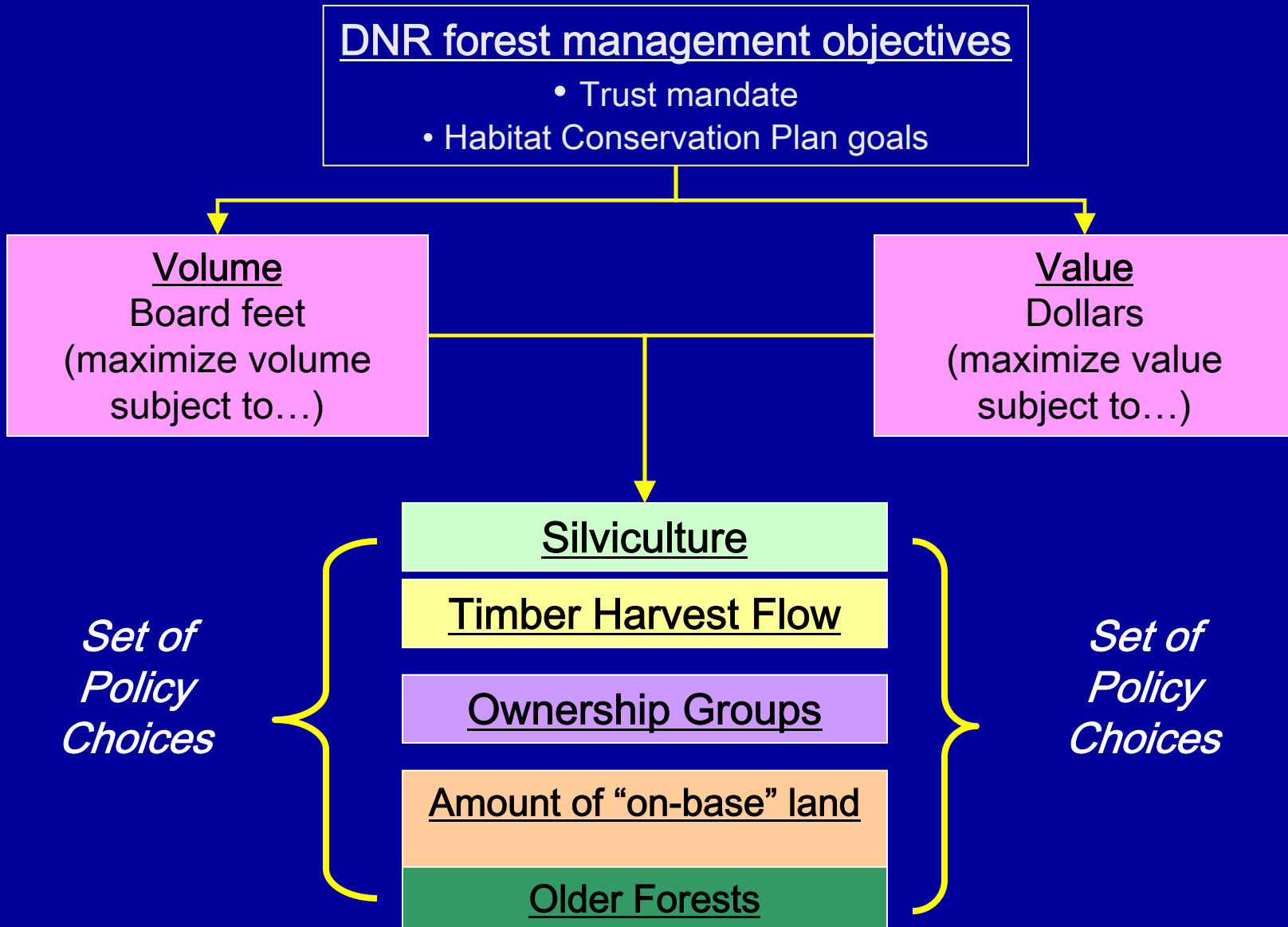
DNR current silviculture

Minimum silviculture

Intensive silviculture

Biodiversity silviculture

A conceptual construct: Viewing the Policy issues as a Decision tree



Calculating the Timber Harvest Volume vs. Value

- A focus on value control over volume control will likely result in:
 - *Positive:*
 - effect on gross revenues in short- and long-term as a result on attempting to maximize value from the forest
 - *Neutral:*
 - effect on amount of income variability the individual trusts experience
 - effect on amount of complex forest conditions
 - impact on long-term standing inventory
 - *Increase:*
 - in costs as a result of increased silvicultural activities and investments
 - *Delay:*
 - in implementing the value-based strategies as challenges of cash-flow limitations and organizational change are over come

(Words in *italics* are the one-word labels used to complete the matrix)

Matrix: Background Reference Material for Policy Choices

Compared to current conditions and Alternative 1 future projections

		a	b	c	d	g	f	g	h
		Outcomes							
Policy Issues	Alternative	Revenue		Income variability	Amount of Structurally Complex forest beyond that required by the HCP	Implementation		Long-term standing inventory increases under Alt. 1	
		Near-term	Long-term			Costs	Timing		
Volume & Value									
1	Volume	1,2,3,4	same	same	neutral	neutral	same	same	neutral
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Silviculture									
3	DNR current Silviculture	1, 2, 3							
4	Minimum Silviculture	4							
5	Intensive Silviculture	5, 6							
6	Bio Diversity	6							
Timber Harvest Flow									
7	Even-flow	1,4							
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Older Forests									
17	Basic Protection Only	1,2,3							
18	Specific site Protection	4							
19	Landscape Targets	5,6							

DNR Current Silviculture

- **Silviculture is the art and science of cultivating forests to deliberately achieve objectives**
 - To grow trees, one needs clear objectives that can be measured as a desired future state
- **“The primary goal of the Forest Resource Plan is to conserve and enhance the natural resources of state forest lands while producing long-term, stable income from these lands.”**
 - Historically, resource protection used a set-as aside management approach, e.g. owl circles, old growth research areas.
- Silvicultural management activities are:
 - Reforestation by planting or natural seeding, including site preparation and use of improved stock, and vegetation control
 - Stand tending – thinning (both commercial and non-commercial), pruning and fertilization
 - Regeneration harvest at the end of the rotation
- **Key components of DNR current silviculture are determined by the investment criteria (Policy No 11) balancing of biological productivity and economic potential. This policy , in large part, determines the:**
 - The types of silvicultural activities a stand might be treated with, and
 - Determines the maturity criteria for the stand (i.e. the minimum age that a stand may be regenerated)
- For example a Douglas-fir average site (site class III) is likely to be planted with improved stock, be treated for competing vegetation, pre-commercially thinned, thinned at approximately 30 years of age, be final harvested with leave trees and regenerated at 60 years
- This is a classic even-age management regime.

DNR Current Silviculture



DNR Current Silviculture



Policy Issues and Outcomes: Matrix details

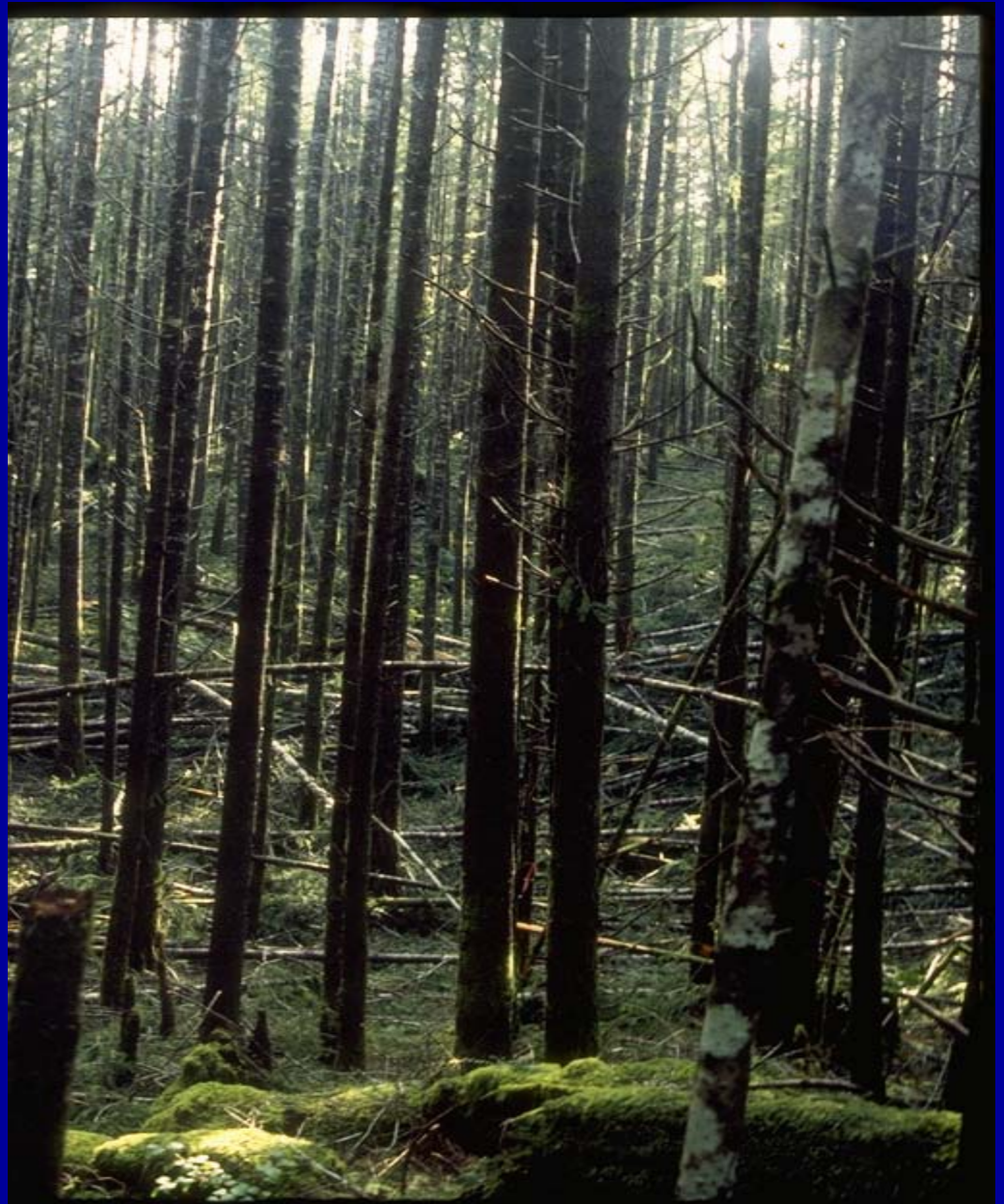
- Implementing Current DNR Silviculture will (as in Alternatives 1, 2, and 3) :
 - Not change the mix of forest products and therefore DNR's revenue earning ability short or long-term - *same*
 - Not increase the area or reduce the time to develop more complex forest stand conditions – *same*
 - Not change the implementation costs beyond the range now experienced - *same*
 - Not be a challenge to implement – *same*
 - Not impact the long-term standing inventory - *same*

(Words in *italics* are the one-word labels used to complete the matrix)

Minimum Silviculture

- Silviculture intensity is determined by the management objectives.
- One key objective is the return on investment as measured by net present value.
- If the all other objectives are the same, then the investment criteria become important in determining what type of silviculture is implemented.
- Biological productivity maximization generally will result in longer rotations (near culmination of mean annual increment) and minimal silvicultural investment at the expense of direct economic returns.
- Longer rotations delays the time of final harvest. The delay, once discounted, makes it difficult to justify early silvicultural investments, as these “costs” don’t yield returns for a long time.
- Thinnings, especially those later into the rotation, help to maintain growth of the stands, provide cash-flow but may reduce total yield.
- Minimizing investments in silviculture reduce volumes in the short-run and reduce gross revenue.
- In the long-term, if other constraints are non-binding, harvest volumes and values should increase due to a price premium for larger diameter wood unless there is a price penalty for larger trees.
- Longer rotations, with thinnings, will maintain growth and will produce larger trees into the future. These forest stands will, in time, likely have the structural characteristics for northern spotted owl habitat.
- Longer rotations maintain more forest cover and will increase the standing inventory for over the long-term.

Minimum Silviculture



Minimum Silviculture



Minimum Silviculture

A result of longer rotations will be larger trees



Intensive Silviculture

- If the all other objectives are the same, then the investment criteria become important in determining what type of silviculture is implemented.
- Where a management objective is to maximize net present value (economic potential), the result will lead to higher investment in stand activities and a shorter rotation length.
- Increased use of improved stock, higher planting densities, fertilization and a lower maturity criteria are all used to increase financial yields.
- Increased harvest activities will generate greater revenues at a greater cost. If costs are controlled, net income to the beneficiaries should increase.
- Intensive silviculture is only practiced on on-base lands. Designated habitat and resource sensitive areas are managed differently to meet specific objectives and minimize costs. Relative to current practices, this is no impact on the development of more complex forests.
- This traditional even-age style of silviculture is well understood by Department staff and implementation would be straightforward. However, financing the silviculture investments, particularly improvements for planting stock, site preparation, fertilization and thinnings (pre- and and commercial) would be a challenge due to current limited cash flow.
- Stand inventories would be lower over the long-term, as they adjust the new management regimes.

Intensive Silviculture



Intensive Silviculture



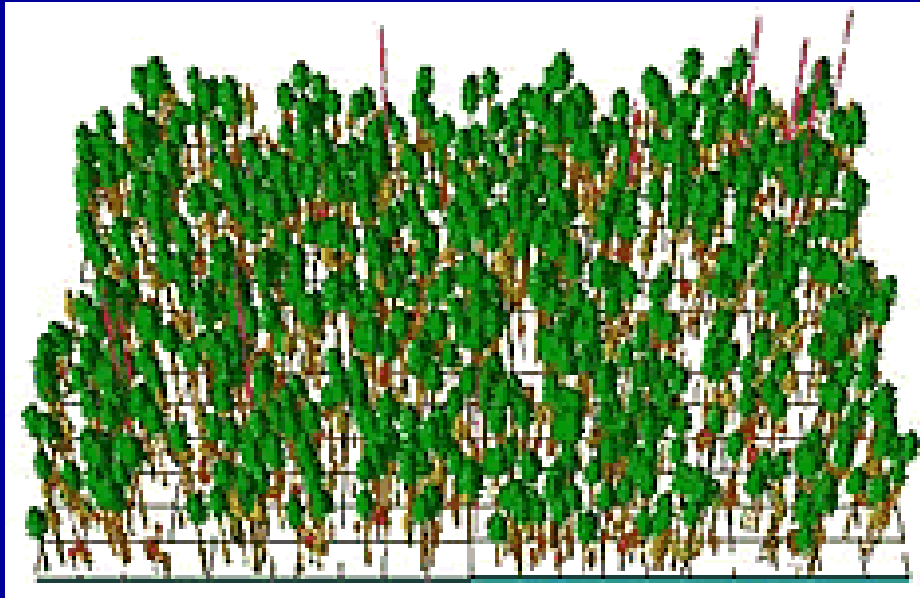
Biodiversity Pathways in designated habitat management areas

- The goal is to simultaneously manage for forest structure, conservation benefits and revenue; this is done both at the stand and landscape levels. Individual forest stands are the basic components of the landscape, techniques include “variable density thinning”, understory planting and management, snag and down woody treatments. Stands are typically treated on alternating long and short rotations.

Impacts on Outcomes

- Implementing variable density thinning and biodiversity pathways effectively results in more land being managed through silviculture (riparian and northern spotted owl habitat management areas). The extent of active management reduces the need for single purpose set asides to achieve conservation objectives.
- Variable density thinning, snag and down woody treatments and under-planting are all designed to accelerate forest structure development. Therefore, biodiversity pathway management should increase and maintain the amount of area in complex forest structure and reduce the time in developing it.
- Biodiversity diversity pathways are largely experimental. Therefore, initial costs and speed of implementation are likely to be high and slow.
- The impact on inventory would probably be neutral.

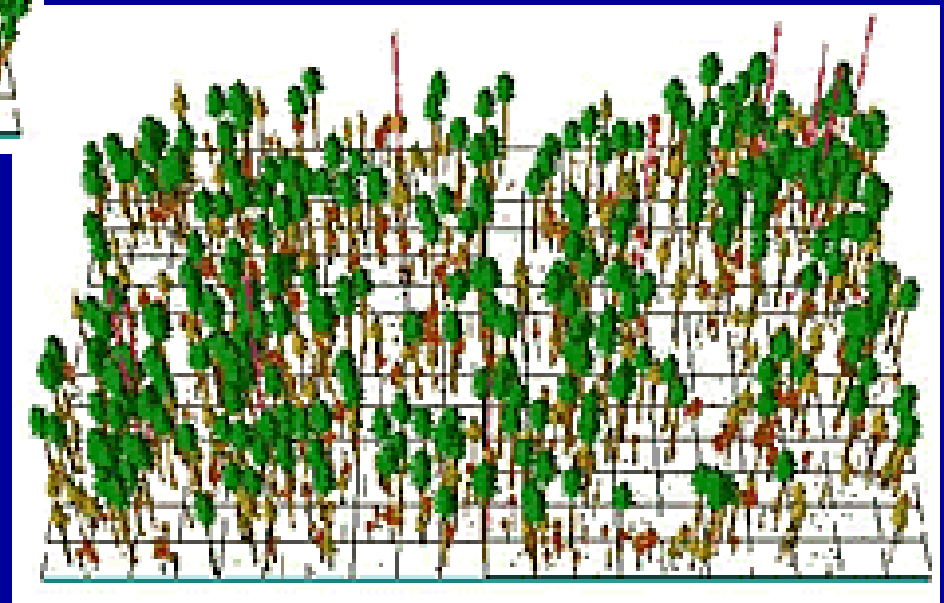
Biodiversity Pathways in designated habitat management areas



Pre-thin stand

Images courtesy of the US Forest Service Pacific Northwest Research Laboratory, Olympia WA

Post-thin stand



Biodiversity



Silviculture and Landscapes



Matrix: Background Reference Material for Policy Choices

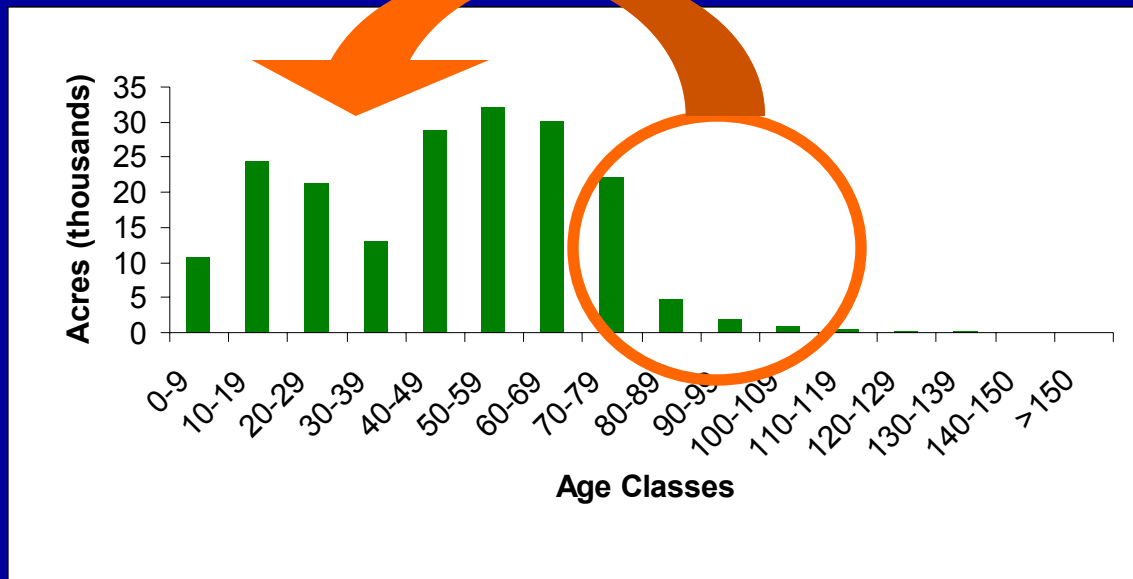
Compared to current conditions and Alternative 1 future projections

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Policy Issues		Outcomes							
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Silviculture									
3	DNR current Silviculture	1, 2, 3	same	same	neutral	same	same	same	same
4	Minimum Silviculture	4	negative	same	neutral	increase	decrease	immediate	increase
5	Intensive Silviculture	5, 6	positive	positive	neutral	same	increase	delay	same
6	Bio Diversity	6	positive	positive	neutral	increase	increase	delay	same
Timber Harvest Flow									
7	Even-flow	1,4							
8	Relative Non-declining	2							
9	Relatively Unconstrained	3							
10	Modulating	5,6							
Ownership Groups									
11	24	1,2,4							
12	20	3,5,6							
13	1	3							
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15	Change procedures & deferrals	3,4,5,6							
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Older Forests									
17	Basic Protection Only	1,2,3							
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19	Landscape Targets	5,6							

Timber Harvest Flow Control

- Is the rate, amount and timing of timber harvested from the on-base lands.
- The more demanding the flow control the larger the constraint on the land-base
 - i.e. when forest conditions are distributed un-evenly within a sustained yield unit, an absolute “even-flow” objective becomes a constraint on the amount of volume and silviculture activity that can occur.

A constraint results, because older forest stands must be held to “fill-in-gaps,” until the forest becomes regulated – i.e., has an even distribution.



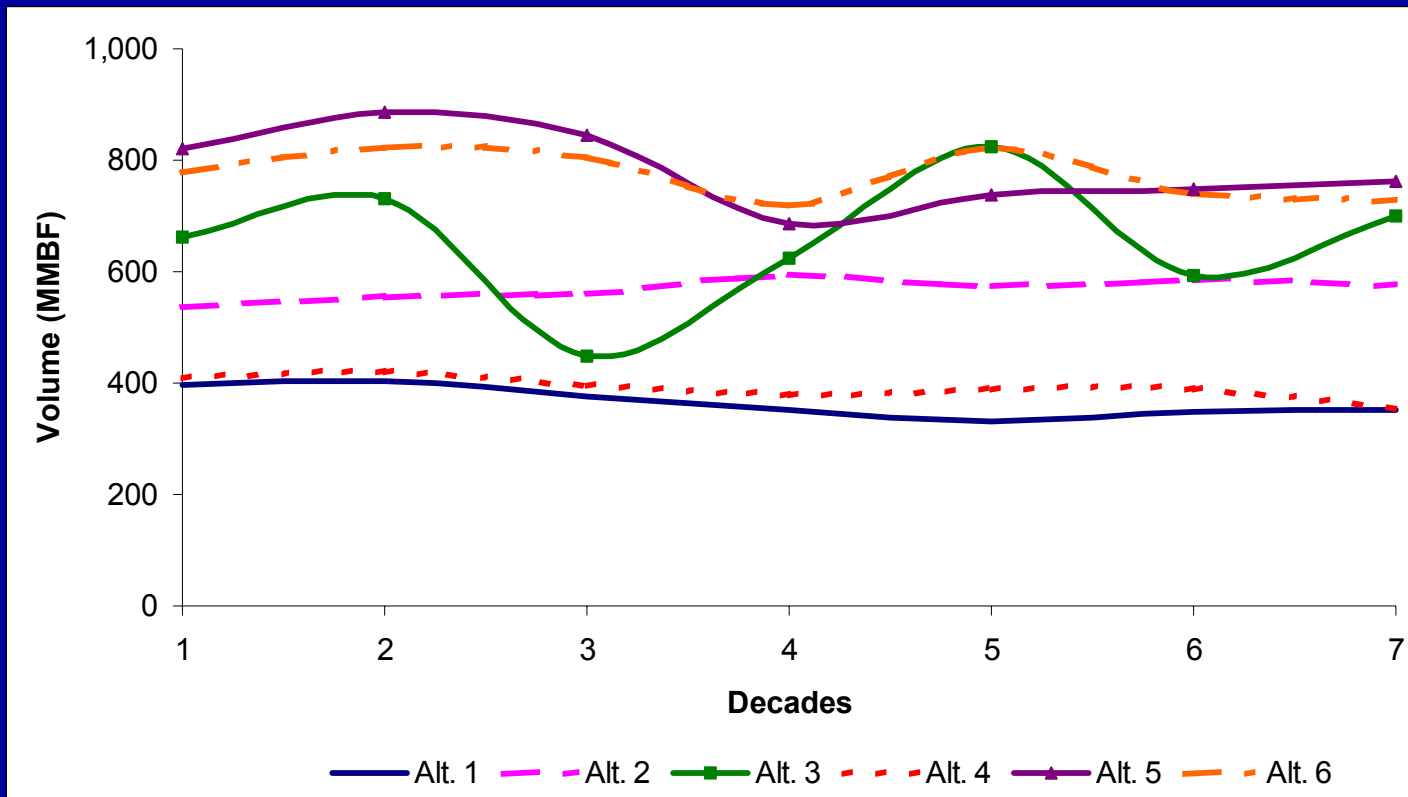
Timber Harvest Flow Control

- Is the rate, amount and timing of timber harvested from the on-base lands.
- **The more demanding the flow control the larger the constraint on the land-base**
 - i.e. when forest conditions are distributed un-evenly within a sustainable harvest yield unit, an absolute “even-flow” objective becomes a constraint on the amount of volume and silviculture activity.
 - A constraint results, because older forest stands must be held to “fill-in-gaps,” until the forest becomes regulated – i.e., has an even distribution.
- **When the age classes are distributed un-evenly within a sustainable harvest unit, a “flexible” or softer timber harvest flow objective does not constrain the land-base.**
- A softer timber harvest flow objective may increase the level of variability in timber harvest flow over time for individual trusts. The level of increase in variability that a trust may experience is influenced by the starting inventory.

Timber Harvest Flow

- **Relative even-flow (e.g., Alt. 1 & 4)**
 - expectation is that any decade will not vary more than a +/-25 % from a long-term average
- **Relative non-declining even-flow (e.g., Alt. 2)**
 - expectation is that harvests will increase over time
- **Relative unconstrained flow (e.g., Alt. 3)**
 - expectation is that there will be no cessation or prolonged curtailment in harvest (legal minimum)
- **Modulating flow (e.g., Alt. 5 & 6)**
 - expectation is that harvest will not vary more than a +/-25 % in volume from one decade to the next

Timber Harvest Flow



Matrix: Background Reference Material for Policy Choices

Compared to current conditions and Alternative 1 future projections

		a	b	c	d	g	f	g	h
<u>Policy Issues</u>		Outcomes							
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<u>Volume & Value</u>									
1	Volume	1,2,3,4	same	same	neutral	neutral	same	same	neutral
2	Value	5,6	positive	positive	neutral	neutral	increase	delay	neutral
<u>Silviculture</u>									
3	DNR current Silviculture	1, 2, 3	same	same	neutral	same	same	same	same
4	Minimum Silviculture	4	negative	same	neutral	increase	decrease	immediate	increase
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6	Bio Diversity	6	positive	positive	neutral	increase	increase	delay	same
<u>Timber Harvest Flow</u>									
7	Even-flow	1,4	same	same	same	neutral	neutral	neutral	neutral
8	Relative Non-declining	2	Slight "+"	same	same	neutral	neutral	neutral	neutral
9	Relatively Unconstrained	3	Big "+"	same	Big "+"	neutral	neutral	neutral	neutral
10	Modulating	5,6	Big "+"	same	Slight "+"	neutral	neutral	neutral	neutral
<u>Ownership Groups</u>									
11	24	1,2,4							
12	20	3,5,6							
13	1	3							
<u>Available "On-base" land</u>									
14	Maintain procedures & deferrals	1							
15	Change procedures & deferrals	3,4,5,6							
16	Change procedures	2							
<u>Older Forests</u>									
17	Basic Protection Only	1,2,3							
18	Specific site Protection	4							
19	Landscape Targets	5,6							

Ownership Groups

- These are the sustainable harvest units
 - Current policy is 24 units

Assumptions Review

Current Ownership Groups (FRP Policy #6) (Westside only)

OESF
&
Capitol
Forest
= 2

Total
24
Ownership
Groups



Forest Board
Transfer in
separate
counties
= 17

Federal
Grant
&
Forest Board
Purchase
grouped in
separate
WADNR
Regions:
= 5

Ownership Groups

- These are the spatial units used in determining the sustainable harvest levels.
- Shocking as it may sound, the size and number of the ownership groups a forest has is unimportant **if** the forest conditions (e.g. age classes distribution) are the same across all landscapes.
- However age class is not distributed evenly across trusts – for example Federally Granted Trusts.

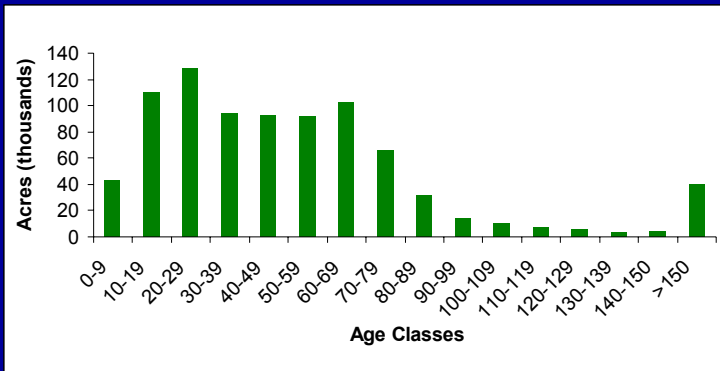
Current Age Class distribution for Federally Granted Lands

Western Washington



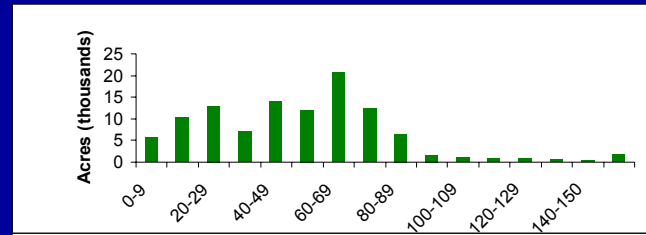
Current Age Class distribution for Federally Granted Lands by Ownership Group

Western Washington

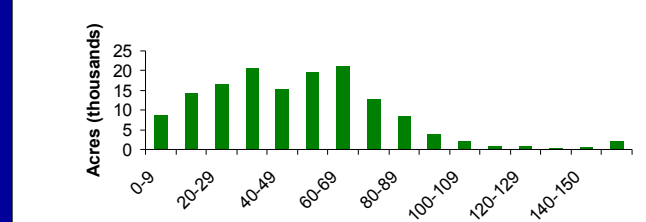


Westside Combined

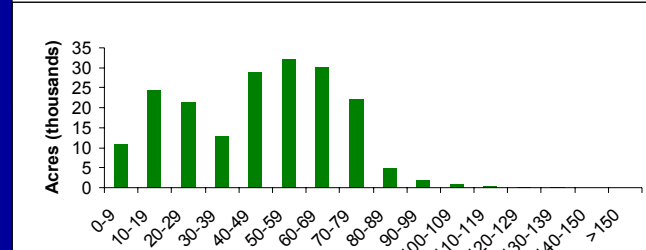
South Puget Sound
Region



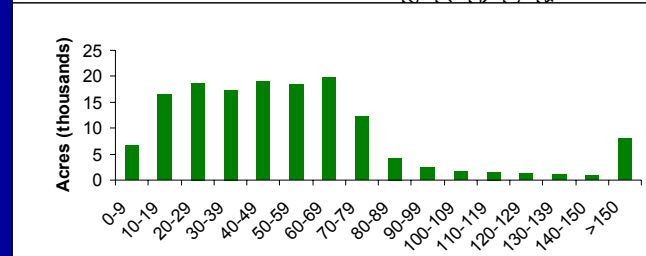
Southwest Region



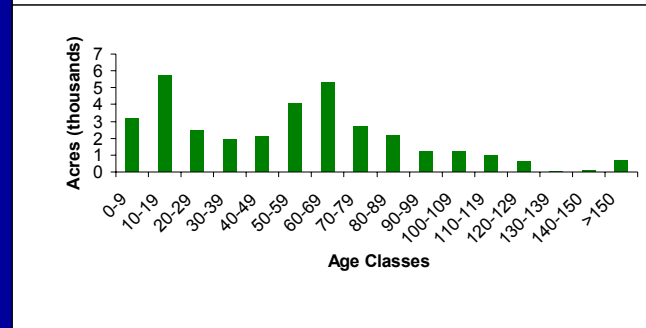
Central Region



Northwest Region



Olympic Region



Ownership Groups

- These are the spatial units used in determining the sustainable forestry levels.
- Shocking as it may sound, the size and number of the ownership groups a forest has is unimportant **if** the forest conditions (e.g. age classes distribution) are the same across all landscapes.
- However age class is not distributed evenly across state forest nor across trusts – for example Federally Granted Trusts.
- Therefore as we make smaller units, we create a “constraint” on the land-base, while larger units relieve this constraint.
- However, the constraint can be beneficial if an objective is to reduce variability in revenue over time.

Likely outcome from changing Ownership Groups

Sustainable Harvest Units

- Reducing the number of ownership groups:
 - Increase revenues
 - Increase the variability of revenue flow to the trusts

Matrix: Background Reference Material for Policy Choices

Compared to current conditions and Alternative 1 future projections

Policy Issues	Alternative	Outcomes							
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6 Bio Diversity	6	positive	positive	neutral	increase	increase	delay	same	
Timber Harvest Flow									
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9 Relatively Unconstrained	3	Big "+"	same	Big "+"	neutral	neutral	neutral	neutral	
10 Modulating	5,6	Big "+"	same	Slight "+"	neutral	neutral	neutral	neutral	
Ownership Groups									
11 24	1,2,4	same	same	same	neutral	neutral	neutral	neutral	
12 20	3,5,6	Slight "+"	same	Slight "+"	neutral	neutral	neutral	neutral	
13 1	3	Big "+"	same	Big "+"	neutral	neutral	neutral	neutral	
Available "On-base" land									
14 Maintain procedures & deferrals	1								
15 Change procedures & deferrals	3,4,5,6								
16 Change procedures	2								
Older Forests									
17 Basic Protection Only	1,2,3								
18 Specific site Protection	4								
19 Landscape Targets	5,6								

Available “On-base” Lands

- Land available for revenue generation is determined by:

1. Deferred areas

- Deferred from silvicultural investment and timber harvest activities for a period of time
- Often used to protect sensitive resources as in parks and reserves, or in a managed landscape situation, until an alternative management plan is implemented
 - Northern spotted owl circles
 - Forest stands occupied by marble murrelets

2. Area constraints

- Restriction imposed to meet a specific management objective
 - For rain-on-snow management, DNR maintain 66% of DNR managed lands within a rain-on-snow sub-basin with forest stands 25 years and older (HCP and Procedure 14-004-060)
 - In all watershed administrative units (WAU) where DNR manages more than 5% of the WAU area, DNR maintains 50% of its management area with forest stands 25 years and older (Task 14-001-010 - Maintaining mature forest components)

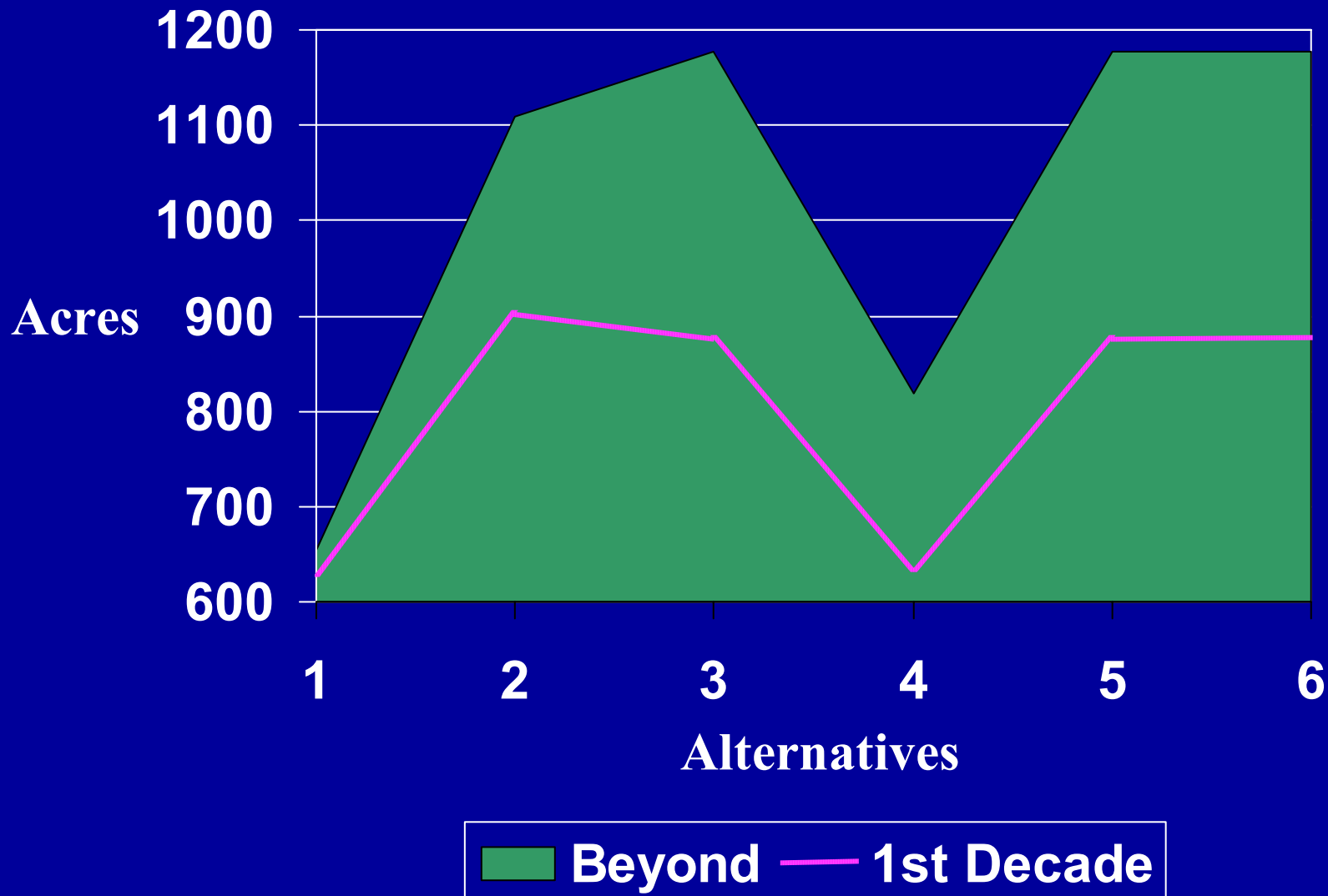
“On-” and “Off-Base”

		On-base		Off-base	
Alts.		Acres	%	Acres	%
First	1	629,000	45%	763,000	55%
Decade	2	902,000	65%	489,000	35%
	3	877,000	63%	515,000	37%
	4	635,000	46%	756,000	54%
	5	877,000	63%	515,000	37%
	6	877,000	63%	515,000	37%
Beyond	1	654,000	47%	737,000	53%
First	2	1,109,000	80%	281,000	20%
Decade	3	1,177,000	85%	213,000	15%
	4	818,000	59%	574,000	41%
	5	1,177,000	85%	213,000	15%
	6	1,177,000	85%	213,000	15%

Notes

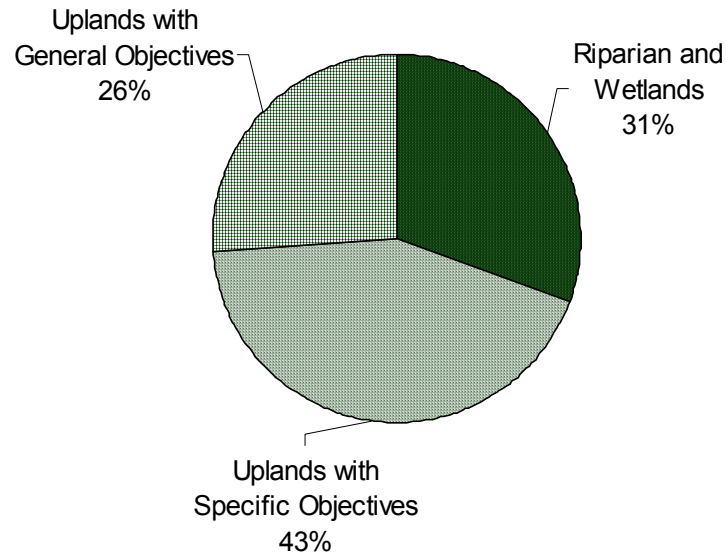
1. On-base acres are forest lands that are available for silvicultural activities and timber harvest, for example: uplands with general objectives, uplands with specific objectives and riparian areas under some alternatives. The type of silvicultural activities may be constrained to meet some specific objectives, such as development of northern spotted owl habitat, visual management, or rain-on-snow area management.
2. Off-base acres are forest lands deferred from silvicultural activities and timber harvest for a specific period of time. Short-term deferrals are assumed to be released from the deferral status during the first decade. Long-term-deferrals are assumed to be maintained in deferral status for more than the first decade.

On-Base Acres at two points in time



The Land Base

Policy and procedural land classification for DNR managed state forest lands in Western Washington in 2004
(approximately 1.4 million acres)



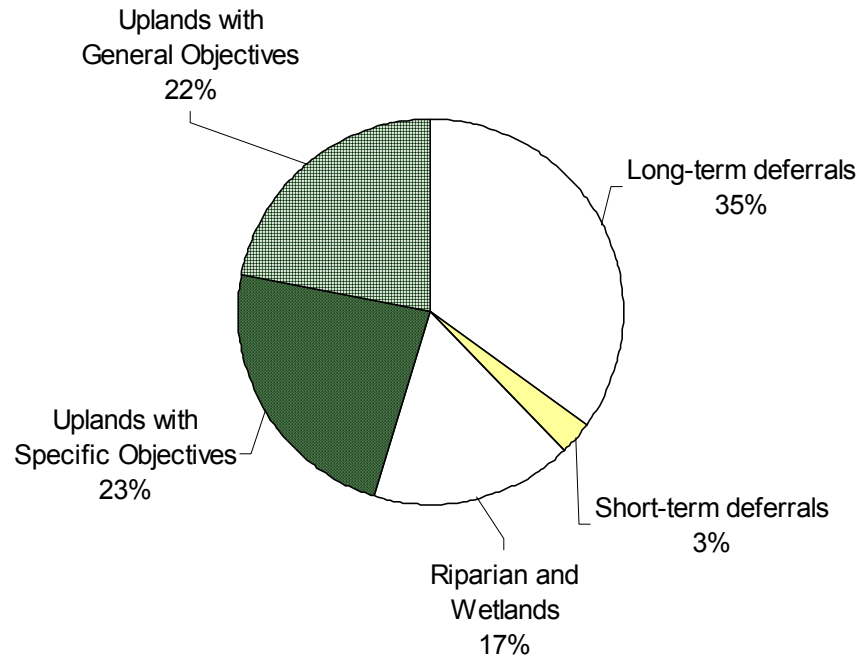
Note:

The different shades or patterns are to indicate the potential levels of silvicultural management. For example, riparian and wetlands areas are represented with a darker shade to indicate that any management will retain most, if not all, the forest cover in these areas.

The Land Base

Alternative 1

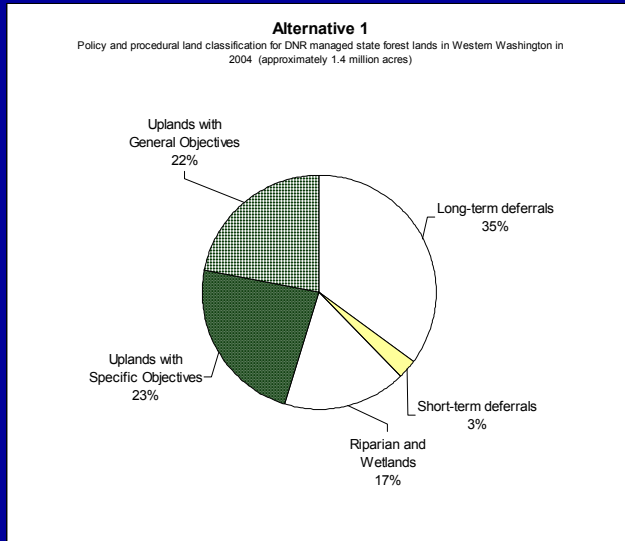
Policy and procedural land classification for DNR managed state forest lands in Western Washington in 2004 (approximately 1.4 million acres)



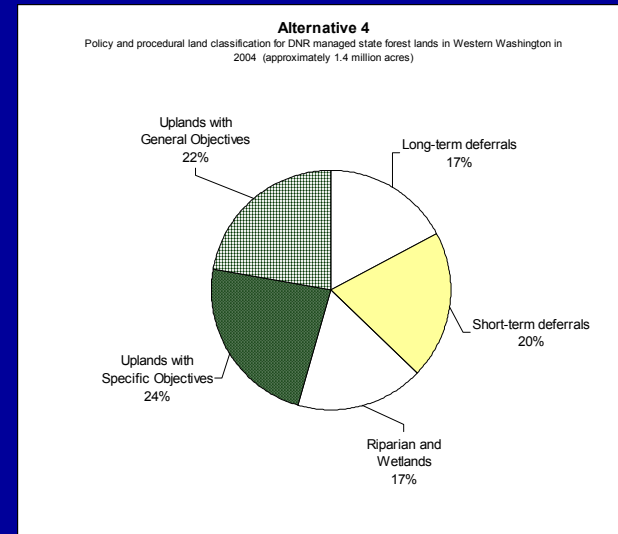
Note:

The different shades or patterns are to indicate the potential levels of silvicultural management. For example, upland areas with specific objectives are represented with a darker shade to indicate that any management will retain some forest cover in these areas. White areas within the pie are “off-base”, except for access

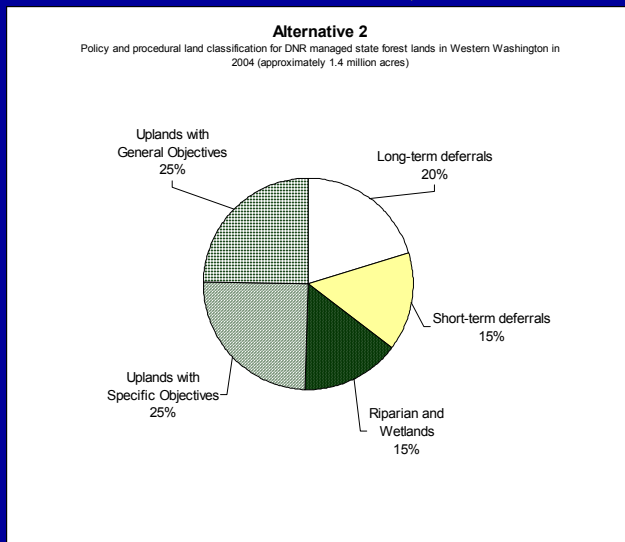
On-base acres during the first decade (2004-2013)



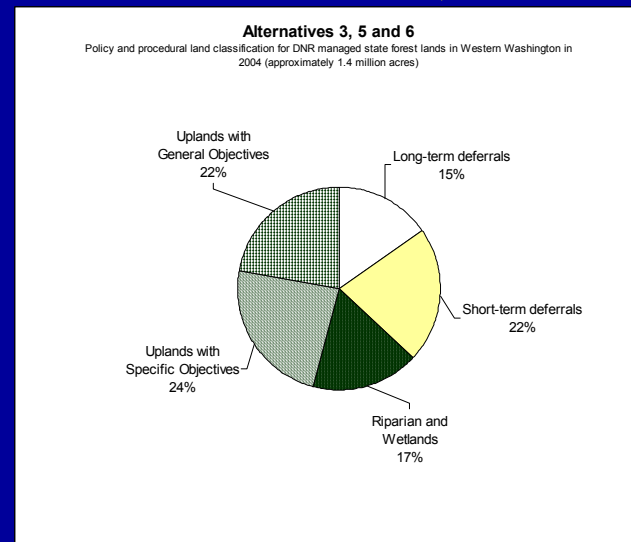
Alt. 1 on-base 629,000 acres



Alt. 4 On-base 635,000 acres



Alt. 2 on-base 902,000 acres



Alt. 3,5 and 6 on-base 877,000 acres

Matrix: Background Reference Material for Policy Choices

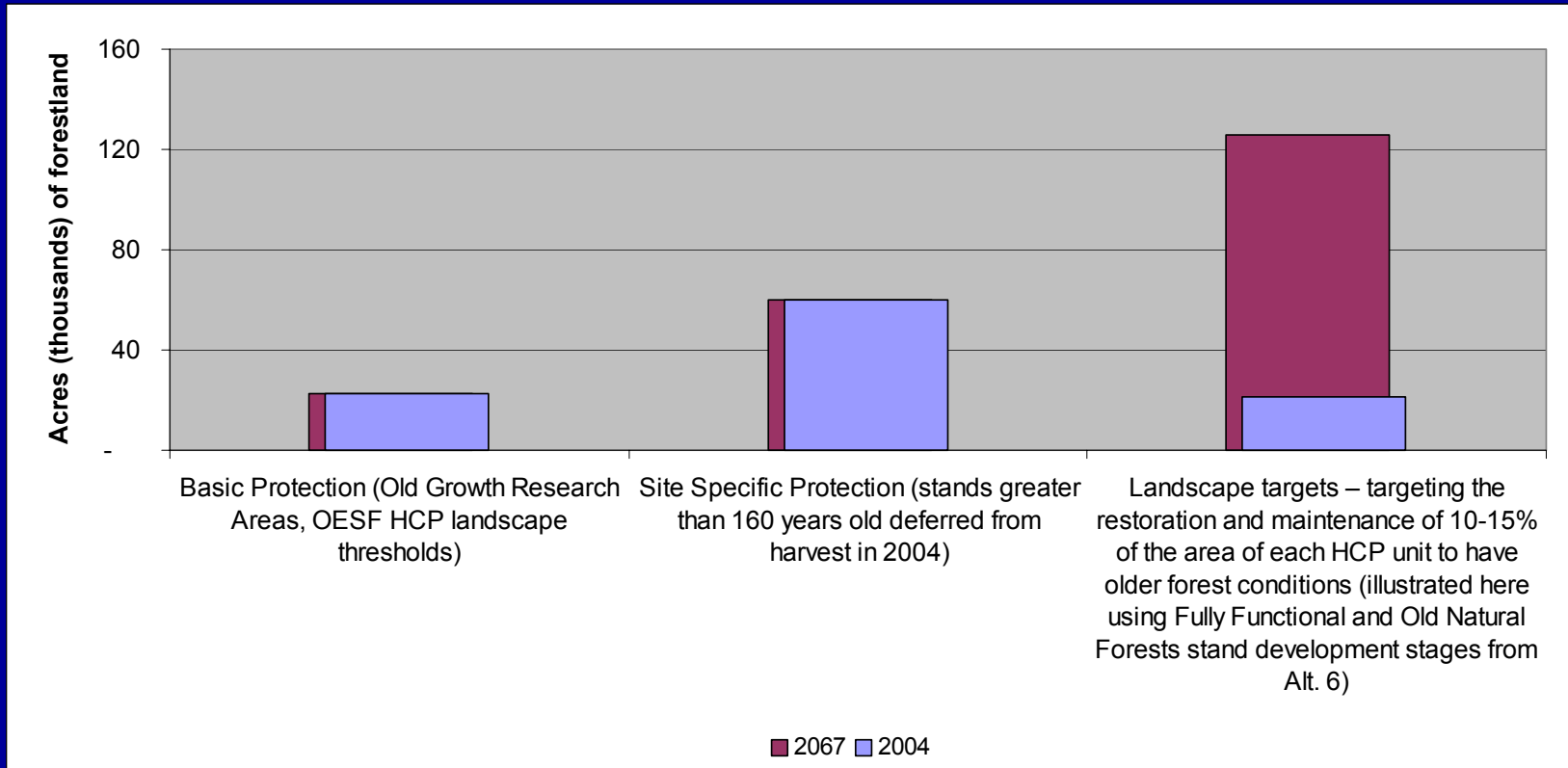
Compared to current conditions and Alternative 1 future projections

		a	b	c	d	e	f	g	h
Policy Issues		Outcomes							
		Alternative	Revenue		Income variability	Amount of Structurally Complex forest in 2067	Implementation		Long-term standing inventory
			Near-term	Long-term			Costs	Timing	
Volume & Value									
1	Volume	1,2,3,4	same	same	neutral	neutral	same	same	neutral
2	Value	5,6	positive	positive	neutral	neutral	increase	delay	neutral
Silviculture									
3	DNR current Silviculture	1, 2, 3	same	same	neutral	same	same	same	same
4	Minimum Silviculture	4	negative	same	neutral	increase	decrease	immediate	increase
5	Intensive Silviculture	5,6	positive	positive	neutral	same	increase	delay	same
6	Bio Diversity	6	positive	positive	neutral	increase	increase	delay	same
Timber Harvest Flow									
7	Even-flow	1,4	same	same	same	neutral	neutral	neutral	neutral
8	Relative Non-declining	2	Slight "+"	same	same	neutral	neutral	neutral	neutral
9	Relatively Unconstrained	3	Big "+"	same	Big "+"	neutral	neutral	neutral	neutral
10	Modulating	5,6	Big "+"	same	Slight "+"	neutral	neutral	neutral	neutral
Ownership Groups									
11	24	1,2,4	same	same	same	neutral	neutral	neutral	neutral
12	20	3,5,6	Slight "+"	same	Slight "+"	neutral	neutral	neutral	neutral
13	1	3	Big "+"	same	Big "+"	neutral	neutral	neutral	neutral
Available "On-base" land									
14	Maintain procedures & deferrals	1	same	same	neutral	Slight "+"	decrease	immediate	increase
15	Change procedures & deferrals	3,4,5,6	Slight "-"	positive	neutral	neutral	decrease	immediate	neutral
16	Change procedures	2	positive	positive	neutral	neutral	increase	immediate	neutral
Older Forests									
17	Basic Protection Only	1,2,3							
18	Specific site Protection	4							
19	Landscape Targets	5,6							

Older Forests and Old Growth

- **Policy choices**
 - **Basic protection**
 - ***Old Growth Research Areas, OESF HCP landscape thresholds***
 - **Site specific protection**
 - ***Place “off-base” now all stands that are currently older than 160 years old***
 - **Landscape targets**
 - ***Targeting the long-term restoration and maintenance of 10-15% of each HCP unit for older forest conditions (as defined by DNR’s HCP)***

Older forest policy options

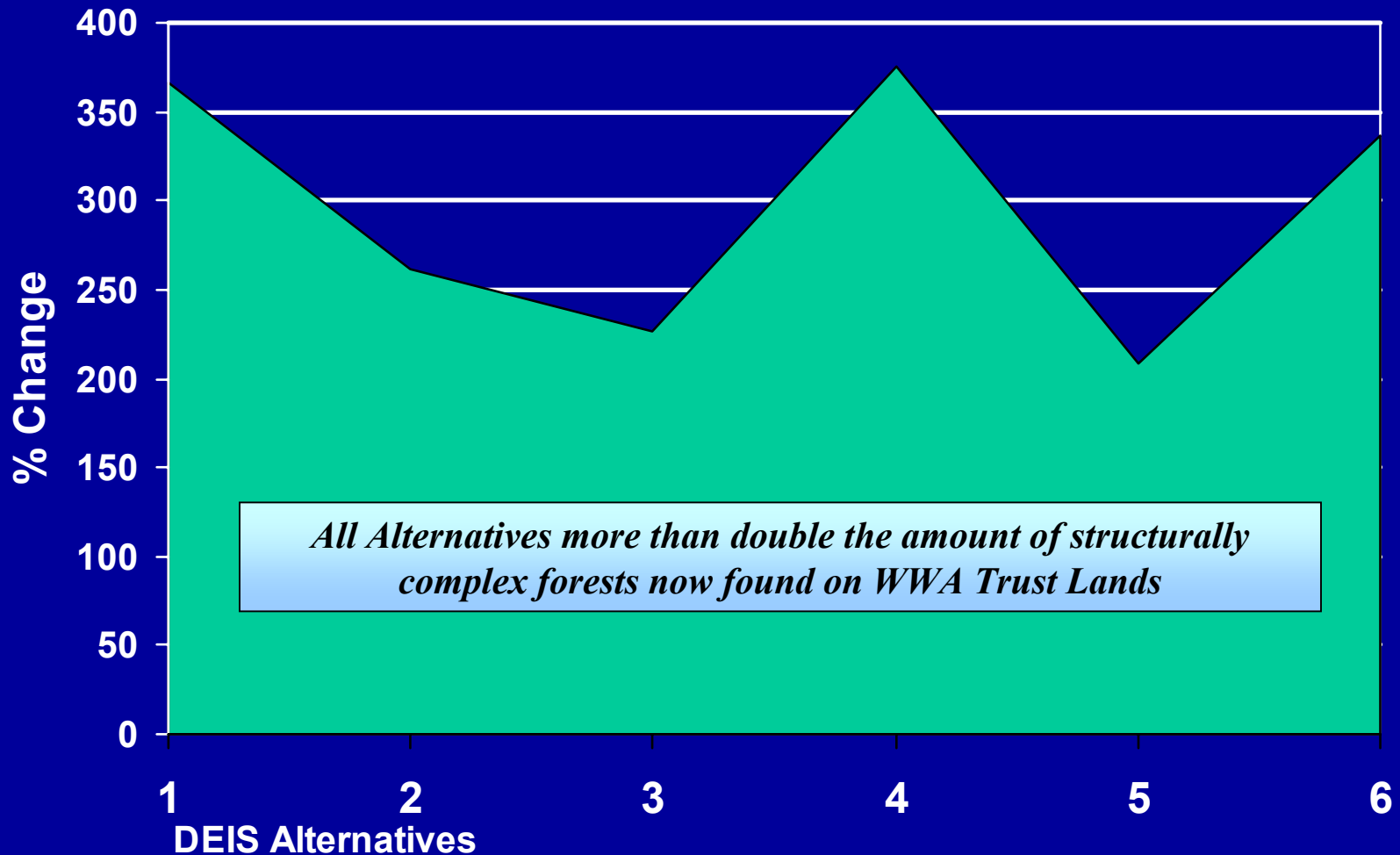


Note:

Other policies and management strategies (i.e. northern spotted owl habitat management strategies, silviculture, amount of area in deferrals and the level of harvest, etc.) also have the potential to influence on the amount of older or more structurally complex forest stands that maintained in the forest. The chart above is an attempt to illustrate the effect of only considering a policy option of older forest protection, whilst holding all other policies and strategies constant.

Change in Structurally Complex Forests

showing % change in 2067 compared to 2004



Note: Data abstracted from Figure 4.4-1, DEIS, page 4-53

Matrix: Background Reference Material for Policy Choices

Compared to current conditions and Alternative 1 future projections

Policy Issues		a	b	c	d	e	f	g	h	
		Outcomes								
		Alternative	Revenue		Income variability	Amount of Structurally Complex forest in 2067	Implementation		Long-term standing inventory	
Near-term	Long-term		Costs	Timing						
Volume & Value										
1	Volume	1,2,3,4	same	same	neutral	neutral	same	same	neutral	
2	Value	5,6	positive	positive	neutral	neutral	increase	delay	neutral	
Silviculture										
3	DNR current Silviculture	1, 2, 3	same	same	neutral	same	same	same	same	
4	Minimum Silviculture	4	negative	same	neutral	increase	decrease	immediate	increase	
5	Intensive Silviculture	5,6	positive	positive	neutral	same	increase	delay	same	
6	Bio Diversity	6	positive	positive	neutral	increase	increase	delay	same	
Timber Harvest Flow										
7	Even-flow	1,4	same	same	same	neutral	neutral	neutral	neutral	
8	Relative Non-declining	2	Slight "+"	same	same	neutral	neutral	neutral	neutral	
9	Relatively Unconstrained	3	Big "+"	same	Big "+"	neutral	neutral	neutral	neutral	
10	Modulating	5,6	Big "+"	same	Slight "+"	neutral	neutral	neutral	neutral	
Ownership Groups										
11	24	1,2,4	same	same	same	neutral	neutral	neutral	neutral	
12	20	3,5,6	Slight "+"	same	Slight "+"	neutral	neutral	neutral	neutral	
13	1	3	Big "+"	same	Big "+"	neutral	neutral	neutral	neutral	
Available "On-base" land										
14	Maintain procedures & deferrals	1	same	same	neutral	Slight "+"	decrease	immediate	increase	
15	Change procedures & deferrals	3,4,5,6	Slight "-"	positive	neutral	neutral	decrease	immediate	neutral	
16	Change procedures	2	positive	positive	neutral	neutral	increase	immediate	neutral	
Older Forests										
17	Basic Protection Only	1,2,3								
18	Specific site Protection	4								
19	Landscape Targets	5,6								

Matrix: Background Reference Material for Policy Choices

compared to current conditions and Alternative 1 projections

Policies that strongly influence revenue earnings are:

- Volume vs Value
- Silviculture
- Timber Harvest Flow
- Ownership Groups
- “Short-term” deferrals

Policies that strongly influence income variability:

- Timber Harvest Flow
- Ownership Groups

Policies that strongly influence the amount of structurally complex forest are:

- Silviculture
- “Short-term” deferrals

Policy Issues	Alternative	Outcomes						
		Revenue		Income variability	Amount of Structurally Complex forest beyond that required by the HCP	Implementation		Long-term standing inventory increases under Alt. 1
		Near-term	Long-term			Costs	Timing	
Volume & Value								
1 Volume	1,2,3,4	same	same	neutral	neutral	same	same	neutral
2 Value	5,6	positive	positive	neutral	neutral	increase	delay	neutral
Silviculture								
3 DNR current Silviculture	1, 2, 3	same	same	neutral	same	same	same	same
4 Minimum Silviculture	4	negative	same	neutral	increase	decrease	immediate	increase
5 Intensive Silviculture	5, 6	positive	positive	neutral	same	increase	delay	same
6 Bio Diversity	6	positive	positive	neutral	increase	increase	delay	same
Timber Harvest Flow								
7 Even-flow	1,4	same	same	same	neutral	neutral	neutral	neutral
8 Relative Non-declining	2	Slight "+"	same	same	neutral	neutral	neutral	neutral
9 Relatively Unconstrained	3	Big "+"	same	Big "+"	neutral	neutral	neutral	neutral
10 Modulating	5,6	Big "+"	same	Slight "+"	neutral	neutral	neutral	neutral
Ownership Groups								
11 24	1,2,4	same	same	same	neutral	neutral	neutral	neutral
12 20	3,5,6	Slight "+"	same	Slight "+"	neutral	neutral	neutral	neutral
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Available "On-base" land								
14 Maintain procedures & deferrals	1	negative	negative	neutral	Slight "+"	decrease	immediate	increase
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16 Change procedures	2	positive	positive	neutral	neutral	increase	immediate	neutral
Older Forests								
17 Basic Protection Only	1,2,3	neutral	neutral	neutral	neutral	neutral	neutral	neutral
18 Specific site Protection	4	neutral	neutral	neutral	neutral	neutral	neutral	neutral
19 Landscape Targets	5,6	neutral	neutral	neutral	neutral	neutral	neutral	neutral

Combining policies can also be used influence desired outcomes, however, the interactions are often unpredictable, hence the use of the model to help identify unknown consequences.

Summary

- Examined the independent policy issues and their impact on important outcomes
 - Revenues, Income variability, Amount of complex forest structure, Implementation and standing inventory
- With a knowledge of the likely impacts of proposed changes to policy issues, you can examine how different policy issues might be combined into a alternative:
 - We have constructed a “card game” that helps to visualize this