

# Sustainable Forestry in the West: Past, Present, and Future

**B. Bruce Bare, Dean  
College of Forest Resources  
University of Washington  
Seattle, WA 98195**

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# Topics for Today

- Talk about sustainable forestry in historical context of forestry in western North America
- Discuss dramatic transformation and paradigm shift in forest management (reasons and consequences)
- Role of C&I and forest certification
- Describe a case study which has some characteristics of sustainable forestry

# Shift in Management Philosophy

- Agricultural Model
- Utilitarian
- Output oriented
- Stand organization
- Timber primacy  
(sustained yield)
- Multiple use
- Ecosystem Model
- Naturalistic
- State oriented
- Landscape view
- Multi-resource  
(sustainability)
- Integrated use

# Land Use Controls in West

- Historically a zonal approach
- Production vs. protection forests
- Plantations vs. natural forests
- Commodity vs. preservation
- Exchange value vs. use value
- Active (intentional) vs. passive management

# Why a Paradigm Shift?

- Changing societal values of an urbanizing population
- Growing influence of the science of ecology
- Global warming, biodiversity, tropical deforestation, restoration, habitat, endangered species, wildfire, clean water, and forest health

# Why a Paradigm Shift?

- Additional factors –
  - ecosystem fragmentation
  - loss of habitat connectivity
  - forest land conversion
  - absence of adequate woody debris and forest structures in the managed forest

# What Is Sustainability?

- To manage (both *passive* and *active*), and use the products and amenities of managed forests, natural wild lands, and urban and suburban environments so that they are maintained in a productive state over the long term

# What Is Sustainability?

- A set of activities or processes that produce desired products and services over long periods of time
- Rational approach that seeks a dynamic equilibrium
- Uses interdisciplinary set of social, ecological and economic sciences in an integrated fashion
- Future generations have the opportunity to enjoy the same products and amenities



# Sustainable Forestry

- Sustainable forests are the desired goal
- Sustainable forestry or sustainable forest management is the means to the desired end

# Sustainable Forestry

- **Sustainable forestry** is the suite of forest policies, plans, and practices that seek to sustain a specified array of forest benefits in a particular place
- **Sustainability** is a **process** and a **goal**, not a single end-point condition

Source: NCSSF, 2005. Science, Biodiversity, and Sustainable Forestry: A Findings Report of the National Commission on Science for Sustainable Forestry, Washington, DC

# Sustainable Forestry

- A type of management that views the forest not as the source of any one economic product or service, but as an integrated whole
- Respects the full range of environmental, social, and economic values of the forest and attempts to integrate these diverse values

Source: Roundtable on Sustainable Forests

# Sustainable Forestry

- Managing a forest to meet all existing regulations such that environmental, social and economic factors are balanced to meet the needs of the present without compromising the ability of future generations to meet their needs

# Sustainable Forestry Initiative

- A land stewardship ethic that integrates reforestation, growing, and harvesting trees for useful products while conserving soil, air, and water quality, wildlife and fish habitat and aesthetics, and protecting: a) the resource from fire, pests, and diseases and b) lands of special significance

Source: American Forest and Paper Association

# Sustainable Forestry Initiative

- **Consider key values:**
  - biodiversity
  - habitat protection and enhancement
  - riparian/wet land protection
  - protection of productive capacity
  - protection of endangered plants and animals
  - protection of cultural, spiritual, and historical sites

Source: American Forest and Paper Association

# Sustainable Forestry Initiative Standard Objectives

- Ensure long-term harvest levels based on the **use** of the best scientific information
- Ensure long-term forest productivity and conservation of forest resources through prompt reforestation, soil conservation, afforestation, and other measures

# Sustainable Forestry Initiative Standard Objectives

- Protect water quality in streams, lakes, and other water bodies
- Manage the quality and distribution of wildlife habitats and contribute to the conservation of biological diversity by developing and implementing stand- and landscape-level measures that promote habitat diversity and the conservation of forest plants and animals, including aquatic fauna



# Sustainable Forestry Initiative Standard Objectives

- Manage the visual impact of harvesting and other forest operations
- Manage lands that are ecologically, geologically, historically, or culturally important in a manner that recognizes their special qualities
- Promote the efficient use of forest resources
- Improve forestry research, science, and technology, upon which sound forest management decisions are based

# Sustainable Forestry

- Definitions convey that sustainability applies to many resources in addition to timber; considers the needs of future generations as well as those of the present; is concerned with ecological functions and condition; and is as much a social and economic as a bio-physical process

# Criteria and Indicators

- **Criteria and Indicators for the Conservation and Sustainable Management of Temperate and Boreal Forests (Montreal Process)**
- **USA signed in Feb. 1995 as the Santiago Declaration**

# Criteria and Indicators

- Santiago Declaration

- Provides a common framework for describing, assessing and evaluating a country's progress toward sustainability at the national level
- Manages forests at the ecosystem level
- Provides information to decision-makers and the general public

# Criteria and Indicators

- Conservation of biological diversity 9
- Maintenance of productive capacity of forest ecosystems 5
- Maintenance of forest ecosystem health and vitality 3
- Conservation and maintenance of soil & water resources 8
- Maintenance of forest contribution to global carbon cycles 3
- Maintenance and enhancement of long-term multiple socio-economic benefits to meet the needs of societies 19
- Legal, institutional and economic framework for forest conservation and sustainable management 20

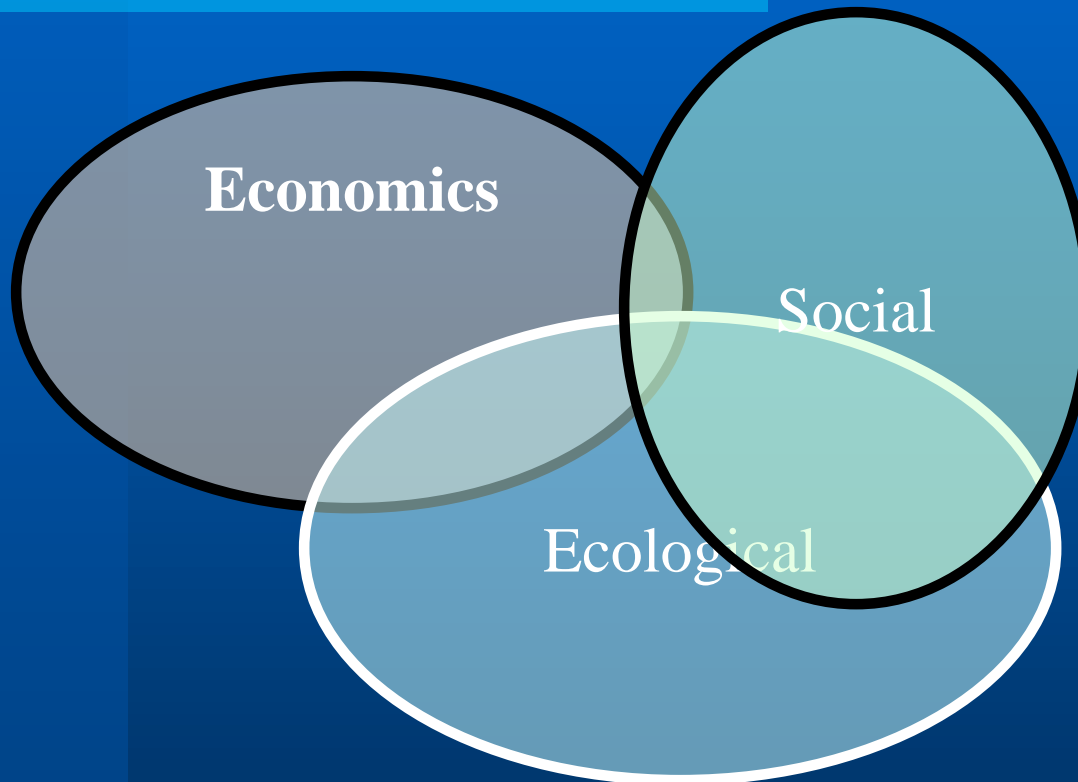
# Green Forest Certification

- Major systems in North America –
  - Sustainable Forestry Initiative (SFI)
  - Forest Stewardship Council (FSC)
  - Canadian Standards Association (CSA)
- The Program for the Endorsement of Forest Certification (PEFC) is a global umbrella that recognizes national certification schemes

# Green Forest Certification

- Promotes responsible forest management
- Increases awareness among public
- Incorporates elements of the international C&I
- Has a world-wide impact in both tropical and temperate regions

# Sustainability Occurs at the Intersection





# Observations

- A balance of ecological and economic values in a socially acceptable fashion
- The use of proper science is absolutely necessary to find the proper balance but is by no means sufficient

# Observations

- Value preferences expressed through the economic, political, and legal systems will largely determine the ultimate balance
- Requires that we adopt an integrated, holistic, adaptive approach that simultaneously considers utilitarian values as well as ecological and social values

# Sustainable Forestry

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- May accomplish this in several ways

# Models of Sustainability

- Find best economic solution subject to ecological sustainability constraints
- Find best ecological solution subject to economic sustainability constraints
- Jointly optimize ecological and economic values (tradeoffs)

# Observations

- The challenge to actually define and implement sustainable forestry is tremendous
- It may be the greatest challenge for educators, natural resource managers, scientists, and policy makers at the start of this Century

# Case Study

# Case Study Observations

- There are several examples of where we have successfully achieved adoption of a sustainable forestry program in Washington
- Some may argue that the HCP for our WDNR lands coupled with regulatory forest practices is an example of such a program

# Case Study Observations

- Others might argue that forest lands certified under the FSC or SFI principles qualify as examples
- Others would cite the lack of compliance with the seven indicators and 67 criteria of the Montreal Process to disqualify some of these examples



# Case Study Observations

- Case study involves the Washington State trust lands that are managed by the Washington State Department of Natural Resources
- We consider the 1.4 million acres lying west of the crest of the Cascade Mountains in the DF region

# Key Statutes: Multiple Use

- Management and administration of state-owned lands under the jurisdiction of the WDNR to provide for several uses simultaneously (on a single tract and/or planned rotation) of one or more uses on and between specific portions of the total ownership

# Key Statutes: Sustained Yield

- Management of the forest to provide harvesting on a continuing basis without major prolonged curtailment or cessation of harvest

# Timber Harvest Policy

- The Department will manage state forest lands to produce a sustainable even flow harvest of timber subject to economic, environmental and regulatory considerations (Forest Resource Plan, 1992)

# Sustained Yield (Timber Mgt.)

- Two historic interpretations:
  - Protection of productive capacity
  - Continuous and relatively smooth harvest of timber over time

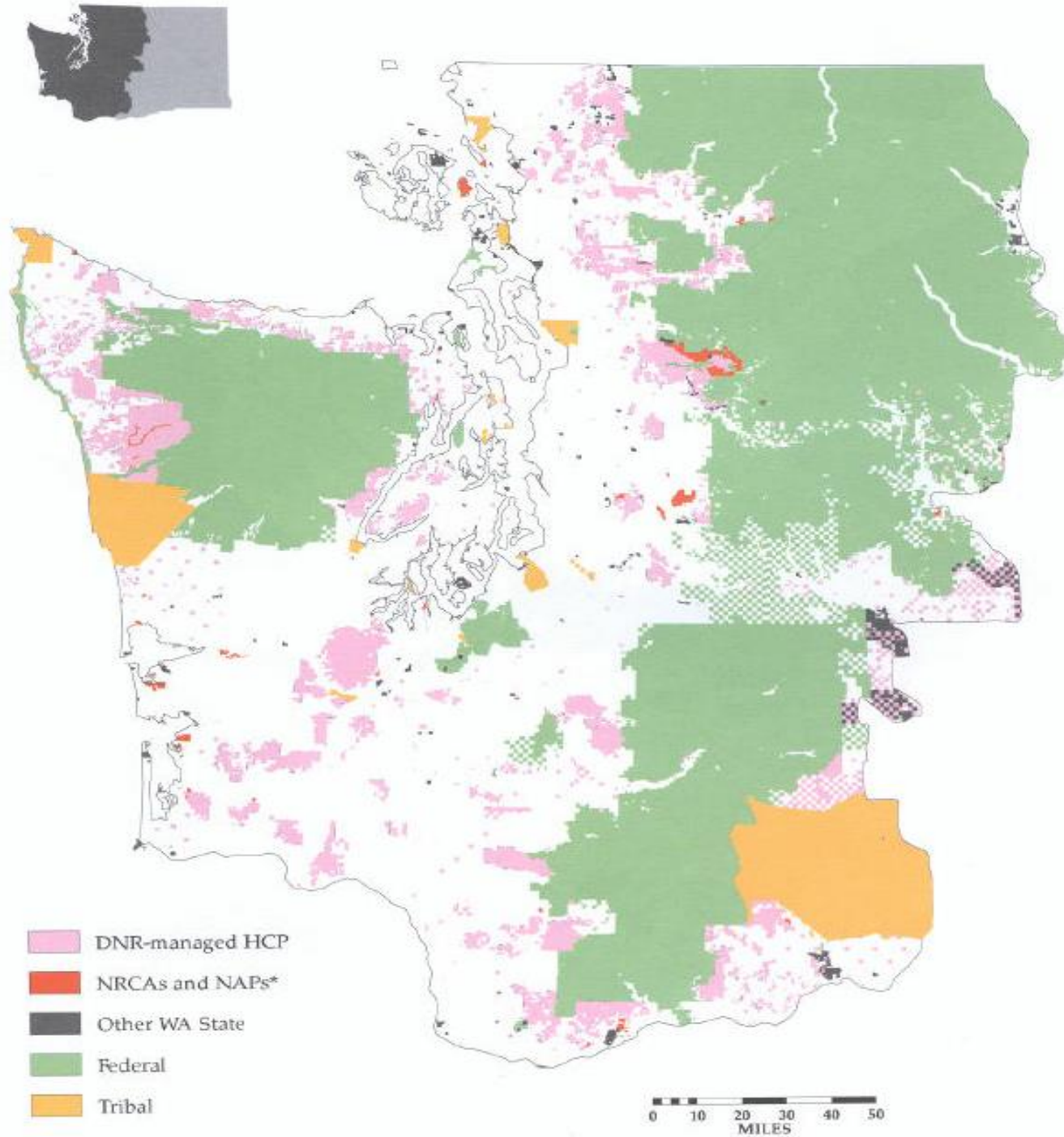
# Sustained Yield

- Classical model of sustained yield
  - Regulated forest is the goal
  - Harvest at age where average annual **growth** is maximized
  - Harvest oldest age classes first
  - Volumetric goal

Uneven-aged variant is to seek a balanced size class distribution using DeLiocourt's 'q'

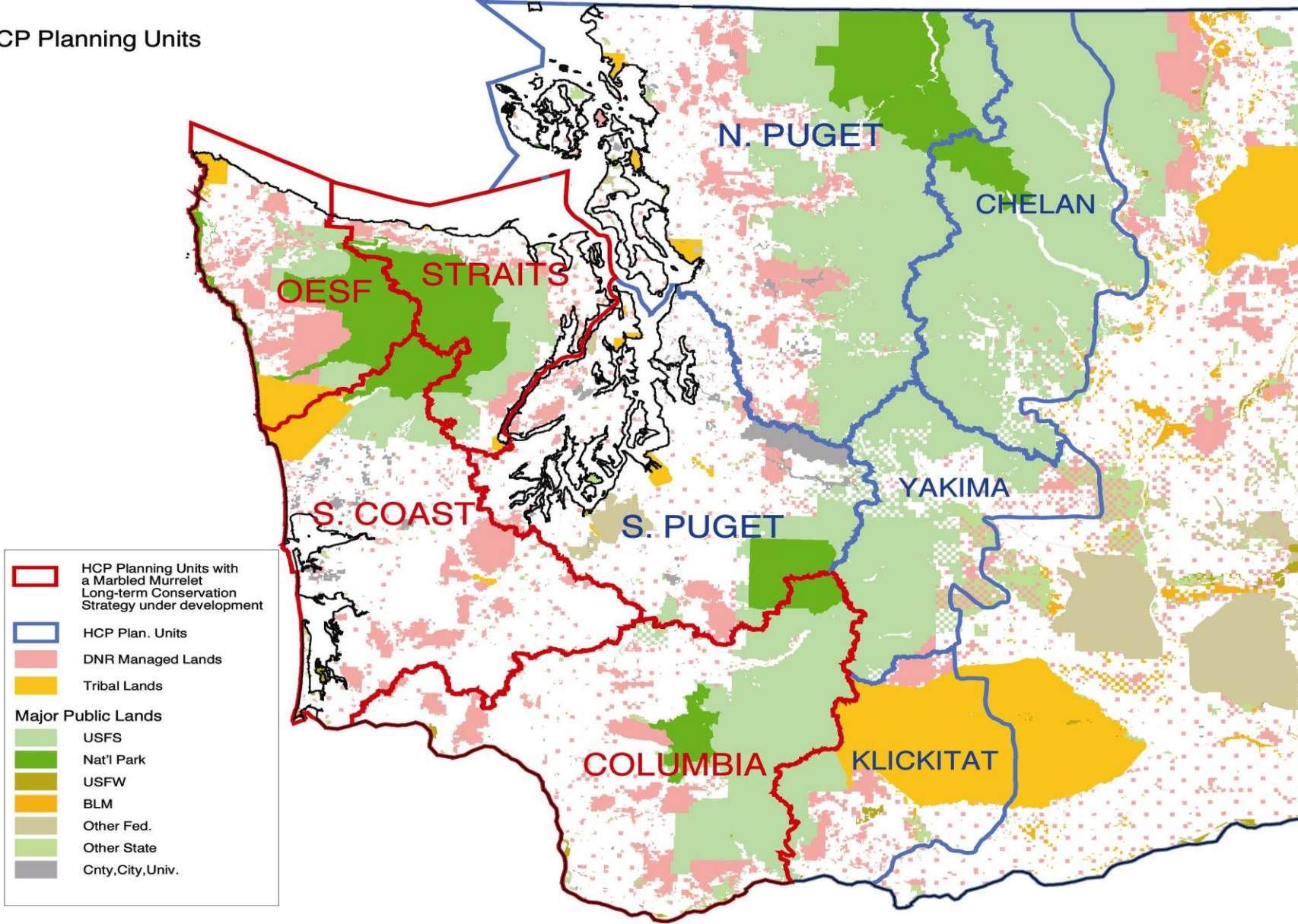
# Forest Planning Is Complex

- Multiple objectives and players (tradeoffs)
- Long time horizons, variability, and uncertainty
- Hierarchical in nature
  - Strategic (long term sustainability plans)
  - Tactical (landscape plans)
  - Operational (project plans)
- Challenging to coordinate levels of planning (time and space)





# HCP Planning Units



# Version One

**1996 UW study of alternatives for the  
HCP**

# Planning Scenarios

- **WDNR**: Uses **60+** year rotations; on/off base acre allocations as shown; no wildlife thins; no partial cuts in the 60-70 year old age classes; **even flow** harvest constraints; **no harvests** in **riparian** or **wetland** areas; **nondeclining** late seral conditions

# Planning Scenarios

- **ALTS**: Uses **50+** year rotations; on/off base acre allocations as shown; wildlife thins; partial cuts in the 60-70 year old age classes; **+ 25% change** in harvest from one decade to the next; **partial harvests** in **riparian** or **wetland** areas if on-base; **nondeclining** late seral conditions

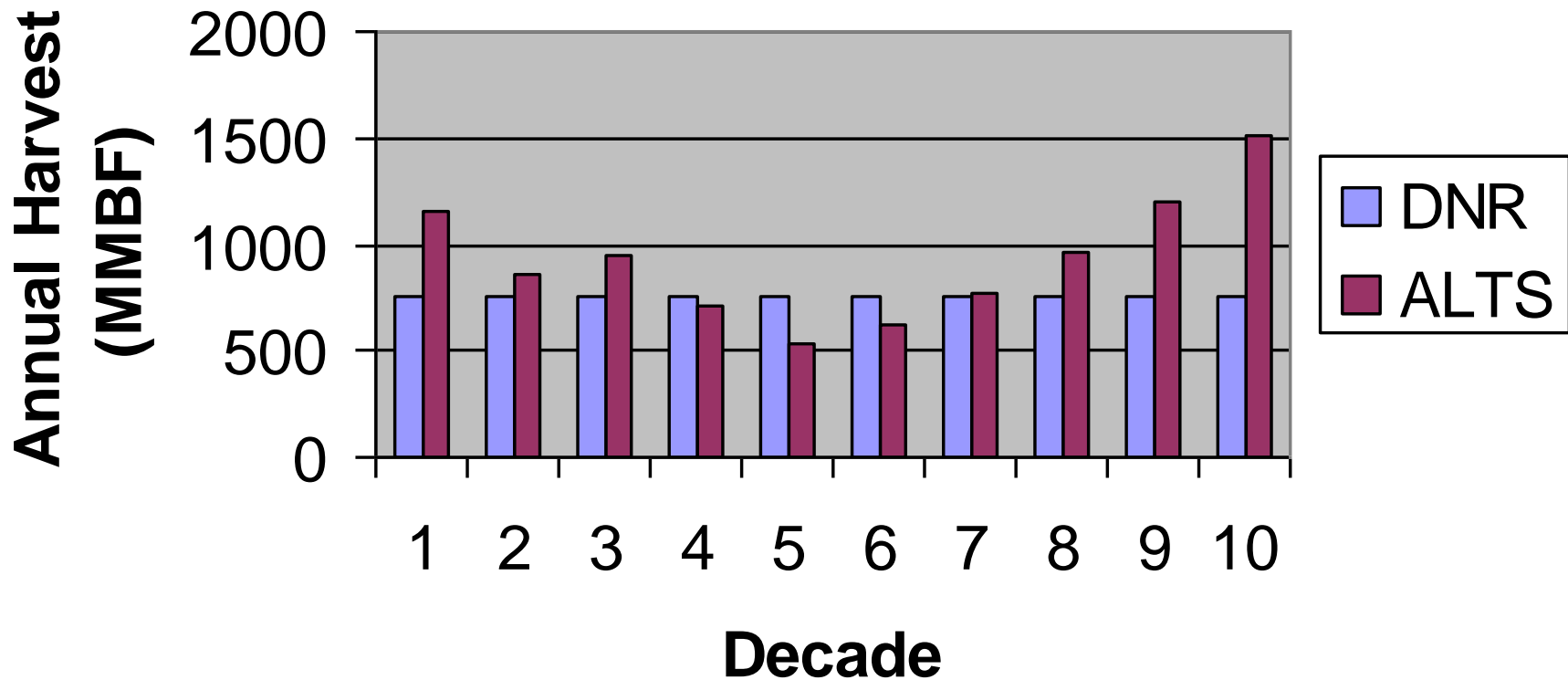
# W. Washington Acreage Summary

	<b>ALTS</b>	<b>DNR</b>
	<b>Acres</b>	<b>Acres</b>
<b>On Base</b>	1,178,154	1,035,586
<b>Off Base</b>	247,937	390,508
<b>Total</b>	1,426,091	1,426,094

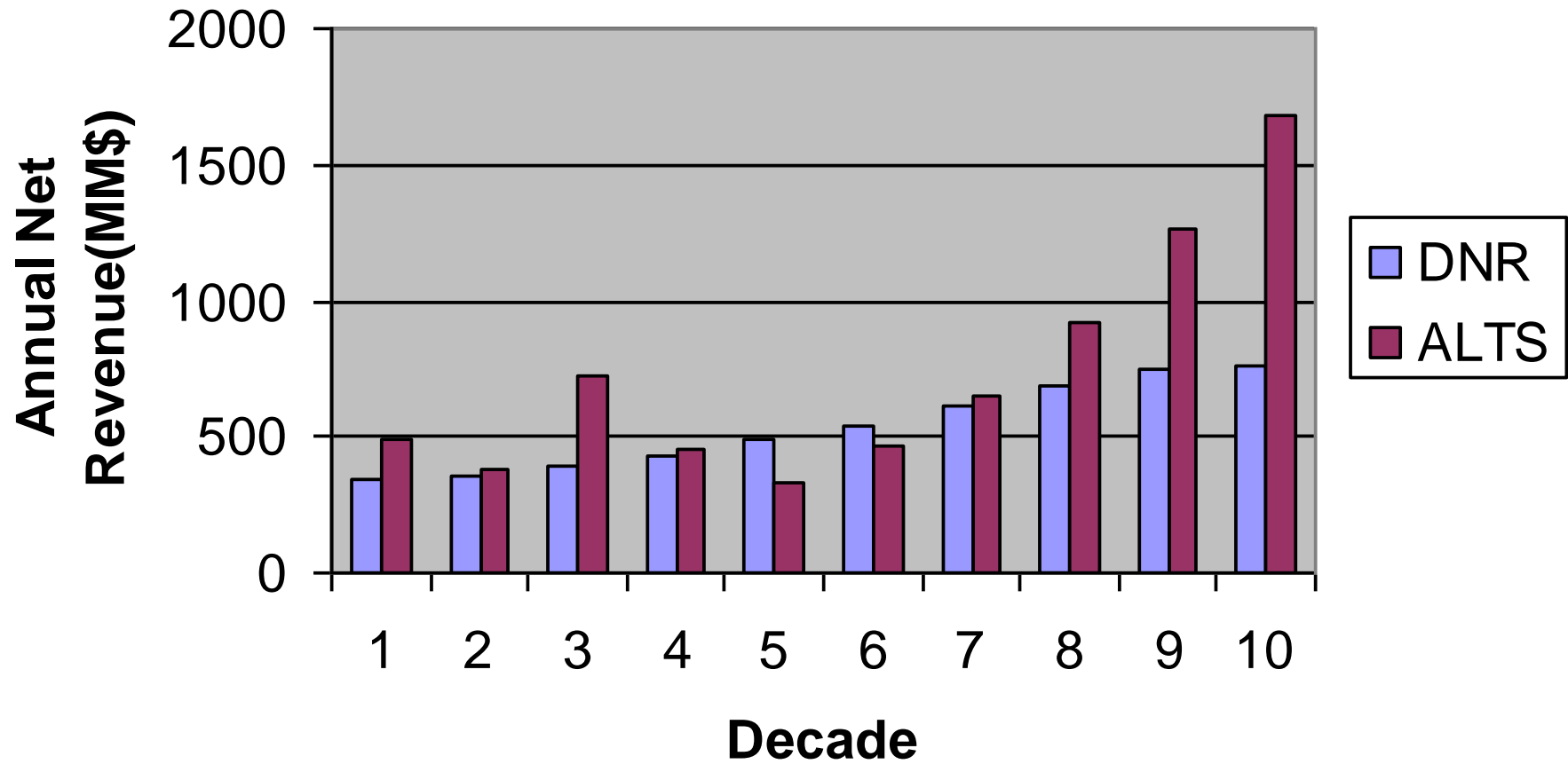
# Scenario Results

	Asset Values (\$ Billion)			
	DNR	ALTS	% Difference	
W Washington	7.505	9.799	31%	ACRES
North Puget	1.945	2.487	28%	381,403
South Puget	0.85	1.091	28%	141,815
Columbia	1.581	1.976	25%	283,021
Straits	0.715	1.034	45%	113,143
OESF	0.781	1.379	77%	240,835
South Coast	1.416	1.746	23%	265,877
Six Unit Total	7.288	9.713	33%	1,426,094
% Difference	3%	1%		

# W Washington Timber Harvest (DNR\$7.5;ALTS\$9.8)

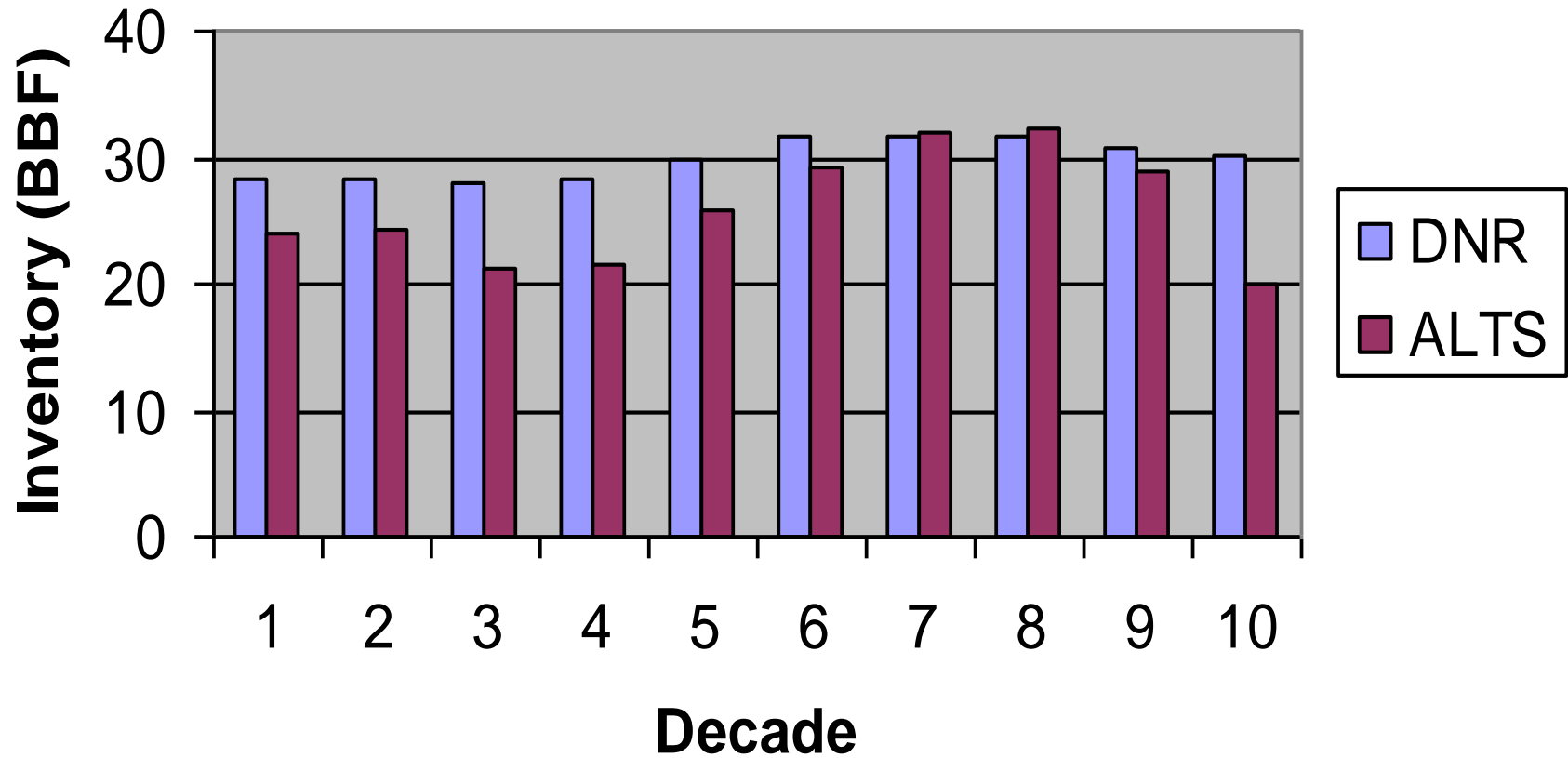


# W Washington Net Revenue

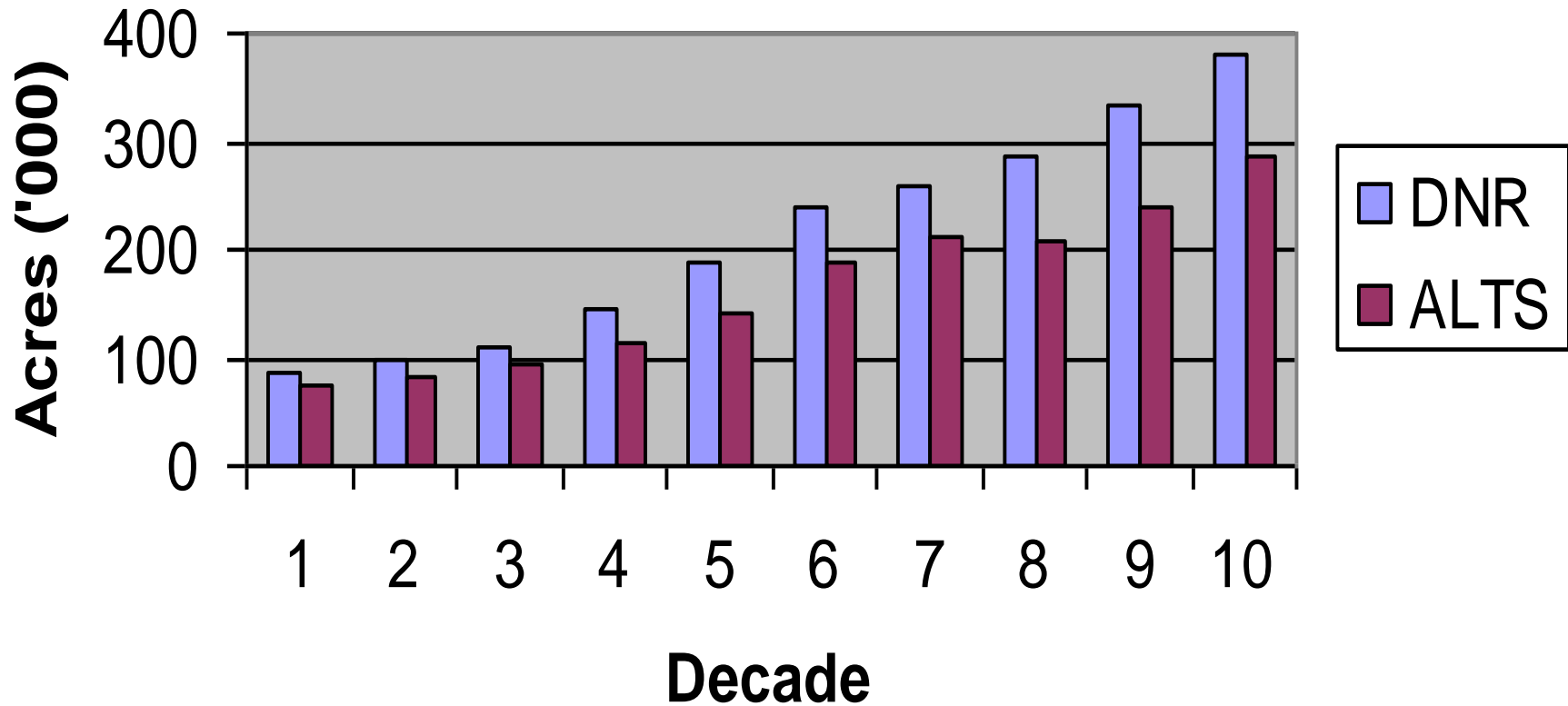




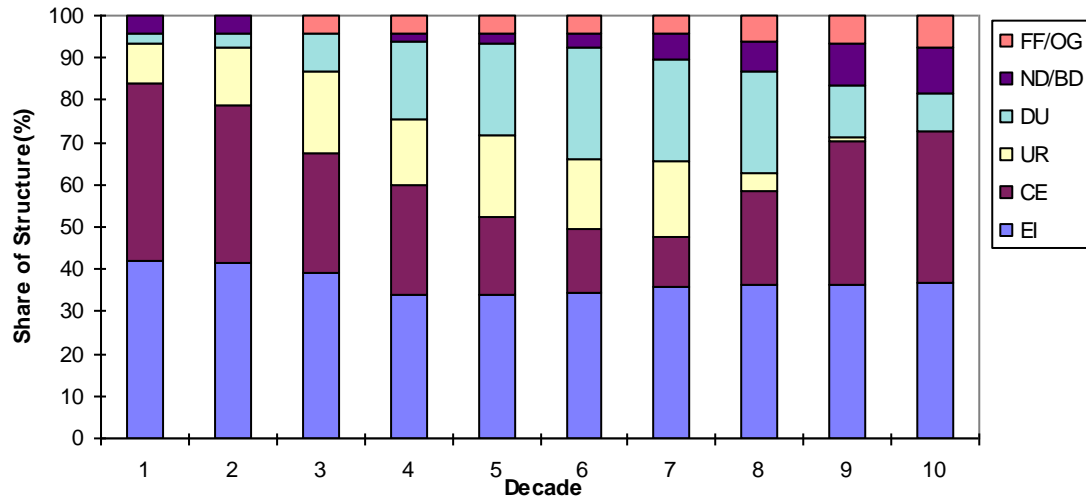
# W Washington Inventory



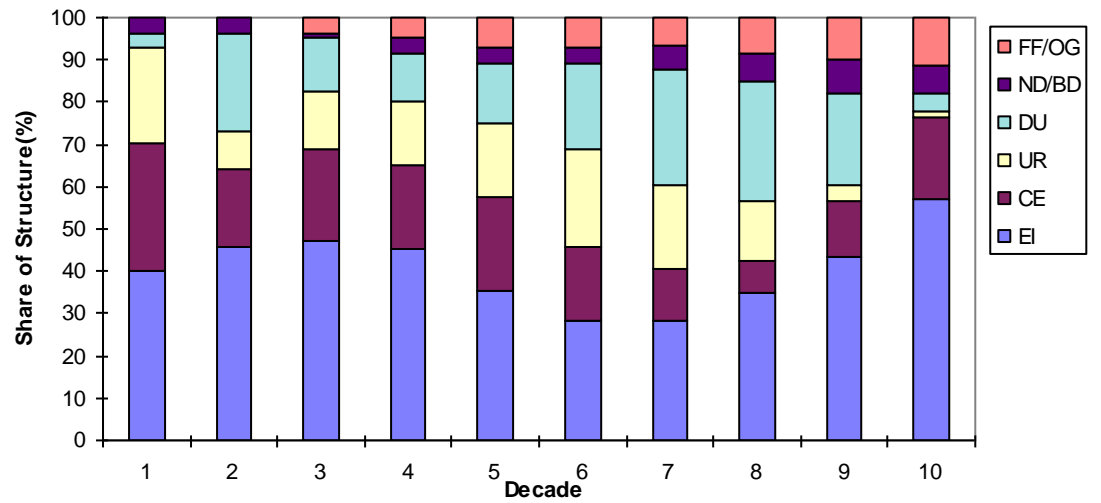
# W Washington Old Forest Habitat



**DNR**  
**Stand Structure Distribution**



**ALTS**  
**Stand Structure Distribution**



# Version Two

**2004 WDNR study of alternatives for  
the Sustainable Harvest Calculation**

# Recap of the Six Alternatives

- Alternative 1
  - No Action Alternative : Current Operations
- Alternative 2
  - *HCP intent*
- Alternative 3
  - Combined Ownerships

# Recap of the Six Alternatives

- Alternative 4
  - Passive Management Approach
- Alternative 5
  - Intensive Management Approach
- Preferred Alternative
  - Innovative Silvicultural Management

# Key Outcomes

- Gross & Net income (timber harvest)
- Variability of income
- Forest Structure and Older Forest-dependent species
- Implementation considerations

# Key Policy Choices for the BNR

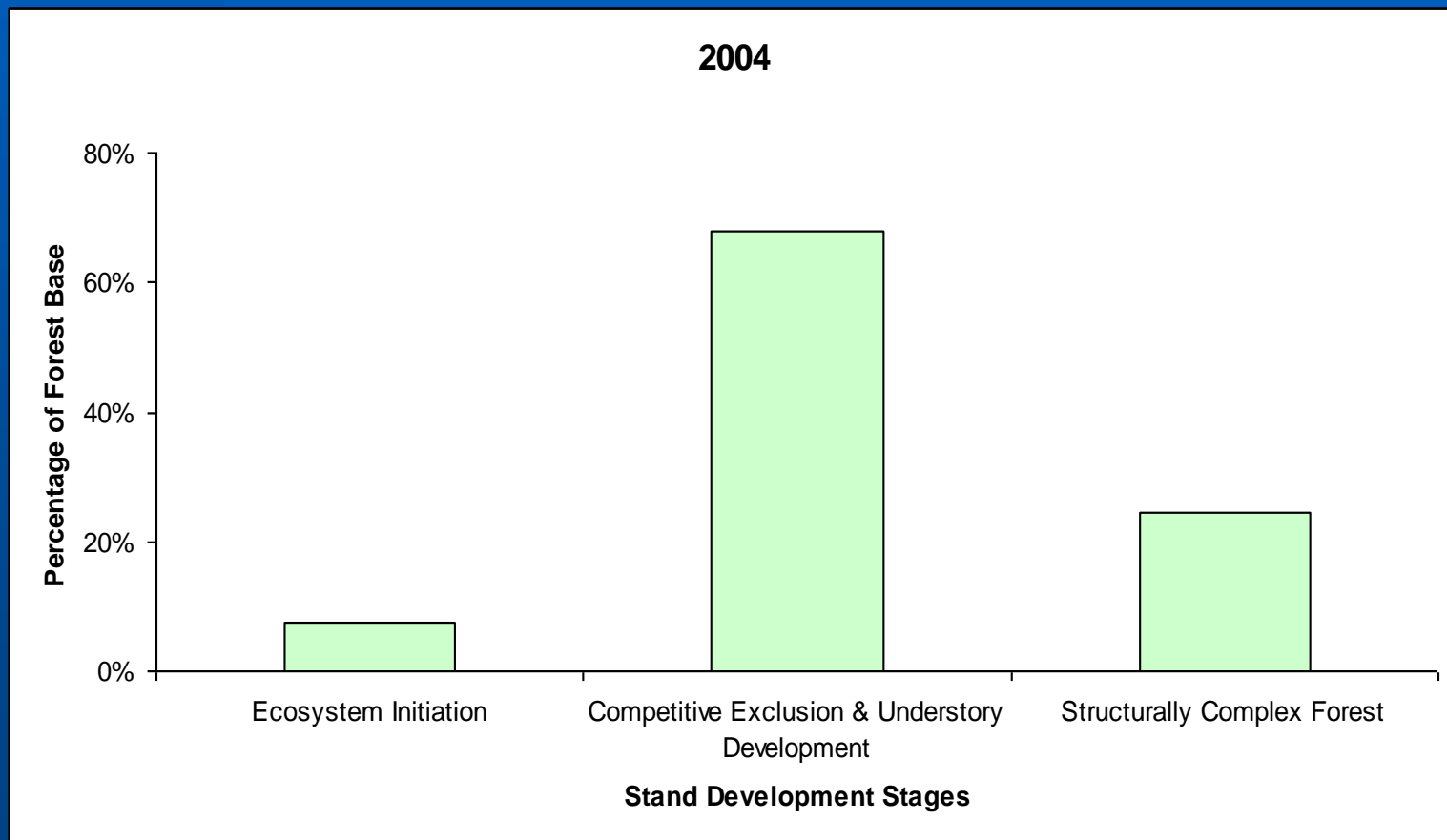
- Active vs. Passive
- Area to Manage
- Ownership Groups
- Harvest Flow Approach
- Old Growth Protection
- Volume vs. Value Regulation



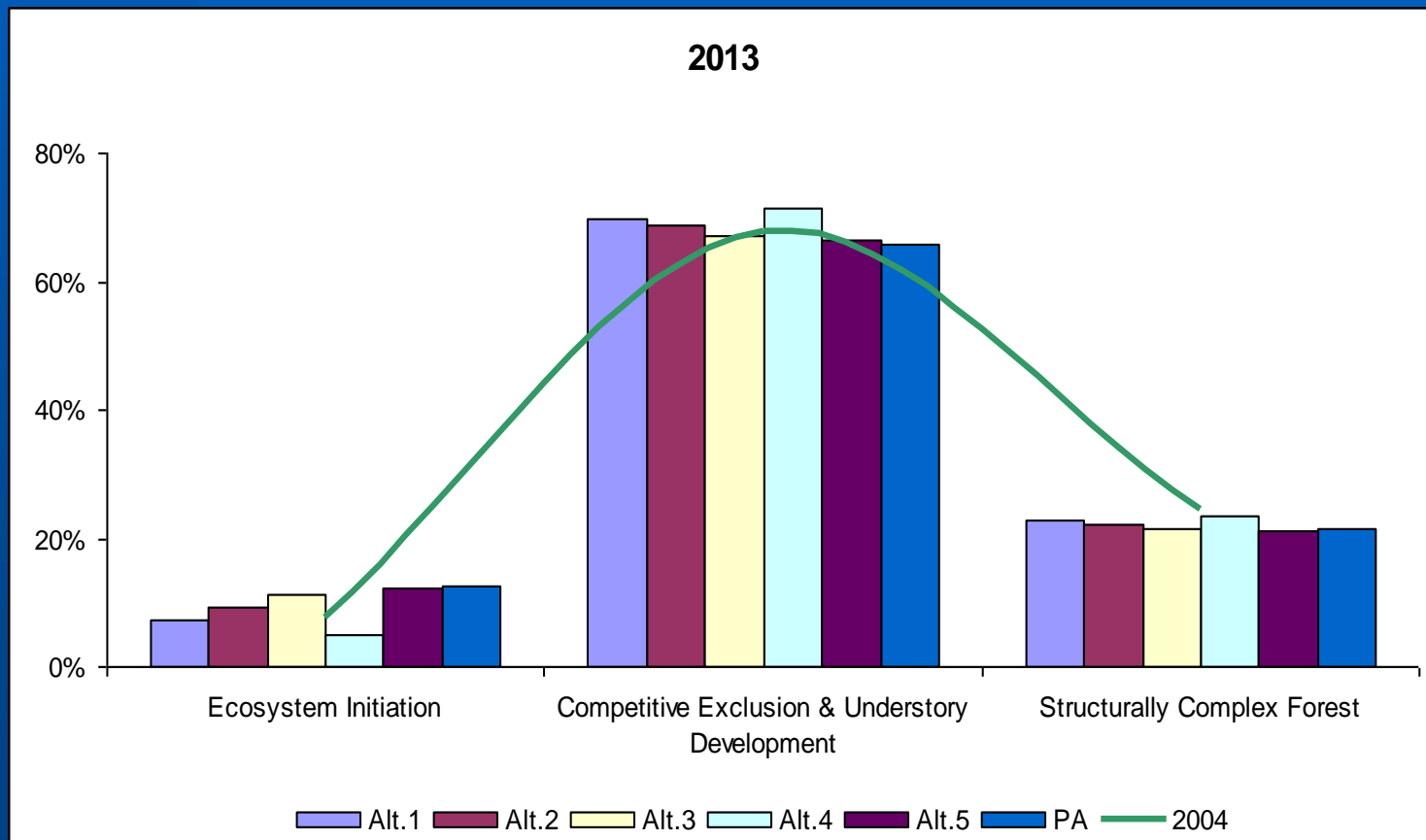
# Key Policy Choices for the BNR

- Riparian Management
- Northern Spotted Owl Management
- Legacy and Reserve Tree

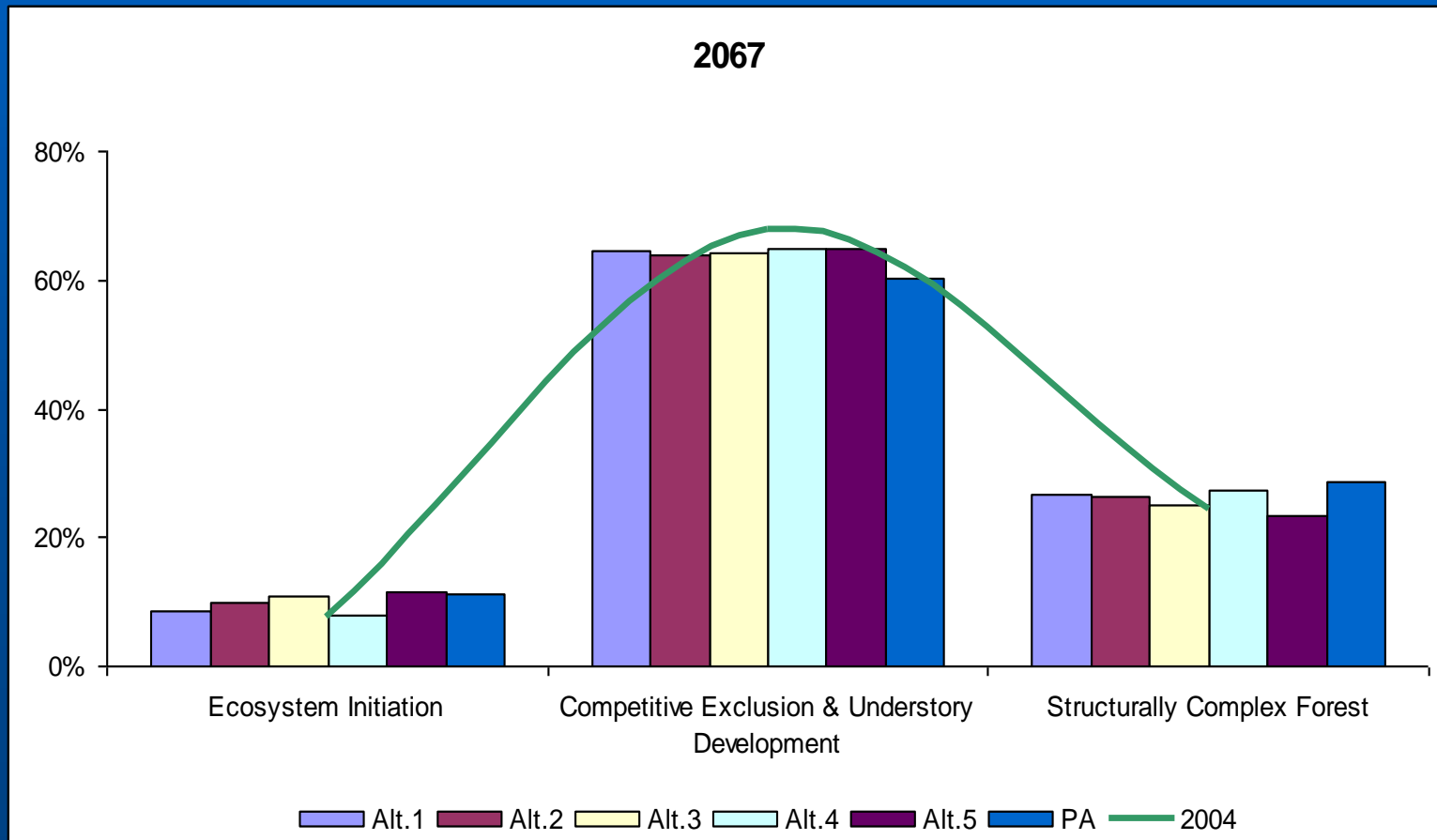
# Stand Structure Distribution



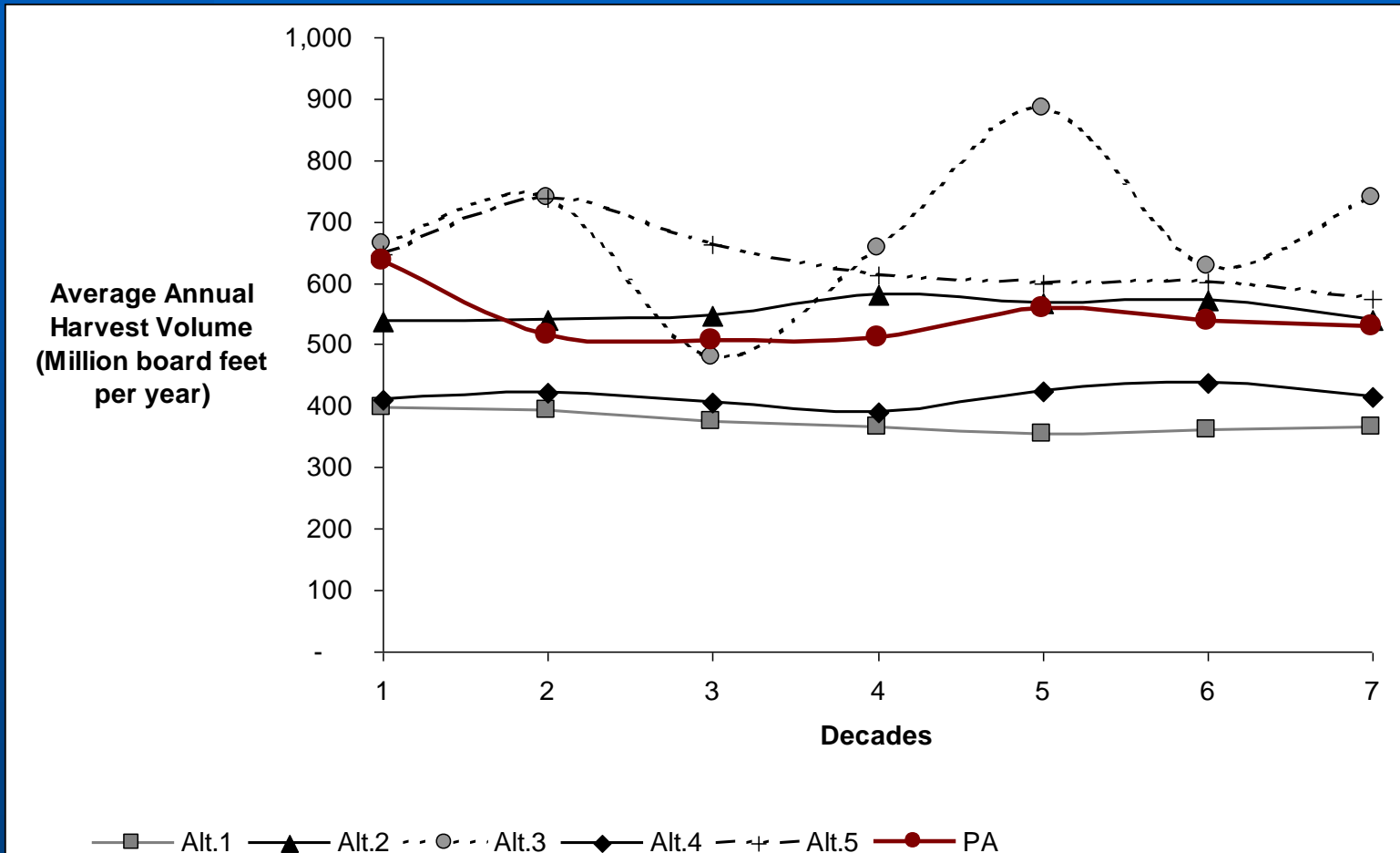
# Stand Structure Distribution



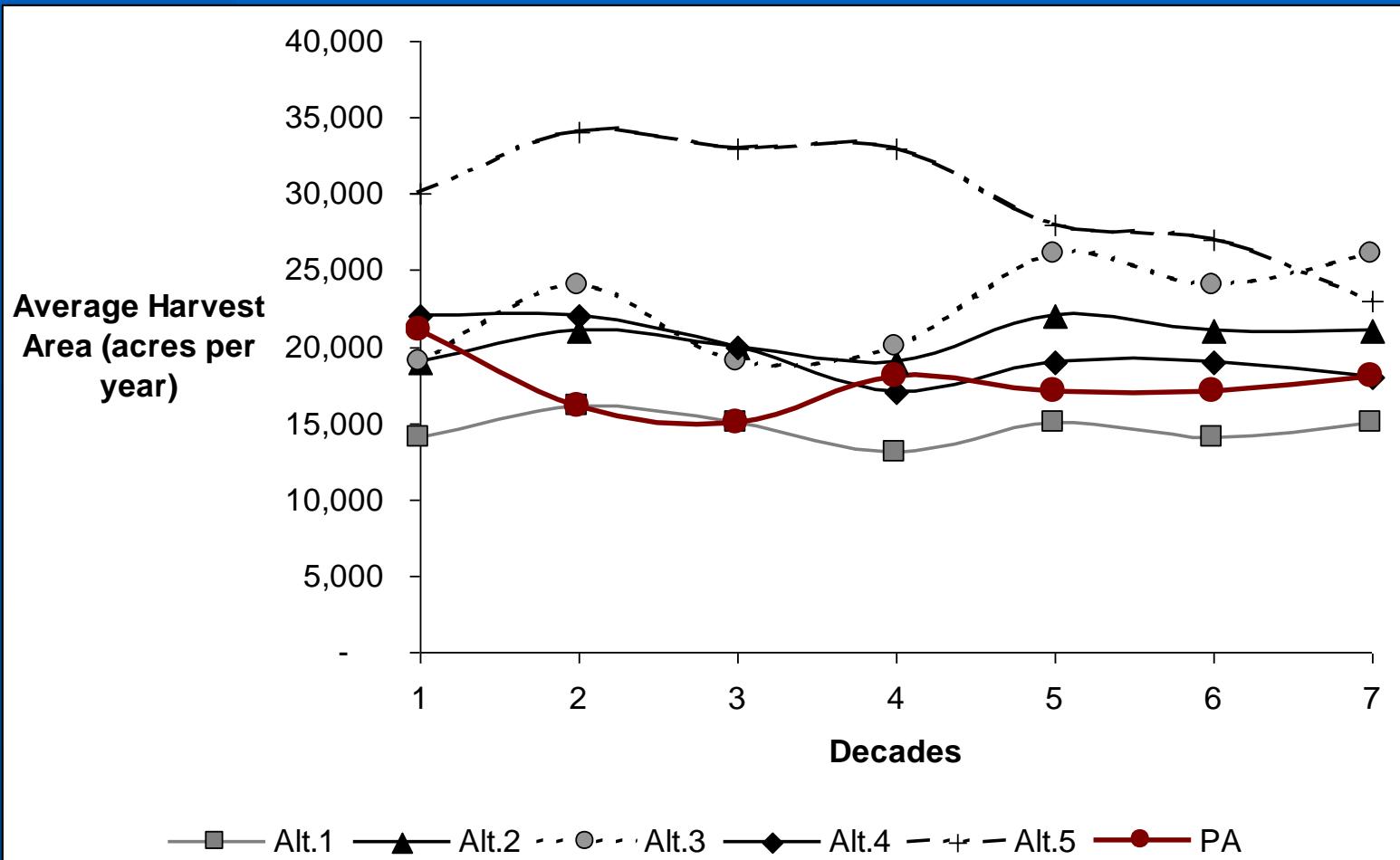
# Stand Structure Distribution



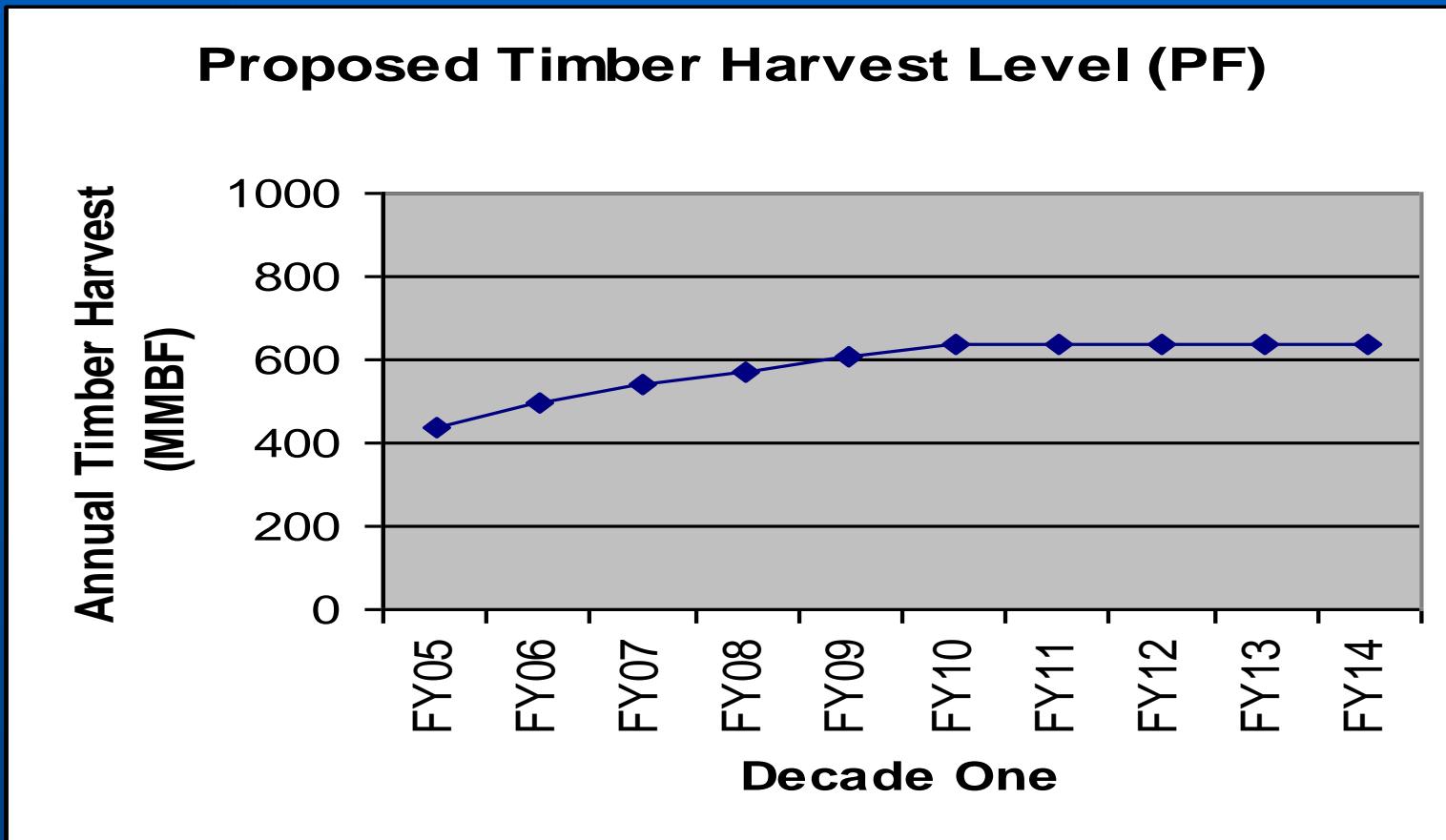
# Timber Harvest Potential (MMBF/year)



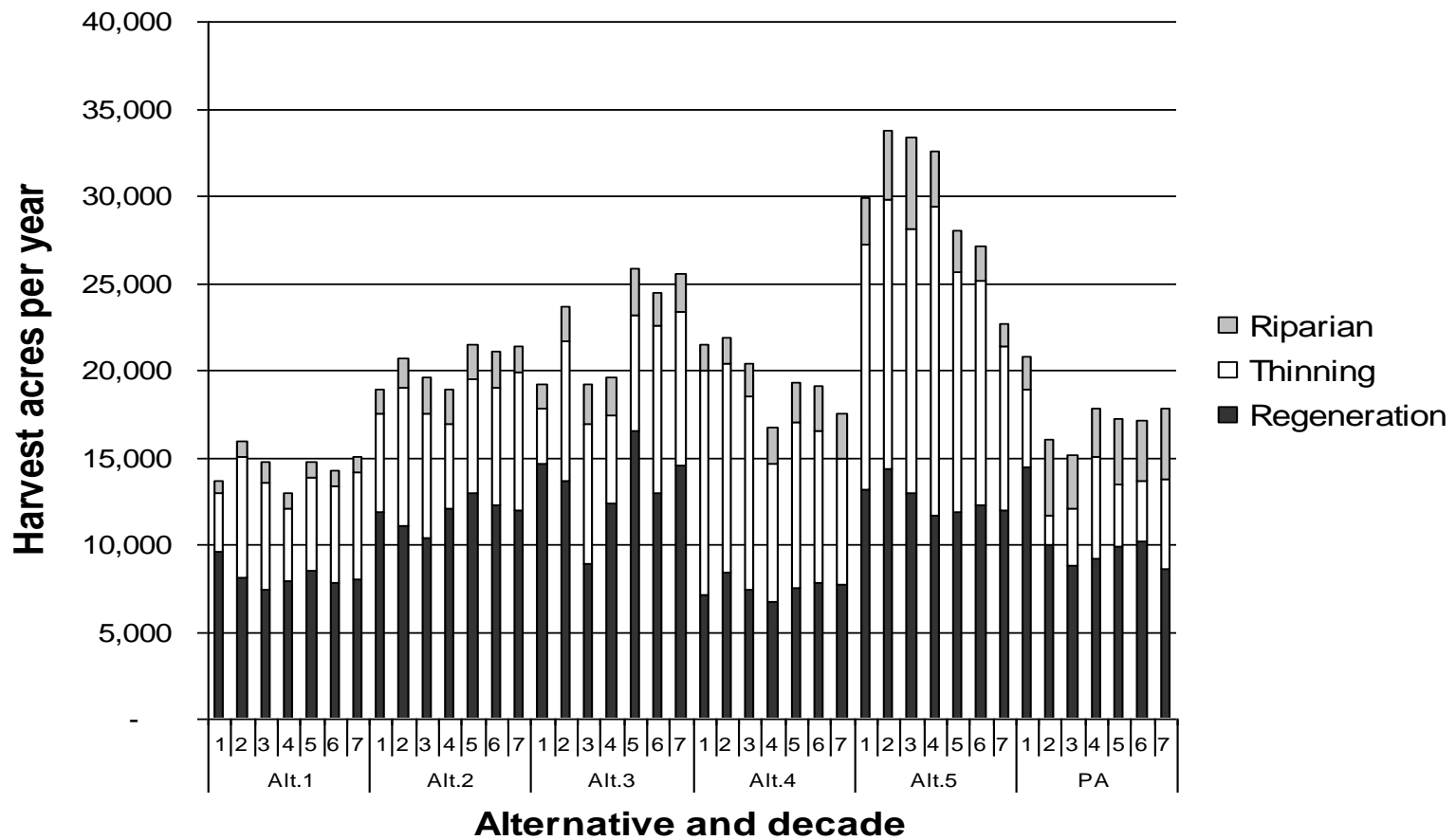
# Harvest Area (acres/year)



# Proposed Timber Harvest Level

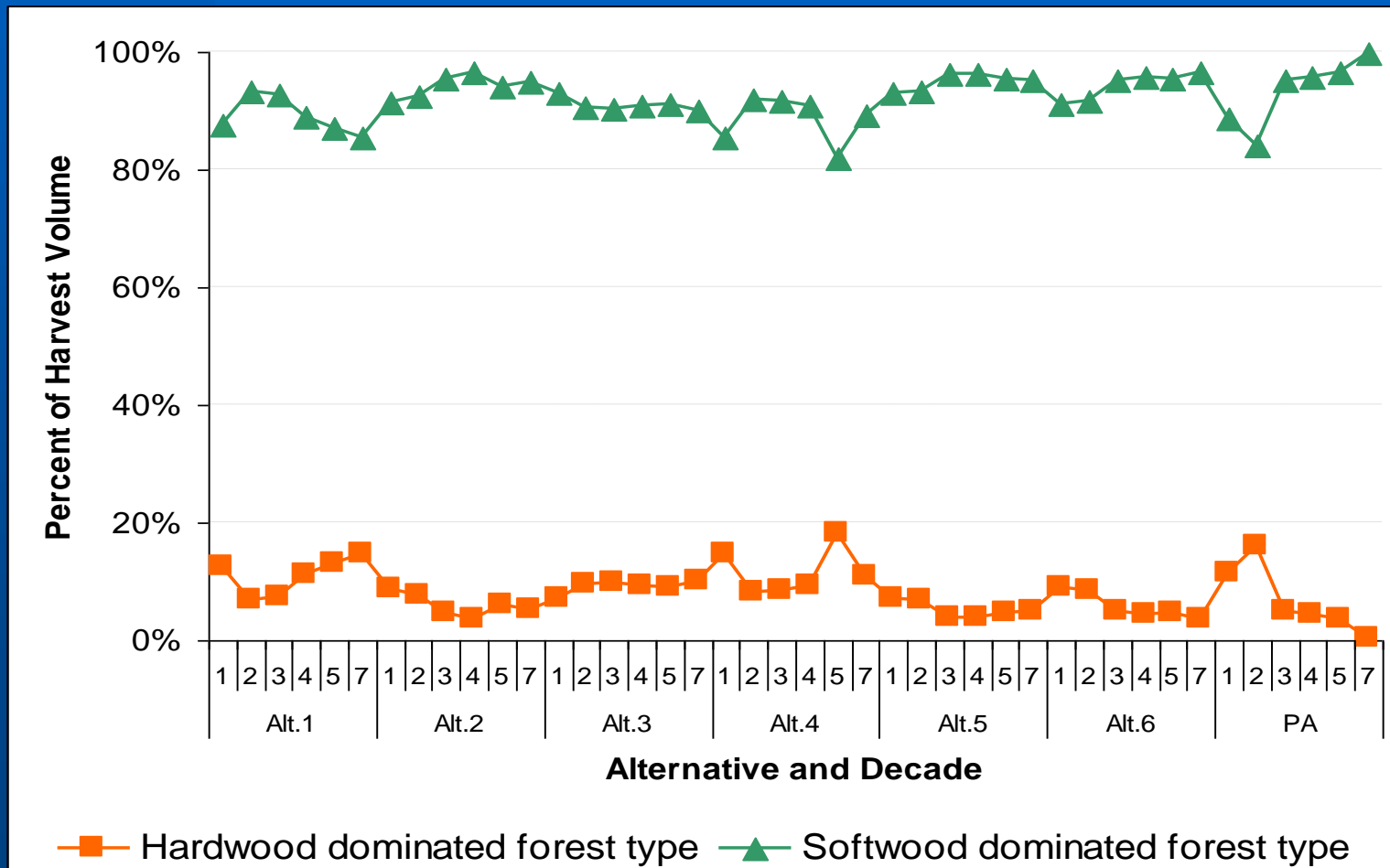


# Harvest Type (area/year)





# Percent of Harvest Volume by Wood Type



# Summary Points

## Revenue Generation

- Less constrained flow control provides significant opportunities for active management
- Ownership group policy needs further discussion and a focus on individual trust objectives
- Harvest regulated by value, and economically determined rotations in non-habitat areas provide greater returns

## Conservation Benefits

- Longer rotations benefit more complex structures
- Active management has to be the “right type” of silviculture to accelerate the development of complex stand structures
- Passive management appears to be an option for developing complex forest structures, albeit a risky and expensive one (\$106 vs. \$208 million in gross revenues between Alts. 1 and 6)

# The End