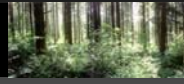


## Forests for a Richer Future



Sustaining the Quality of Human Life

Hal Salwasser  
Oregon State University  
College of Forestry  
2009

---

---

---

---

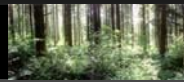
---

---

---

---

## Forest Benefits



- ❖ Livable planet – composition of atmosphere, climate
- ❖ Subsistence resources: water, foods, fibers, cover
- ❖ Cultural/spiritual/recreational connections
- ❖ Wealth and jobs

---

---

---

---

---

---

---

---

## Global Forests



- ❖ **Land cover:**
  - ❖ ~ 9.6 billion acres (total area of US is 2.2 billion acres)
  - ❖ ~ **33-50% loss since agriculture, civilization**
  - ❖ Massive losses since industrial era and population boom
- ❖ **Contemporary loss:**
  - ❖ ~ 18 Million ac/yr 2000-2005
- ❖ **Humanity/forests:**
  - ❖ Population Growth + Economic Growth = Forest Loss
  - ❖ But not everywhere now:
    - ❖ - 32 mil ac/yr in tropics, + 14 mil ac/yr in non-tropics

---

---

---

---

---

---

---

---

## US Forests



- ❖ **US forestland net area ~ stable since 1920:**
  - ❖ 749 million acres; loss in urban, gain in abandoned farmland
  - ❖ ~ 75% of forested area of 1650 (90% in Oregon)
- ❖ **Significant ownership changes**
  - ❖ Industry lands to TIMOs and REITs
  - ❖ Family lands fragmented on intergenerational transfer
- ❖ **Demand for forest benefits/ecosystem services ever growing**
  - ❖ Space for human habitation; biggest force changing forests
  - ❖ Water quality, quantity; THE biggest future global forest resource issue
  - ❖ Wood use; + 0.3 to 0.5%/yr growth; supply solid; global markets
  - ❖ Native species conservation; fish, wildlife, plants
  - ❖ Climate-carbon ~ accounting, trees + products, market/policy uncertainty
  - ❖ Recreation, subsistence, & cultural uses; variable by ownership

---

---

---

---

---

---

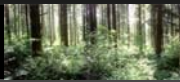
---

---

---

---

## Global Wood Use



- ❖ Global industrial wood use rose 40% from 1960 to 1990:
  - ❖ ~ 1.8 BCM in 2005, but post-1990 removals stable due to conservation
  - ❖ **Football field covered with wood ~ 208 miles high, endzones incl**
- ❖ Fuel wood use: ~ 1.2 BCM in 2005, post-1990 annual removals ~ flat
- ❖ Post-1990 industrial wood removals ~ flat, could increase < 33% by 2050 if growing population uses more wood: + .6 BCM
  - ❖ **Pile of wood ~ 277 miles high**
- ❖ ~ 33% of global wood and fiber now comes from planted forests
  - ❖ **Monumental global transition in source of industrial wood**
- ❖ ~ 31% of global solid wood consumption crossed an international boundary from tree to product in 2000; most likely to increase

---

---

---

---

---

---

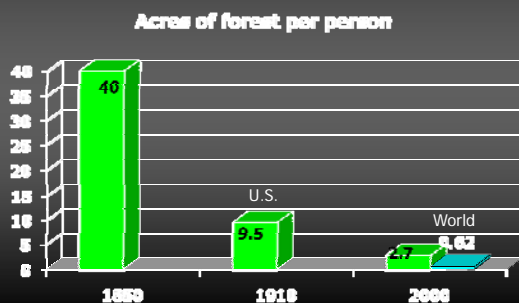
---

---

---

---

## The Demand Crunch




---

---

---

---

---

---

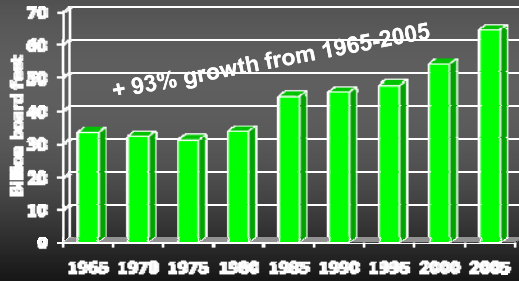
---

---

---

---

### US SW Lumber Consumption



Sources: Howard 2006

---

---

---

---

---

---

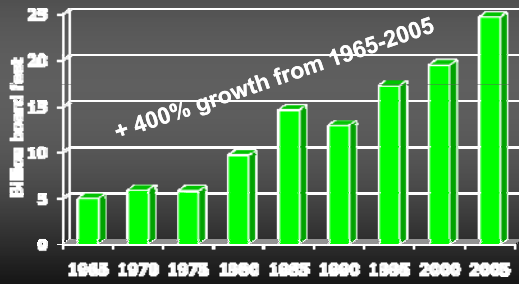
---

---

---

---

### US SW Lumber Imports



Sources: Howard 2006

---

---

---

---

---

---

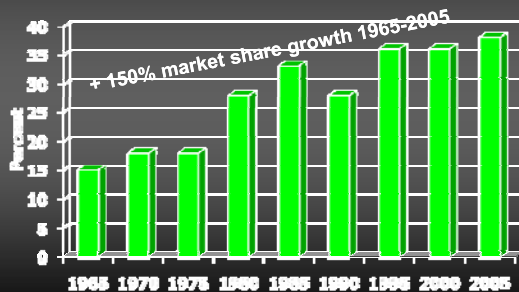
---

---

---

---

### SW Imports/Consumption



Sources: Howard 2006

---

---

---

---

---

---

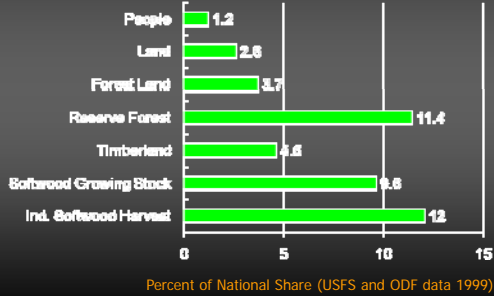
---

---

---

---

## Oregon in US Context



---

---

---

---

---

---

---

---

## Threats to U.S. Forests



1. Global climate change (drought, fire, insects, invasive species)
2. Urban-exurban sprawl (> 1 million ac/yr converted during 1990s)
3. Uncharacteristically intense fires, storms, pest epidemics
4. Loss of wood market share (disinvestment, land use change)
5. Rising regulatory costs (disinvestment, land use change)
6. Invasive species (changes ecosystem structure, function)
7. Decline in management capacity (access to capital, infrastructure)
8. Unmanaged recreation in some public forests (damages soils, waters, native flora and fauna)

---

---

---

---

---

---

---

---

## Climate Change



- + 1° F 1900-2000; + 2° to + 11° F 2000-2100
- Longer growing seasons – more biomass; good for wood, bad for fires
- Warmer winters – favors insects
- More precipitation as rain than snow
- Earlier peak spring flows
- Lower summer flows, warmer water temp; bad for cold-water fish
- Invasive species
- More intense fires
- Challenges in reforestation

---

---

---

---

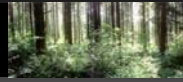
---

---

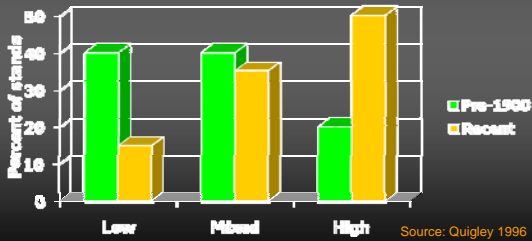
---

---

## NW Forest Fire Regimes



Fire Regime Severity



---

---

---

---

---

---

---

---

## Sustainability



Surviving and thriving in a rapidly changing world.

Meeting the needs of the present while providing for the needs of future generations.

---

---

---

---

---

---

---

---

## Sustainability



The suite of policies, plans and practices that seek to protect, produce, and perpetuate forest ecosystems for the values, uses, products, and services desired by communities and landowners for this and future generations.

*National Commission on Science for Sustainable Forestry 2005*

---

---

---

---

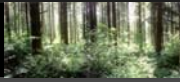
---

---

---

---

## Breadth of Sustainable Forest Management



- Varies by forest type, ownership, primary purpose
- Primary forest purposes:
  - Wood and fiber production
  - Multiple resource values/uses
  - Reserves, nature preservation
  - Urban and community forests

---

---

---

---

---

---

---

---

## Wood Production Forests



- Most of world's future wood will come from planted forests:
  - ~ 33% now, ~ 75% by 2050
  - ~ 5% or less of global forest area
- Primary purposes:
  - Grow trees for wood, fiber
  - Increase forest value to owner
- Management challenges:
  - Thrive in global markets
  - Increase wood yield = ~ 20 m<sup>3</sup>/ha/yr
  - Improve environmental outcomes
  - Improve wood quality, consistency
  - Produce high return on investment
  - Revenues from non-wood benefits
  - Maintain social license to operate

---

---

---

---

---

---

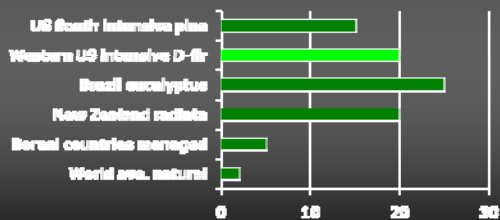
---

---

## Why PNW for Wood?



Cubic Meters/ha/yr Ave. Over Rotation



Estimates accurate only in relative sense; management intensity, rotation length vary

---

---

---

---

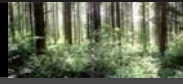
---

---

---

---

## Multi-resource Forests



- Most of the world's accessible forests have multiple resource purposes
  - ~ 40% of global forest area eventually
- Primary purposes:
  - Meet diverse landowner objectives
  - Increase forest value to owner(s)
- Challenges:
  - If US federal, clarify purposes and direction
  - Deliver multi-resource/value outcomes at acceptable costs
  - Differentiate products in markets
  - Finance non-wood benefits
  - Finance management of federal lands

---

---

---

---

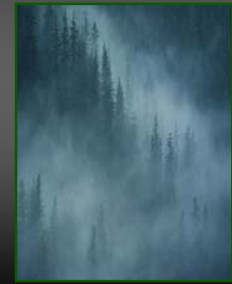
---

---

---

---

## Reserve Forests



- Parks, wilderness, natural areas:
  - ~ 9% worldwide in 2005
  - ~ 50% of global forest area eventually
- Primary purposes:
  - Sustain at-risk species, natural processes, "wild" ecosystems
  - Recreation, cultural uses
- Management challenges:
  - Minimize human use impacts
  - Restore, promote wildness, naturalness
  - Ameliorate effects of invasive species, air pollution, explosive natives
  - Achieve goals for least costs
  - Finance management

---

---

---

---

---

---

---

---

## Urban, Community Forests



- Where 80% of the people live
- Primary purposes:
  - Attractive communities, neighborhoods
  - Conserve resources: water, energy
  - Increase property values
  - Backyard wildlife habitats
- Management challenges:
  - Safety, infrastructure impacts
  - Minimize sprawl
  - Minimize invasive species escapes

---

---

---

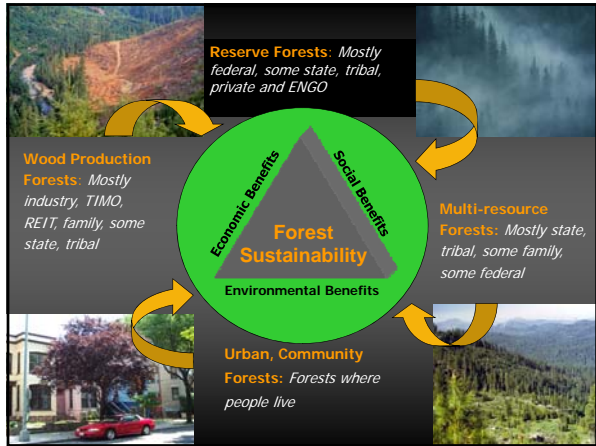
---

---

---

---

---




---

---

---

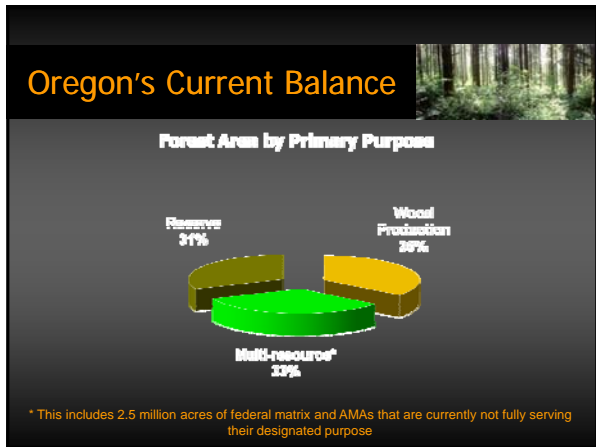
---

---

---

---

---




---

---

---

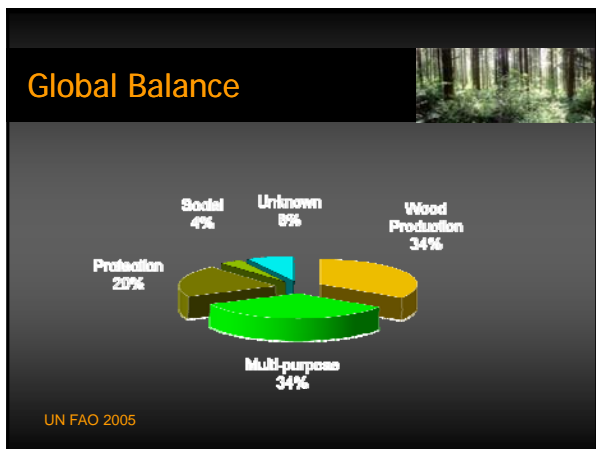
---

---

---

---

---




---

---

---

---

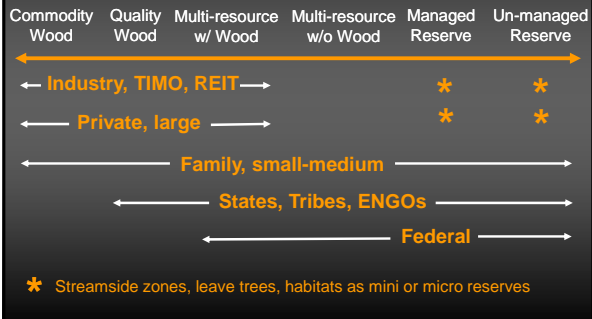
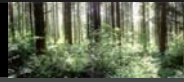
---

---

---

---

## Ownership Matters




---

---

---

---

---

---

---

---

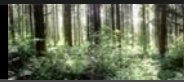
---

---

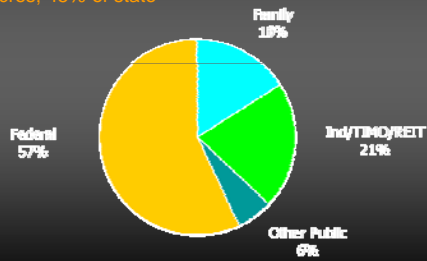
---

---

## Oregon Forest Owners



28 million acres; 45% of state




---

---

---

---

---

---

---

---

---

---

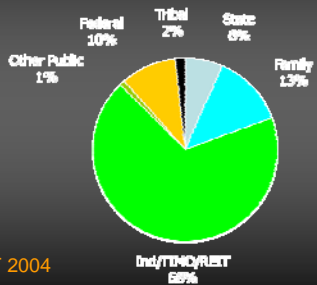
---

---

## Oregon Timber Harvest



4.45 BBF 2004




---

---

---

---

---

---

---

---

---

---

---

---

## Forest Sector in Economy



### ❖ Primary, Secondary, Services

- ❖ **\$12.6 billion** total industrial output (TIO);  
6.3% of State TIO
- ❖ **> 25%** off traded sector economy in **22/36** counties
- ❖ **85,600** direct jobs; **4%** of State total; **190,000** indirect; **9%**
- ❖ **\$3.5 billion** wages; ave wage = **\$40,525**;  
State ave. wage = **\$34,840**

### ❖ Forest recreation/tourism

- ❖ **\$1.6 billion** TIO; 37,900 jobs

Hovee 2004

---

---

---

---

---

---

---

---

---

---

## Challenges



- 1. Keep forest lands in forest uses for forest values**
  - Sustain forests against global/US forces of change
  - Requires a globally competitive domestic forest cluster
- 2. Better utilize capacity of federal forests to meet a share of domestic demand for wood-based products, restore forest health, create wealth and rural jobs**
  - Rationalize federal wood supply and reduce admin. costs
  - Restore and sustain health of at-risk federal forests
  - Improve production, product, and conservation efficiency
- 3. Boost productivity of private forests**
  - Science and technologies for productivity enhancement
  - Product and practice innovations for competitive advantage
  - Science for regulatory efficiency: costs = outcomes
- 4. Attract capital investments**

---

---

---

---

---

---

---

---

---

---

## Forests and Climate



- 1. Halt and reverse deforestation trends**
  - Conversion to agriculture in tropics, urban sprawl in temperate
- 2. Reforest following harvest or disturbance with warmer climate in mind**
  - Seed sources from lower elevations, warmer growing zones, diversify species composition stock with expectation for droughts
- 3. Manage forests to store more carbon**
  - Returns to landowner for carbon storage services
- 4. Optimize capture of carbon in wood into durable products**
  - Mill efficiency, innovative products
- 5. Biomass, bio-fuels from waste to offset fossil fuel energy**
- 6. Use wood and wood-based products in lieu of more energy demanding, polluting materials, e.g., concrete, steel, plastics**

---

---

---

---

---

---

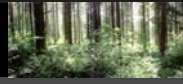
---

---

---

---

## Everyone has a Role



---

---

---

---

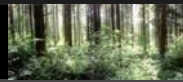
---

---

---

---

## University Roles ...



- ❖ Educate a highly skilled, diverse, adaptable, problem-solving forest/mill workforce, future scientists, teachers
- ❖ Create a stronger science base for all forest management systems; foundation for regulatory efficiency
- ❖ R&D for improved market and environmental performance of forests, forest products, forest businesses
- ❖ R&D to increase productivity and sustainability of forest resources, forest products, forest businesses
- ❖ Educate citizenry on needs for production and conservation
- ❖ Advocate science objectivity in policies; 3<sup>rd</sup> party credibility
- ❖ Advocate for diverse, productive, resilient forests and associated economies and human communities

---

---

---

---

---

---

---

---

## Richer Future Forests?



Wisely use, conserve, restore and manage forest resources to meet human needs and wants ...

Based on forest capabilities and local experience plus ever improving science and technologies ...

To lift the quality of life in poverty stricken places...

And reduce environmental impacts of consumption-intensive societies.

---

---

---

---

---

---

---

---