

Integrating forest ecosystem services into national policies and programs in the USA: implications for global inter-generational wellbeing

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Outline of Presentation

- Overview and working definition for ecosystem services.
- Summary of emerging markets for ecosystem services in the USA using carbon and water as examples.
- Ecosystem services concept for managing public lands in the USA and some recent federal legislation.
- USFS ecosystem services examples (from national programs to forest and project scales).
- Discussion on the role of ecosystem services for inter-generational wellbeing.

Ecosystem Services

The benefits people receive from nature

- Clean air and water
- Mitigation of fire and floods
- Climate regulation
- Fish and wildlife habitat
- Recreation opportunities
- Economic benefits

are often undervalued or unrecognized



Ecosystem Services

The benefits people obtain from ecosystems

From MEA, 2005

PROVISIONING

Water (quantity)
Fuelwood
Energy and Minerals
Food and Medicines
Fiber
Forage
Timber
Range
Fish and Wildlife

REGULATING

Carbon sequestration
Climate regulation
Soil stabilization
Watershed services
(water quality and flood control)

CULTURAL

Aesthetic values
Educational values
Spiritual values
Cultural heritage
Recreation

SUPPORTING

Soil formation
Seed dispersal
Pollination
Nutrient cycling



Emerging markets for Ecosystem Services

- Water quality trading
- Wetland mitigation
- Species conservation banking
- Carbon credits
- Biodiversity and voluntary markets



Ecosystem Services Markets and Payment Programs in the USA

- Compliance markets based on environmental regulations
- Voluntary markets for market access and desire to “do the right thing” for nature
- Government payment programs



National Regulatory Drivers for Compliance Markets

Clean Air Act (1970)



→ Endangered Species Act (1973)

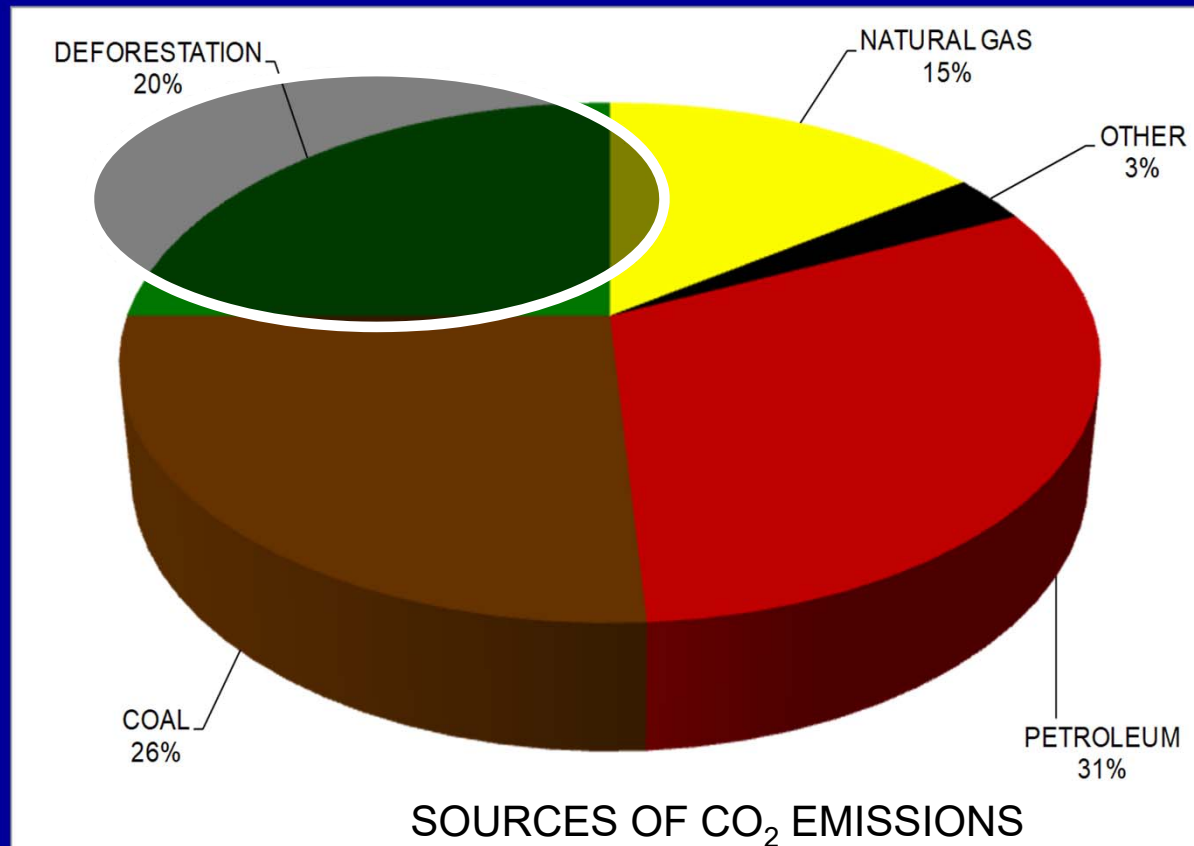


→ Clean Water Act (1977)



Voluntary Market: Carbon

ANNUAL GLOBAL CO₂ EMISSIONS CAUSED BY HUMANS



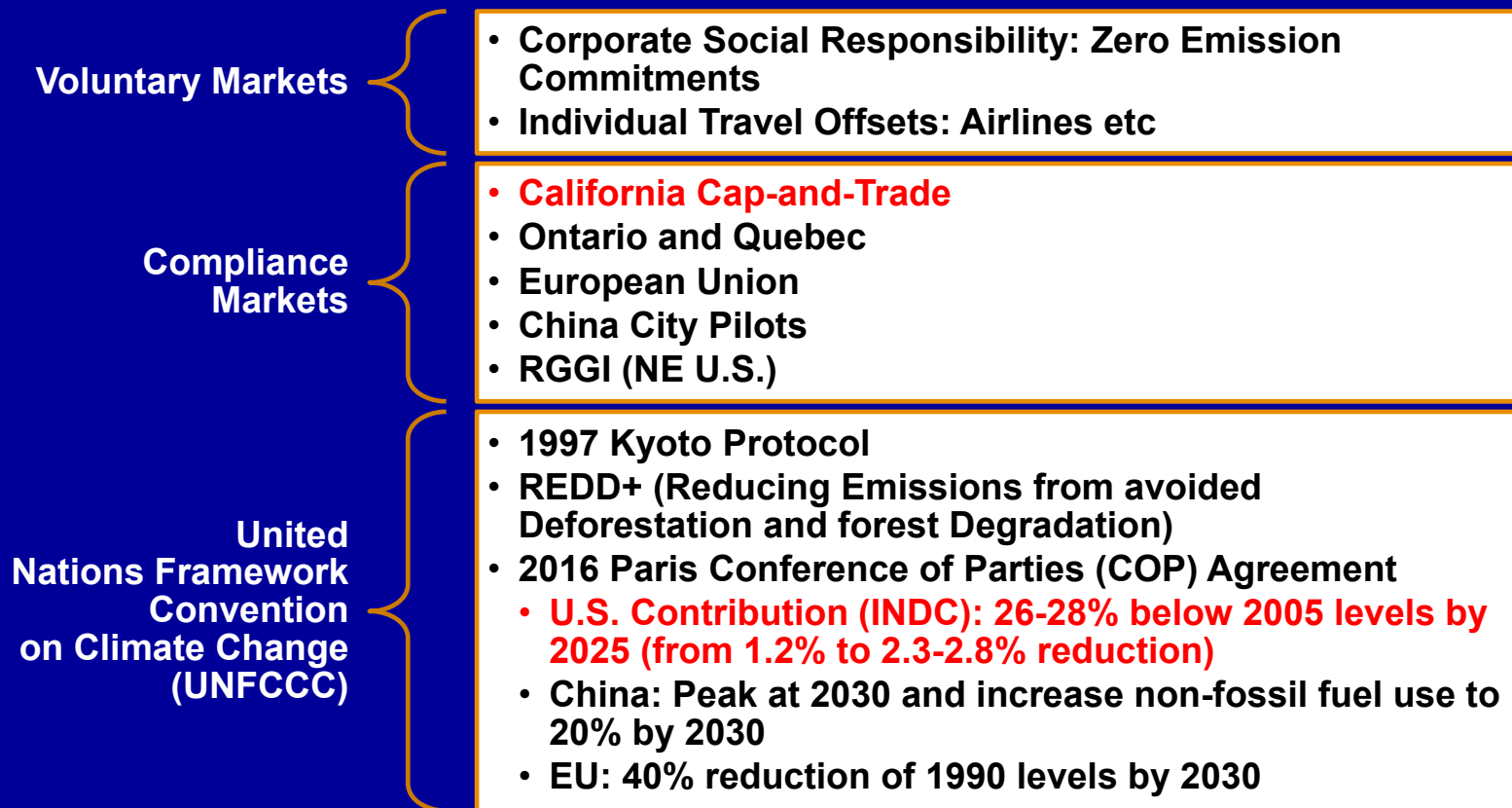
Forest Offsets-avoided emissions



Forest Offsets-carbon sequestration



Emission Reduction Mechanisms



California Forest Offset Program

CA Forest Offset Program

- 39 current projects across US
 - Reforestation
 - Avoided Conversion
 - Improved Forest Management – most common
- Federal Lands not currently eligible
- Baseline based on FIA data – updated in 2015

Project Process

- Landowners work with Project developers
- Submit Project to Registry
- Registry Lists Project, Collects Project Documents, and Facilitates Project Verification
- Registry issues Registry Offset Credits (ROCs)
- CARB review of project
- ROCs are transitioned to CARB Credits
- CARB Credits are issued to claiming entity

CARB Compliance Offset Credits Issued

Ozone Depleting Substances	5,726,940
Livestock	815,650
U.S. Forest	14,791,335
Urban Forest	0
Mine Methane	504,705
Rice Cultivation	0

Willamette Valley, Oregon







Grey Infrastructure

Cooling Towers

Compliance Achieved

Cost - A lot

Ecological Value

Not Much



Green Infrastructure

Restore 50 KM of streams

Compliance Achieved

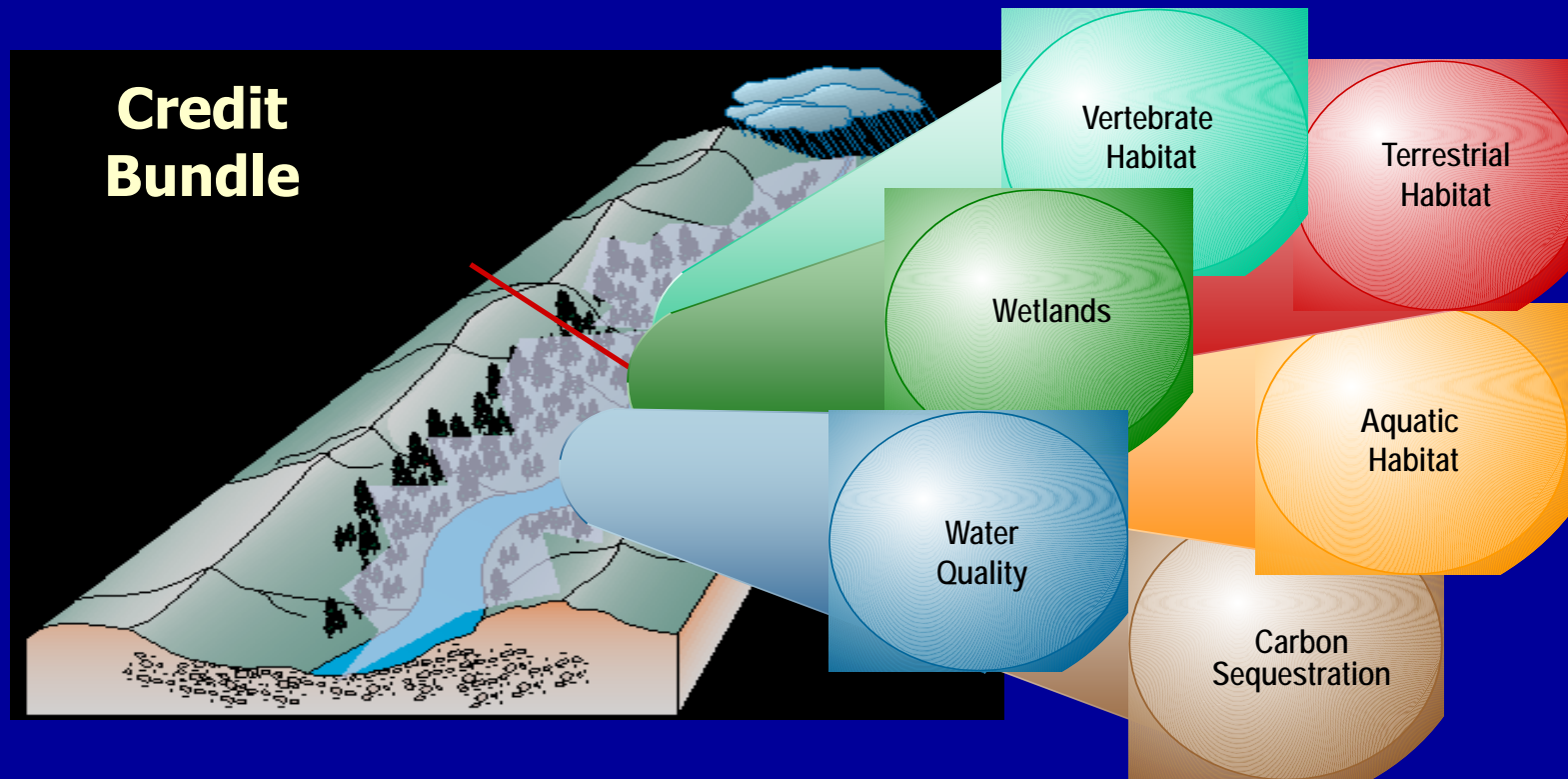
Cost - A lot Less

Ecological Value

HUGE



Bundling ecosystem services to increase forest value



Standards, Metrics, and Process



Willamette Partnership- Counting on the Environment

- COTE developed of an integrated ecosystem credit accounting protocol for four ecosystem service markets:
 - Water quality trading
 - Wetland mitigation
 - Salmonid habitat
 - Prairie habitat

Deal, Cochran, LaRocco, 2012. *Forest Policy and Economics*

Ecosystem Services on Public Lands

More than just markets



Evolving management of USFS lands

- Early 1900s Custodial Management Period.
- Closing public lands from private exploitation from over-harvesting of timber & grazing.
- Promoting/protecting forests and grasslands.
- Establishment of USFS National Forests and National Parks in USA.



Evolving management of USFS lands

- 1920-1970s Sustainable Forestry Period
- National Forests with sustainable yield, timber targets and fire protection.
- USFS seen as a model public agency.
- Provided jobs, timber, agency net profit from timber sales and grazing, water-irrigation.



Evolving management of USFS lands

- 1970s to recent - Environmental Period.
- MUSYA, Clean Water & Clean Air Act, ESA.
- Resource specialists in agency, Multiple Use
- Greatly reduced USFS timber harvests.
- Application of multiple use and ecosystem services concepts.



Ecosystem Services on Public Lands

- 2012 - U.S. Forest Service Planning Rule
- Ecosystem Services into Federal Decision Making (OMB, CEQ Directive)
- NESST- National Ecosystem Services Strategy Team



Natural resource legislation and federal agency responses and applications of ecosystem services.

Legislation	Intent of Legislation	Federal Agencies
Multiple Use Sustained Yield Act (1960)	Sustainable management of natural resources	USFS and BLM
National Environmental Policy Act (1969)	Impacts of people and the environment and understanding of the connection between ecological systems and management actions	Any federal project that used federal funding
National Forest Management Act (1976)	Establishes policy of inventory and planning in accordance with MUSYA	USFS and BLM
National Forest System Land Management Planning Rule (2012)	USFS regulation to implement planning from NFMA	Rule explicitly requires managers to address ecosystem services in planning
Presidential Memorandum: Ecosystem Services into Federal Decision Making (2015)	Directs federal agencies to incorporate ES into decision frameworks	NOAA, NRCS, USFWS, USFS, EPA, BLM, USGS

USFS Planning Rule

- **Ecosystem services and multiple uses** “considering a full range of resources, uses and benefits”
- MUSYA- timber, water, recreation, range, wildlife & fish.
- E.S. also includes cultural heritage values, other services not included in multiple use.
- Early adopter forests are using Planning Rule for forest plan revisions and assessments.
- 2015 Directives state the N.F. should include “key ecosystem services” in forest plan revisions.



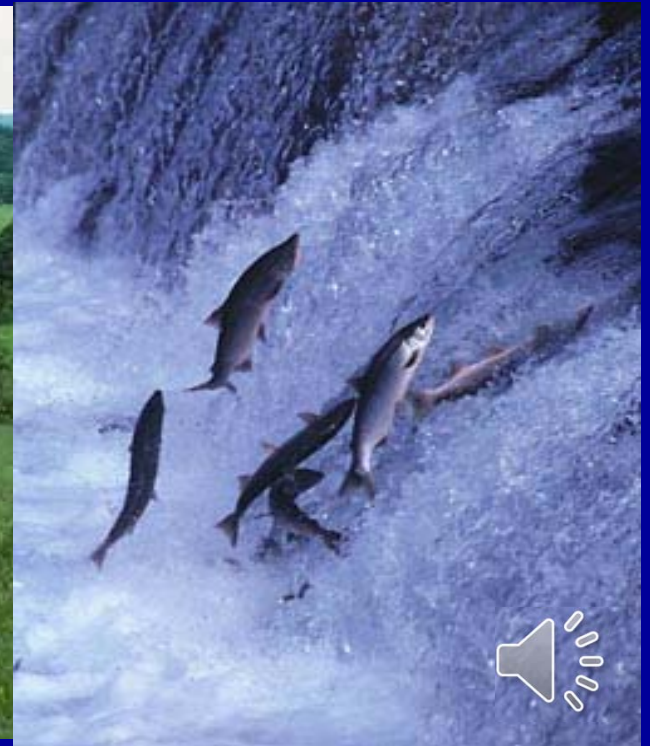
Incorporating Ecosystem Services into Federal Decision Making

- October, 2015 –CEQ, OMB Directive.
- Directs agencies to develop and institutionalize policies for ecosystem services in planning, investment and regulatory context.
- Each agency submitted their plan in March, 2016.
- Implementation guidance, CEQ convening subject matter experts for “community of practice” concept.

➤ **NESST- National Ecosystem Services Strategy Team**

NESST- National Ecosystem Services Strategy Team

Robert Deal, Emily Weidner, Mary Snieckus, Tommie Herbert, Jonas Epstein,
Krista Gebert, Tania Ellersick, Greg Arthaud, Nikola Smith, many others



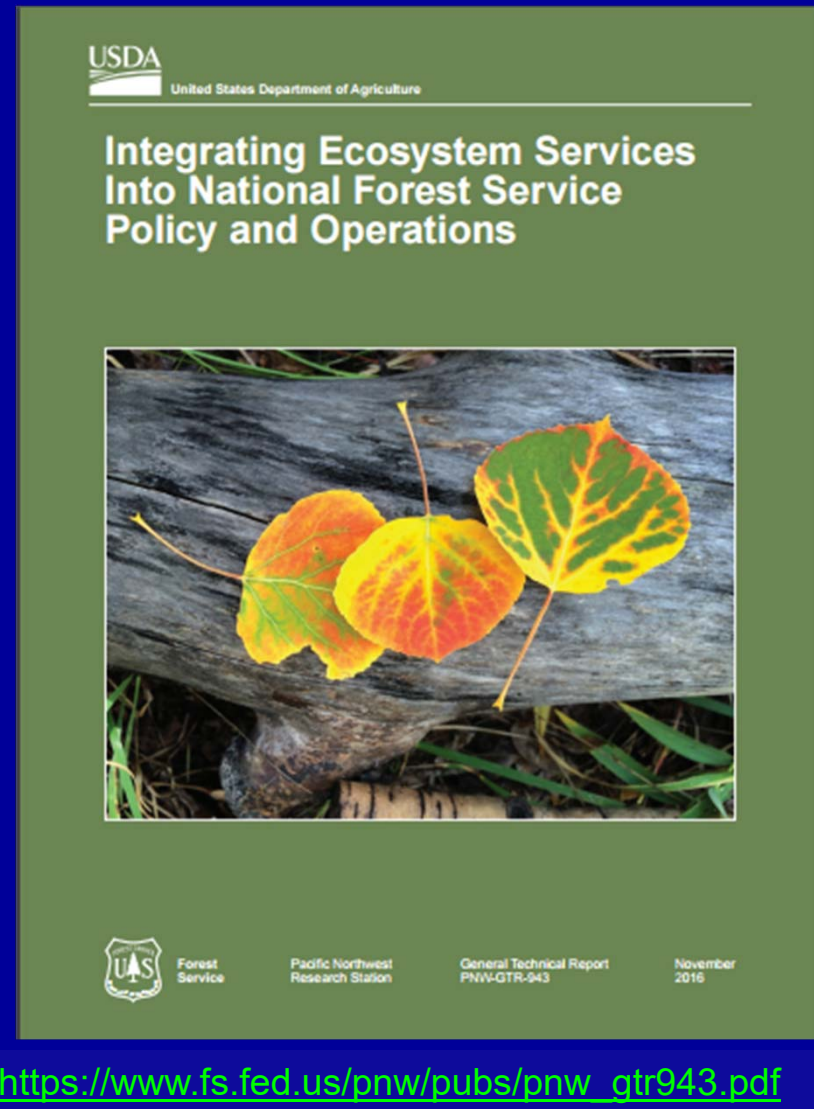
NESST Purpose

“The National Ecosystem Services Strategy Team was established to collaboratively develop national strategy and policy around ecosystem services and integrate it into Forest Service programs and operations.”



NESST Report

- Introduction
- Ecosystem Services and USFS
- Elements of an Ecosystem Services Approach
 - Decision-Making and Analysis
 - Measuring, Reporting, Communicating
 - Partnerships and shared investments in ES
- Synthesis
 - Common Needs
- Next Steps



The Opportunities

- **Planning:** Consider a broad suite of ecosystem services in decision-making and priority-setting
- **Performance:** Quantify and communicate in terms of benefits to people through measurement and reporting
- **Partnerships:** Connect providers and beneficiaries of ecosystem services through partnerships and investments

Planning

Considering the full suite of objectives in analysis, decision-making and priority-setting

- Forest Planning
- Project Level Planning
- Prioritizing Restoration Activities
- State Forest Action Plans



Ecosystem Services Identified in Assessments

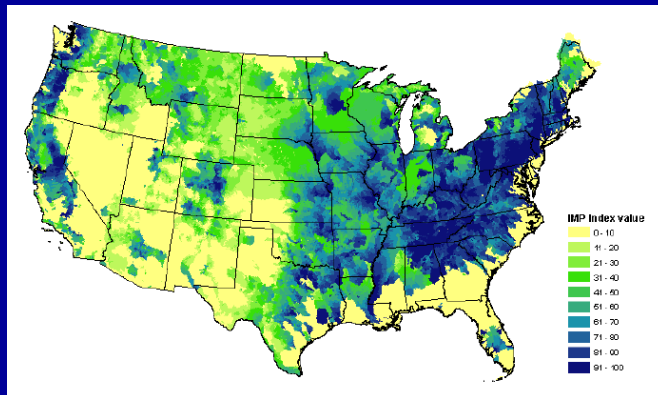


between 7-22 services per assessment

Forest Contributions to Water Supplies

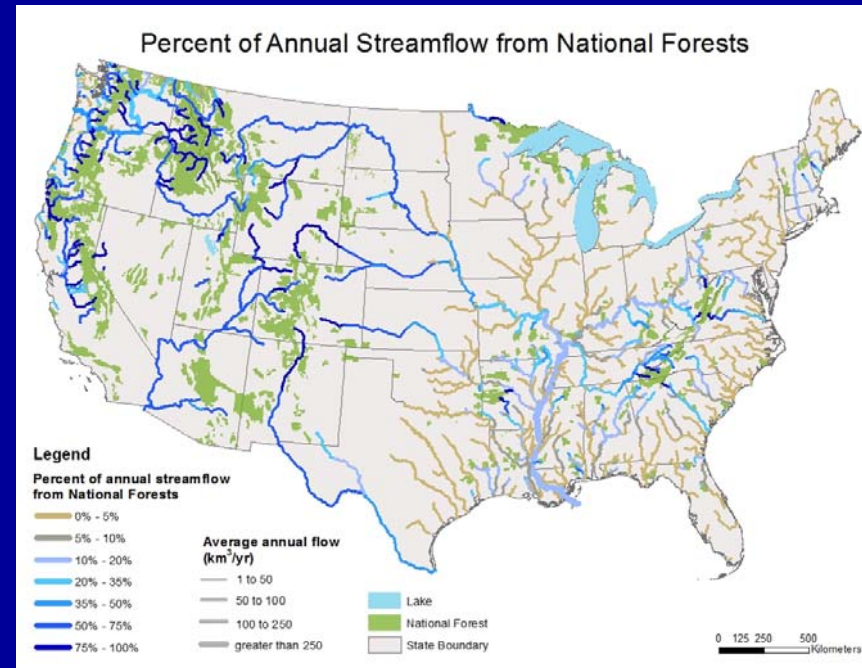
Forests to Faucets Project

Assessing Drinking Water Importance and Threats



Increasing focus on **geospatial tools** to quantify benefits delivered to the public

Characterization of threats and **justification** for targeted restoration

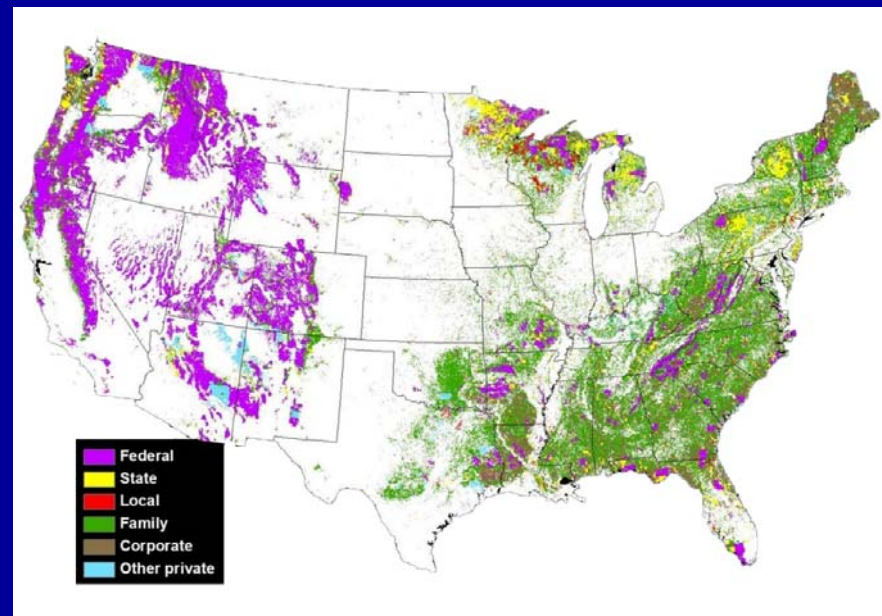


National Forest Contributions to Stream Flow
Rocky Mountain Research Station, Luce et al. 2016

State Forest Action Plans

Required under the U.S. Farm Bill

- ✓ Preserve working forest lands
- ✓ Protect forests from harm
- ✓ Enhance **public benefits** from trees and forests



Performance

Quantifying and communicating the value of resources and impacts of management actions in terms of benefits to people

- National Assessments
- Performance Management
- Inventory Monitoring & Assessment



Numbers are
for national
forests only.



The Carbon Bathtub of National Forests

Carbon Dynamics

Carbon entering the
tub through tree
growth = **42 ounces**.



Total carbon stocks
in national forests
= 10,240 ounces
(an 80 gallon tub.)

Net gain of carbon (growth
minus harvest & natural disturbances)
= **31 ounces**, equivalent to a
large bottle of shampoo.



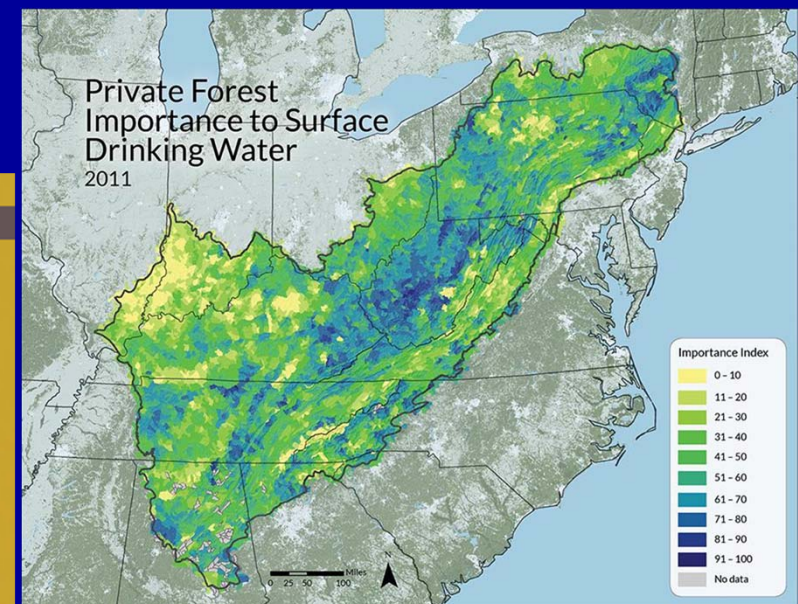
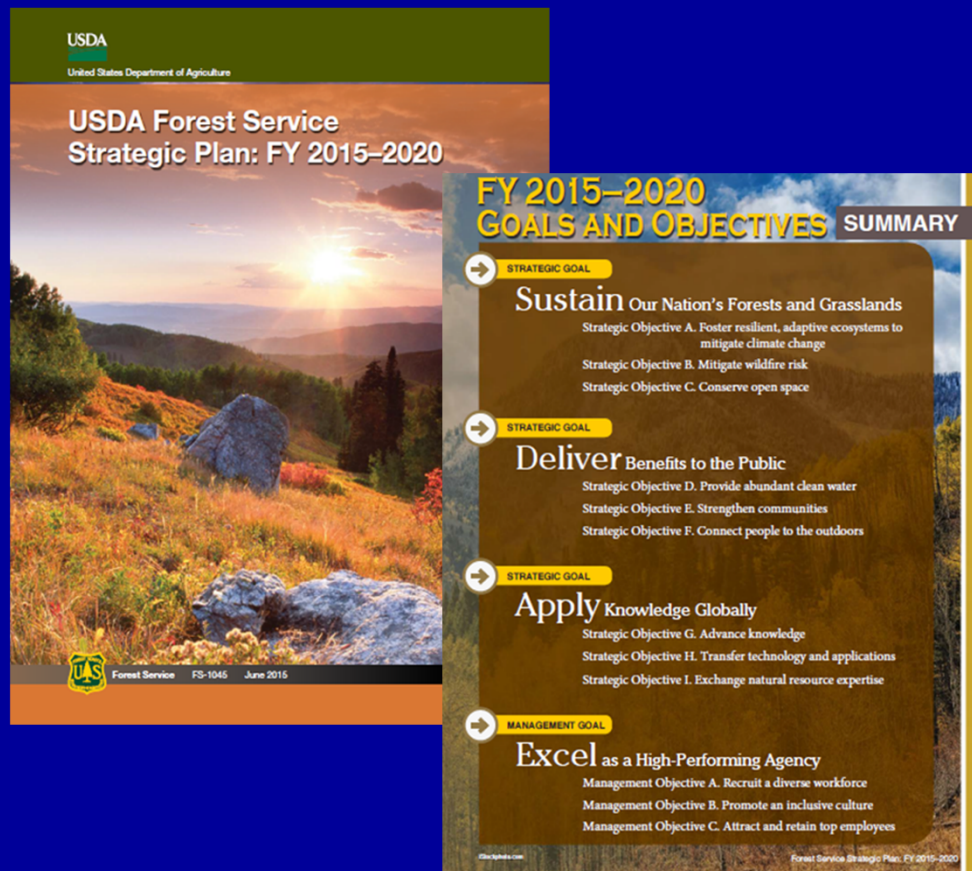
Carbon leaving the
tub from harvesting
= **3 ounces**,
equivalent to what a
washcloth can
absorb.

Carbon leaving the tub through
natural disturbances = 8 ounces.



Performance Reporting

Creating standardized metrics & indicators that enhance national reporting, program management, and encourage third-party investment



Partnerships

Connecting providers and beneficiaries of ecosystem services through partnerships and shared investments.

- Incentives for Private Landowners
- Partnerships for Shared Investments
- Damage Assessments
- Environmental Markets



Example: Watershed Investment Partnerships

- Utilities
- Municipalities
- Multi-Sector/
Water Funds
- Federal Agencies
- Corporations
- Consumers/
Communities

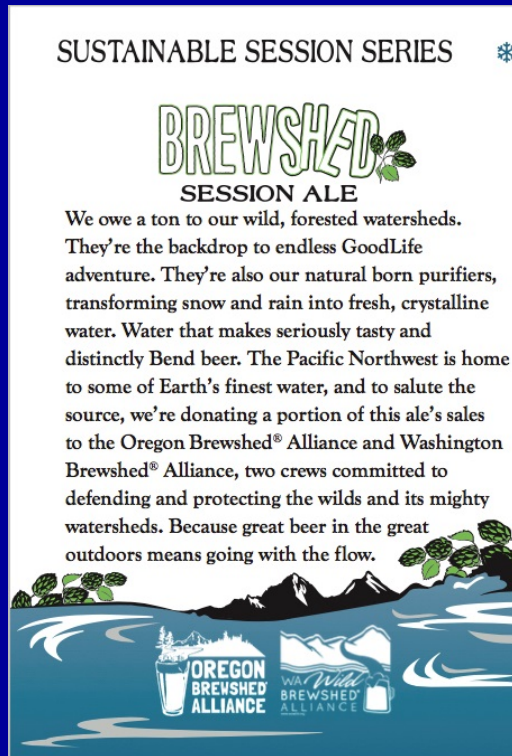
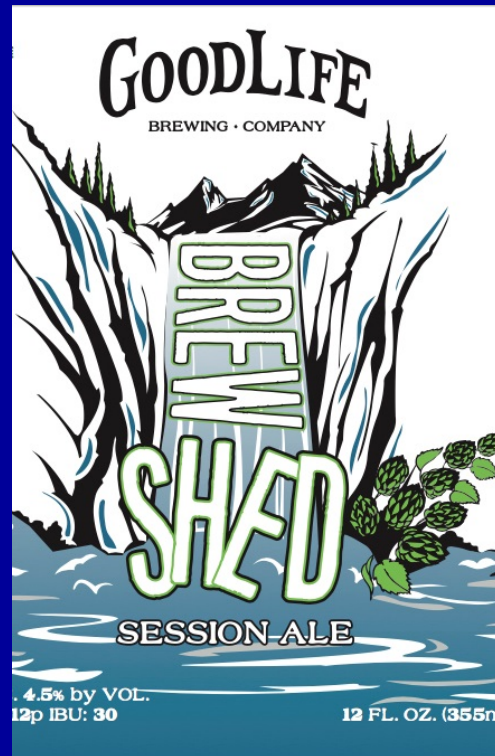
VAIL RESORTS
EXPERIENCE OF A LIFETIME™



The Nature
Conservancy 

Coca-Cola

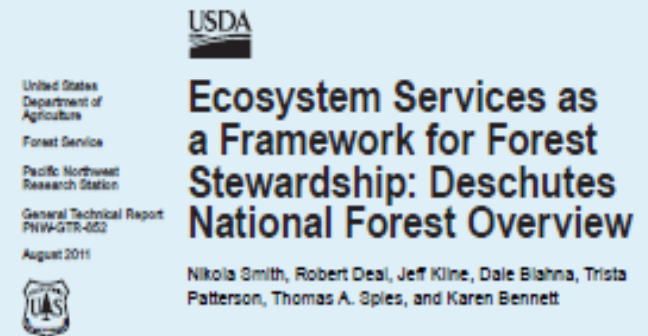
Private Sector Partnerships: Brewshed Investments Deschutes National Forest, Oregon



GREAT BEER *begins with*
CLEAN WATER



Ecosystem Services as a Framework for Forest Stewardship



Building a New Language for Management: An Ecosystem Services Framework

Project Goals

- Articulate the values that the forest provides to the public.
- Evaluate effects between management actions and the sustainable delivery of ecosystem services.
- Build ecosystem services-based partnerships to design and fund needed work on the ground.
- Create analytical tools that allow managers to assess project outcomes and tradeoffs in ecosystem services terms, i.e., across resource areas and over longer time scales.

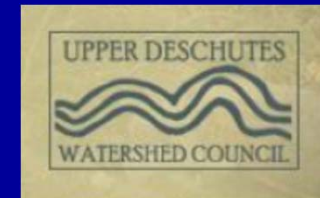
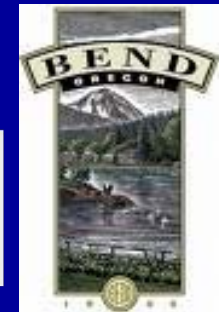
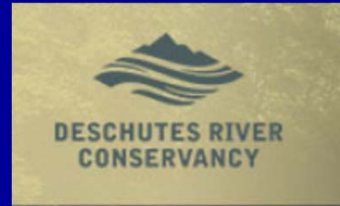


Some services can be quantified and monetized, while others are described qualitatively



Who benefits from
Forest Service
management
actions?

Who shares
common interests
in ecosystem
service provision?



The benefits of an ecosystem services approach to management

- An **integrated approach** - allows managers to assess the costs and benefits of projects across resource areas and beyond forest boundaries.
- Creates **awareness** about the services provided by public lands and brings attention to under-valued projects.
- Leverages **partnerships** and funds to implement work needed on the ground.



Using ecosystem services to frame forest management is like going from

black and white



to color



~ John Allen, Forest Supervisor, Deschutes National Forest

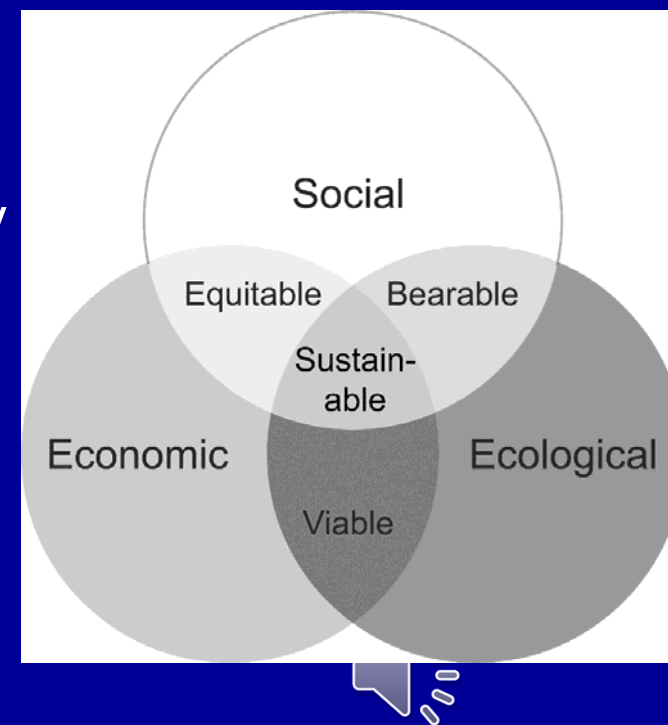
Ecosystem services at local scales

- Ecosystem services (Nature's benefits) concept at National Forest and project scale.
- Operationalize key services including sustainable recreation, water and carbon.
- Using concept to help the USFS better connect with key partners.
- Planning Forums in Oregon and California.



Connecting ecosystem services with inter-generational wellbeing

- Ecosystem Services: benefits people receive from ecosystems- Nature's Benefits.
- Sustainable: intersection between social, economic and ecological sustainability
- Sustainable Forest Management: balance between three pillars of sustainability



Connecting ecosystem services with inter-generational wellbeing

- Intergenerational wellbeing depends on the sustainable growth of natural capital, human and social capital and financial/physical capital.
- These stocks combine to generate flows of wellbeing.
- Connecting ecosystem services, natural capital and sustainable forest management is critical to support values for people over the long term.



Connecting ecosystem services with inter-generational wellbeing

- The role of ecosystem services markets to add economic value for people.
- The ecosystem services concept on public lands to ensure the sustainability of services such as recreation, water, carbon and cultural values.
- Providing these goods and services for people over the long term for the wellbeing of future generations



Take-Home Messages



- Ecosystem services highlight the importance of nature for human wellbeing and attract investment in restoration
- Markets and payment programs use financial incentives to restore ecosystems
- Programs that couple livelihood improvements with natural resource stewardship are particularly successful
- Ecosystem services is a powerful tool to support collaborative landscape-scale restoration and to provide long term wellbeing for future generations.