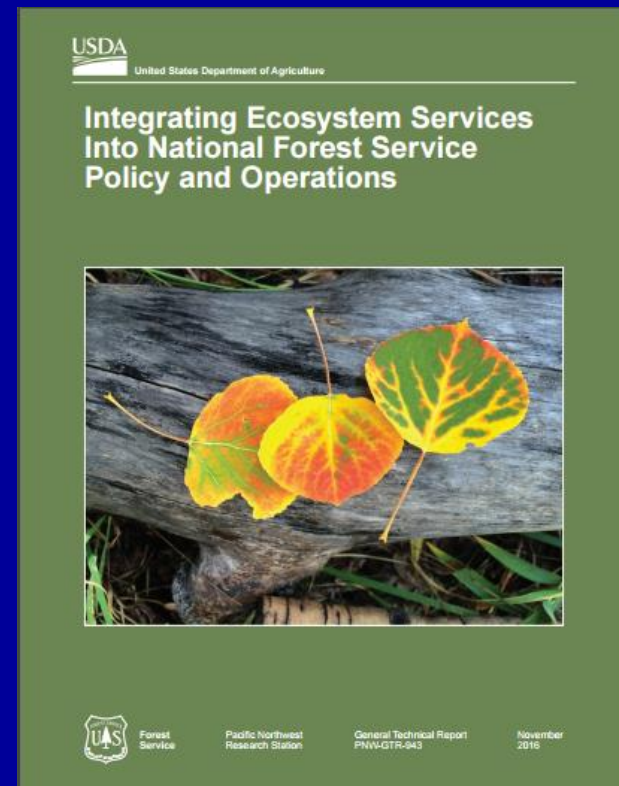


Integrating Ecosystem Services into Forest Service Programs and Operations

Robert Deal, USFS PNW Research Station, Portland, OR

Nikola Smith, USFS Pacific Northwest Region 6, Portland, OR

Jonas Epstein, USFS WO-WFWARP, Washington, DC



Outline of Presentation

- USFS and Ecosystem Services
- Ecosystem Services and the chartering of NESST
- NESST General Technical Report
- Planning and Partnerships
- Performance and Evolution of NESST
- Synthesis and Future Directions

Ecosystem Services and the USFS

- Ecosystem Services for USFS evolved from multiple-use concept
- Ecosystem services as a working concept
- 2012 USFS Planning Rule
- 2015 Presidential Memorandum
- Ecosystem Services Champions Forum and evolution of NESST

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.
- 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.
- E.S. also includes **cultural heritage values**, and other services not directly included in multiple uses.

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 developing work plan due March, 2016.**
- **Implementation guidance, CEQ convening subject matter experts for “community of practice” concept.**

FRMES Projects

- Case Study examples including:
- Marsh Project
- Cool Soda Project
- Forest Planning
- Early efforts for integrating ecosystem services into USFS programs and operations

Evolution and Chartering of NESST

- Ecosystem Services Champions Forum in 2012.
- Scientists–R&D, Line officers–NFS, Practitioners–S&P
- Set of recommendations for Ecosystem Services Framework including: developing common language and understanding, relevance to the agency, available tools and information, better communication across USFS Deputy Areas.
- Not exactly... USFS leadership directed us to develop national strategy and policy for the agency
- NESST was chartered in 2013, re-chartered in 2016.

NESST- National Ecosystem Services Strategy Team

Robert Deal, Nikola Smith, Jonas Epstein, Emily Weidner, Mary Snieckus, Lisa Fong, Tommie Herbert, Tania Ellersick, Greg Arthaud, Claire Harper, many others

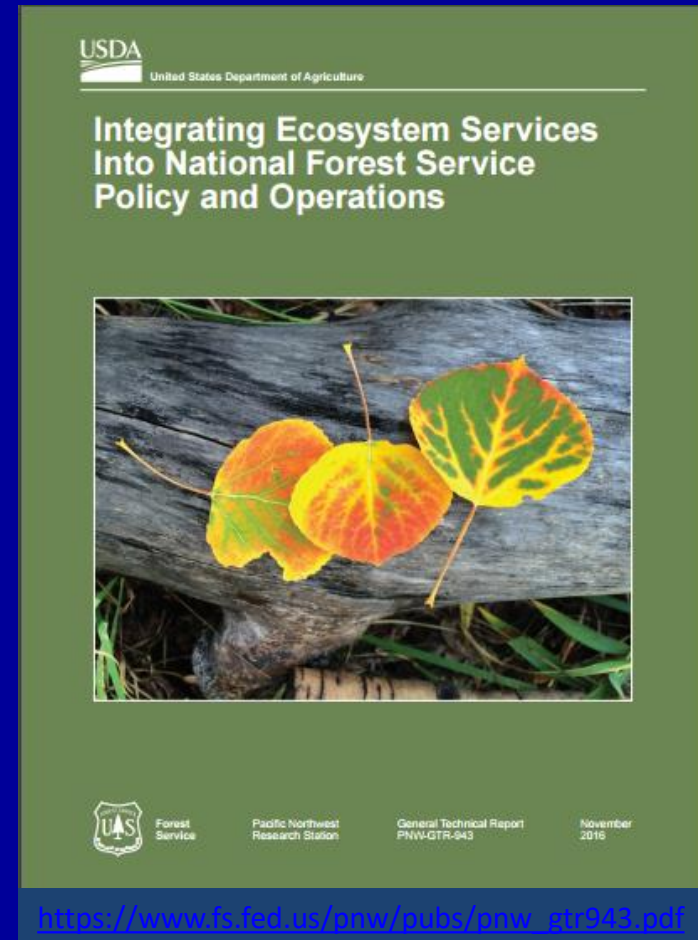


NESST Purpose

“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.”



- 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
- **Partnerships:** Connect providers and beneficiaries of ecosystem services through partnerships and investments
- **Performance:** Quantify and communicate in terms of benefits to people through measurement and reporting

Planning

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

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





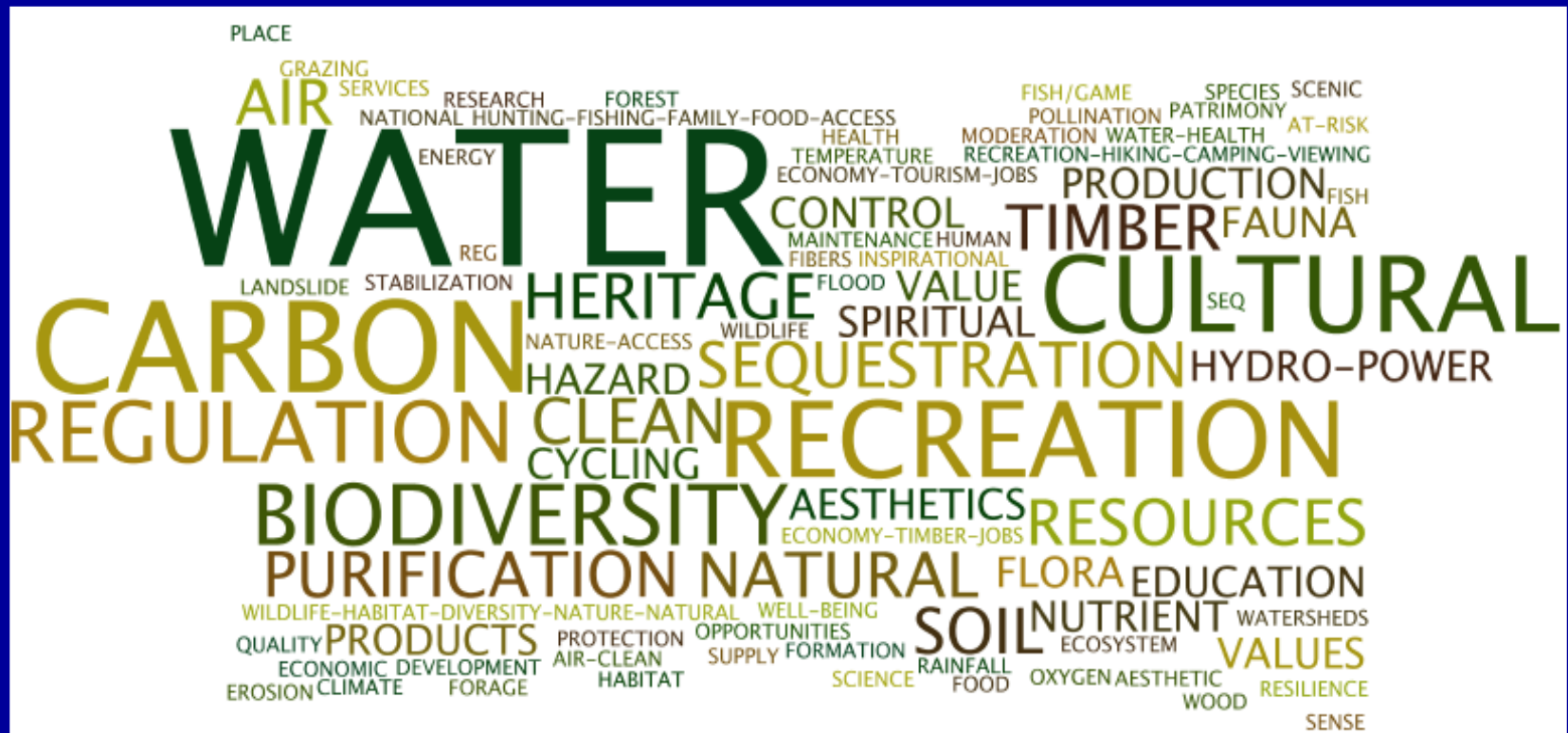
Ecosystem Services in the U.S. Forest Service Planning Rule

*“..... Plans will guide management of NFS lands so that they...have the capacity to provide people and communities with **ecosystem services** and multiple uses that provide a range of **social, economic, and ecological benefits** for the present and into the future.”*

Evaluating **key** ecosystem services

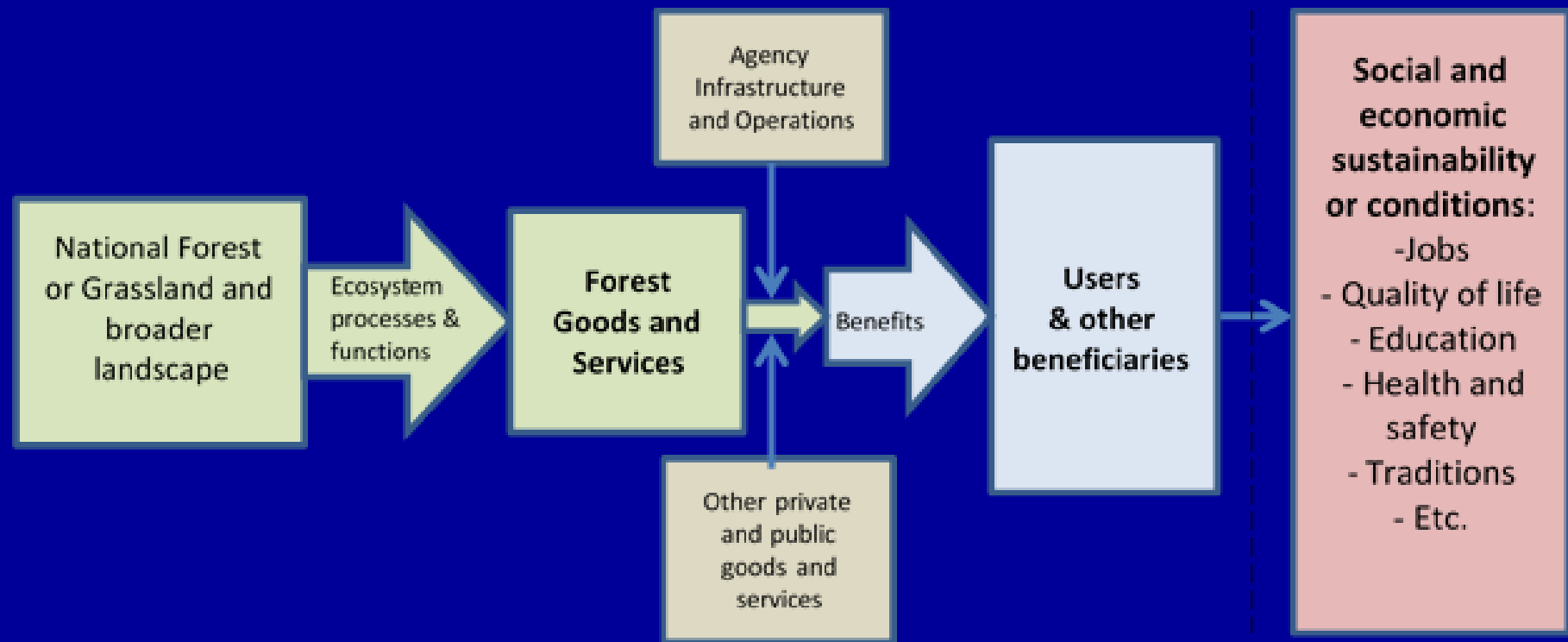
1. Ecosystem service **contributions** by the plan area.
2. The **geographic scale** of these contributions (for example, watersheds, counties, regional markets, or eco-regions).
3. The **condition** and **trend** of these key ecosystem services.
4. The **drivers** likely to affect future demand and availability.
5. The **stability** or **resiliency** of the ecosystems or key characteristics of ecosystems that currently sustain ecosystem services.
6. The **influence of adjacent lands** or other conditions beyond the authority of the Forest Service that influence the plan area's ability to provide ecosystem services.

Ecosystem Services Identified in Assessments



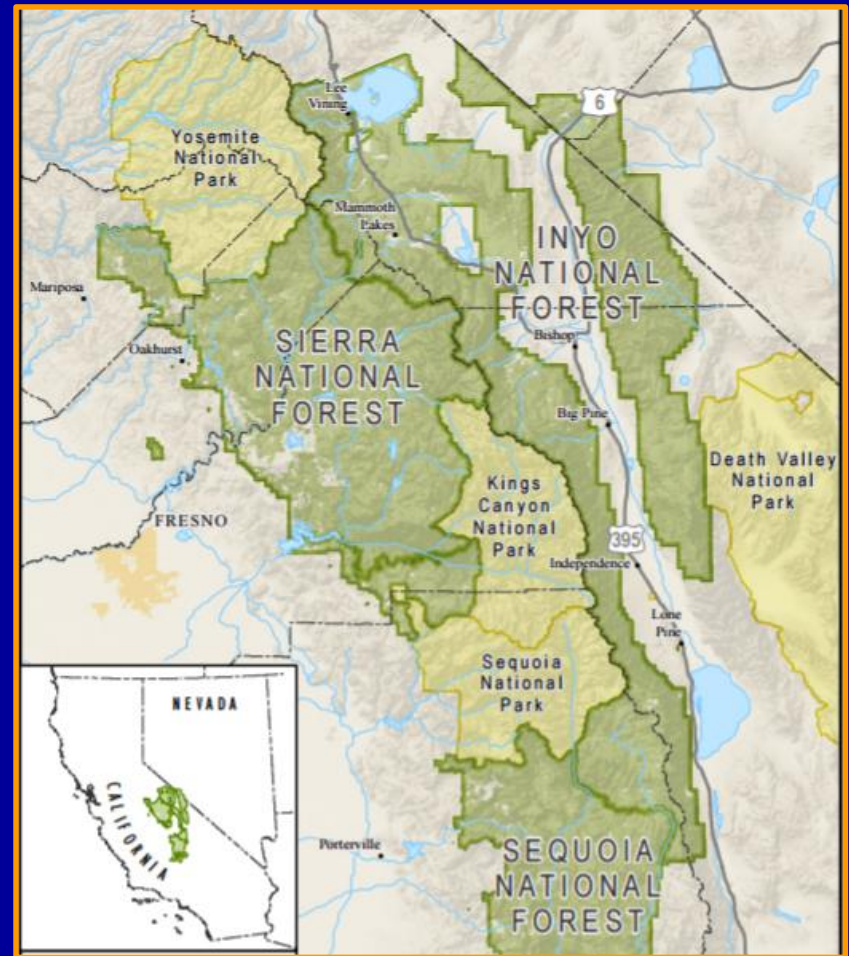
between 7-22 services per assessment

Relationships Identified in the Planning Process



conditions, trends, drivers / stressors

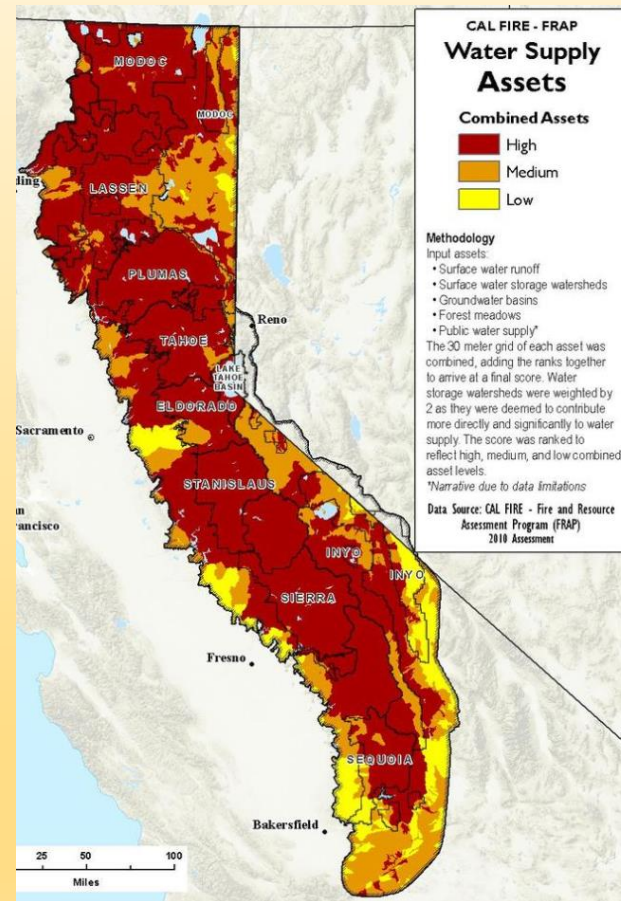
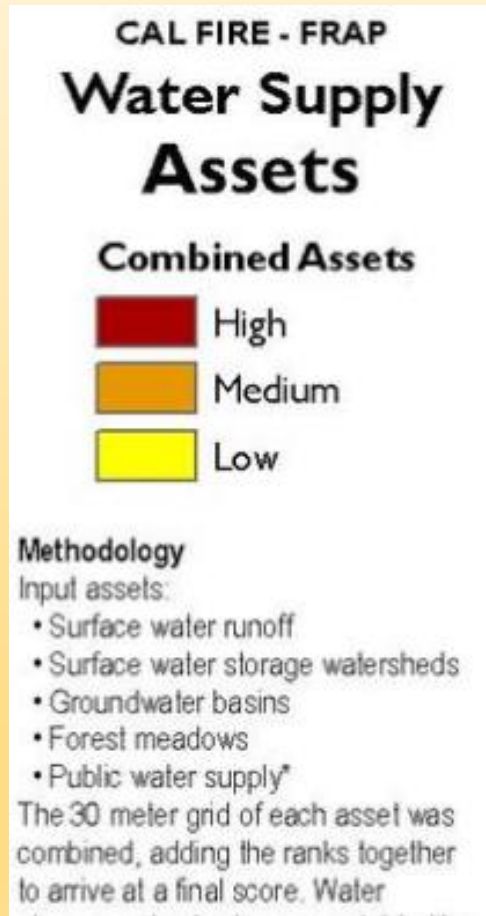
Inyo, Sequoia and Sierra National Forests



Assessment: Mapping and Spatial Analysis

- Relative **capacity** for:
 - Flood protection
 - Assets for providing water supply
 - Water quality
 - Drinking water importance
- Mapped areas of service provision at risk from **stressors**:
 - Climate change (changing snowpack; seasonal flows; peak flows)
 - Development / impervious surfaces
 - Uncharacteristic (large) wildfire
 - Impaired waterbodies

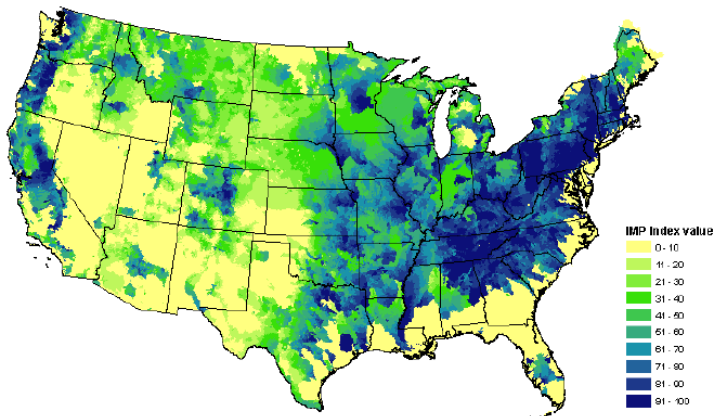
Water Supply Asset Mapping



Forest Contributions to Water Supplies

Forests to Faucets Project

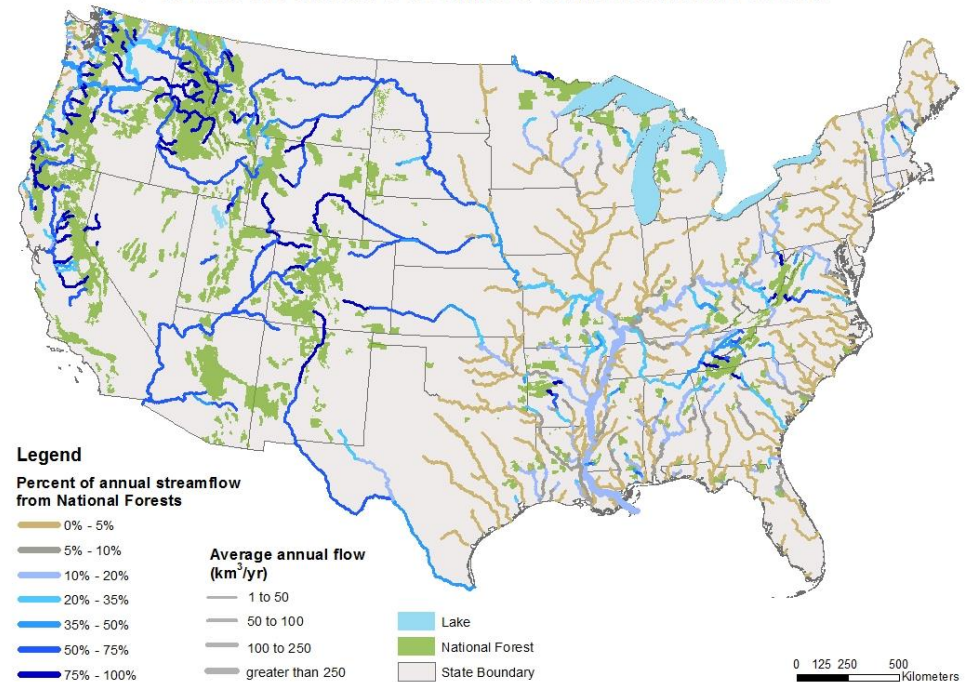
Assessing Drinking Water Importance and Threats



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

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

Percent of Annual Streamflow from National Forests



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

Other Ecosystem Service Indicators

Timber – appropriate vegetation types and infrastructure locations

Grazing – permitted areas

Energy – potential areas of fuel treatment (source of biomass)

- proximity to biomass energy generating facilities
- critical areas of potential hydropower, geothermal, wind, solar

Recreation - “Recreation Opportunity Spectrum”; recreation sites; visitation

Aesthetics – existing condition based on “Visual Quality Objectives”

Cultural services – historic sites, Tribal significance, locations of important species for hunting, medicine, and food

Carbon Sequestration – sites vulnerable to fire, land cover critical in providing capacity for carbon sequestration

Biodiversity – critical terrestrial and aquatic habitat

From Policy to Practice:

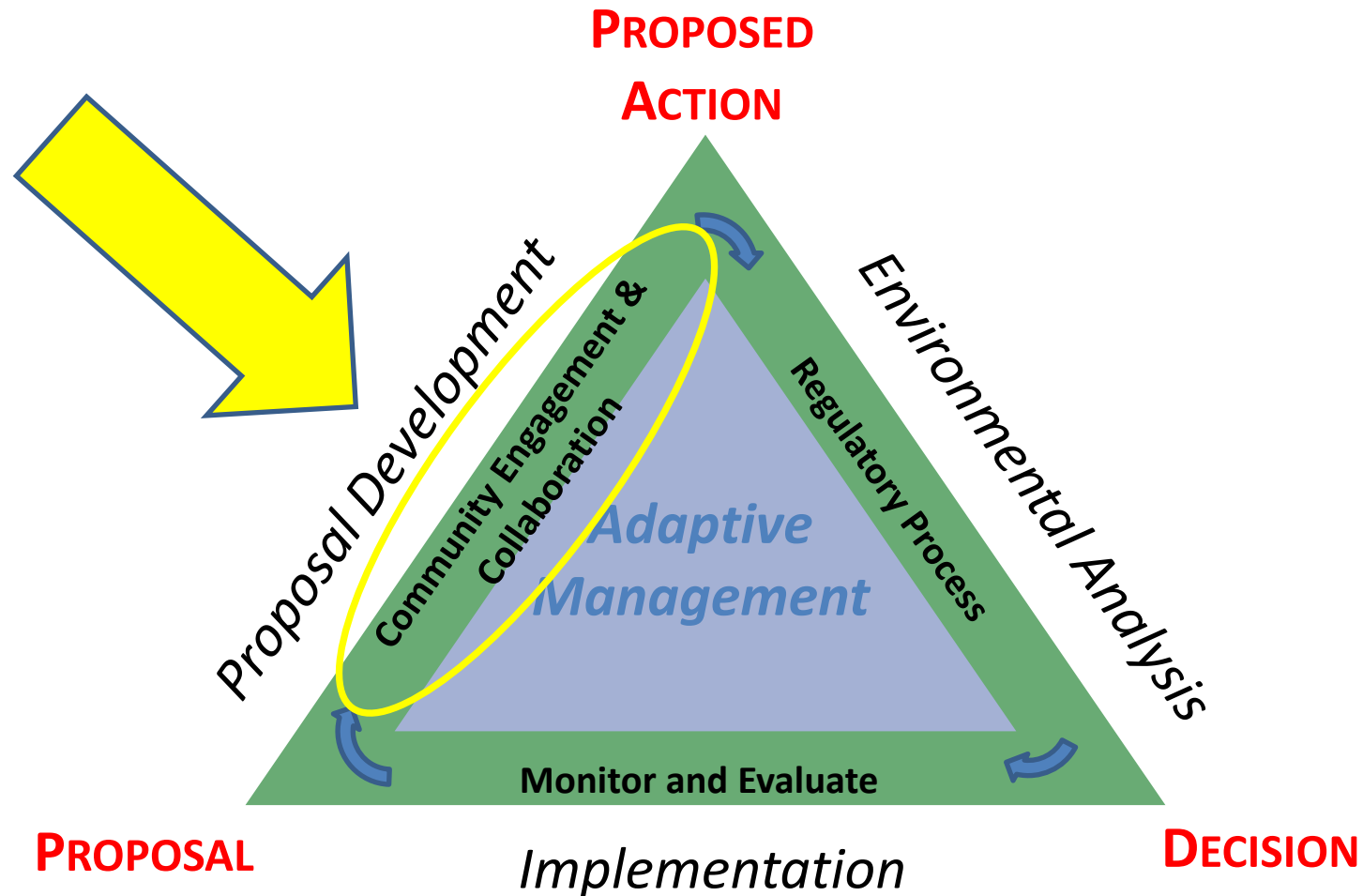
**project-level
implementation**



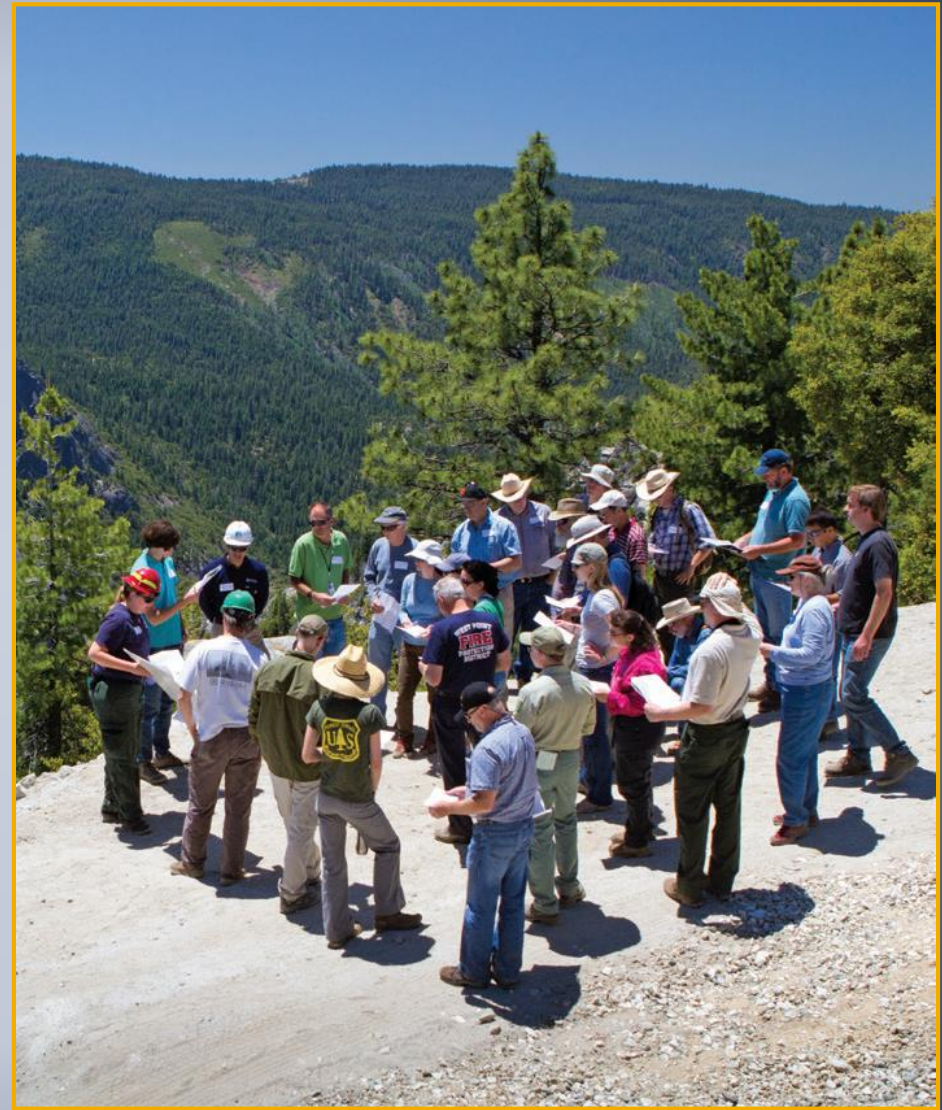
for the greatest good

National Environmental Policy Act (NEPA)

Promote harmony between **people** and the **environment**



Information
exchange about
public values and
forest conditions



“every piece of land has its own signature and function”

Karen Bennett, Retired Regional Soil Scientist, USFS Pacific Northwest Region



*making connections between ecosystem services
and site-specific ecological context*

FEDERAL RESOURCE MANAGEMENT AND ECOSYSTEM SERVICES GUIDEBOOK

National Ecosystem Services Partnership

Enter your search term(s)



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[WHY ECOSYSTEM SERVICES?](#)

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National Ecosystem Services Partnership

FEDERAL RESOURCE MANAGEMENT AND ECOSYSTEM SERVICES GUIDEBOOK
Federal Agency Explorations and Applications: Case 7 (U.S. Forest Service)

An Ecosystem Services Approach to Management of a Complex Landscape: The Marsh Project

Tim Foley, Joe Bowles, Nikola Smith, and Pete Caligiuri



National Ecosystem Services Partnership

FEDERAL RESOURCE MANAGEMENT AND ECOSYSTEM SERVICES GUIDEBOOK
Federal Agency Explorations and Applications: Case 4 (U.S. Forest Service)

Sustaining Ecosystem Services across Public and Private Lands: The Cool Soda All Lands Restoration Proposal

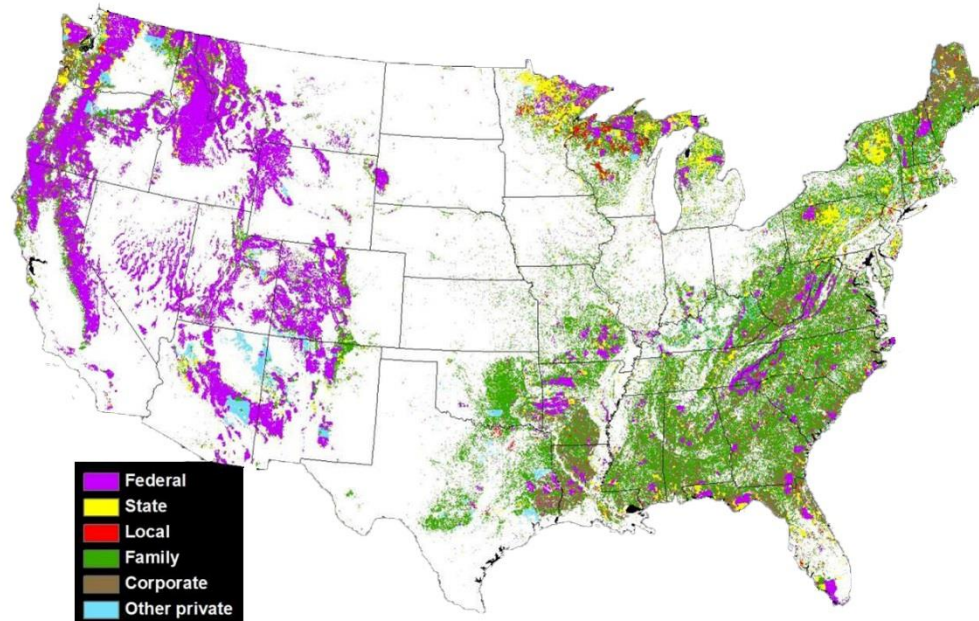
Nikola Smith



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





Partnering with States to Sustain Ecosystem Services on All Lands

“A sustainable forest land base requires relief from development pressures, an intact industry infrastructure, and **conservation incentives and markets that value working forests’ ecosystem services.**”

~ Washington State Forest Action Plan



Leadership in the South

- ❑ Tennessee estimates the value of its urban forests for improving air quality is over \$203 million annually
- ❑ Georgia determined that its forest industry employs 128,000 at an economic benefit of nearly \$29 billion
- ❑ USFS is assisting the Southern Group of State Foresters to standardize ecosystem service valuation across the region



for the greatest good

National Programming priorities and outcomes

- ✓ Where can restoration actions be most effective in ecological, social and economic terms?
- ✓ How can we minimize costs and tradeoffs?
- ✓ What is the American public receiving from these investments?



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Partnerships

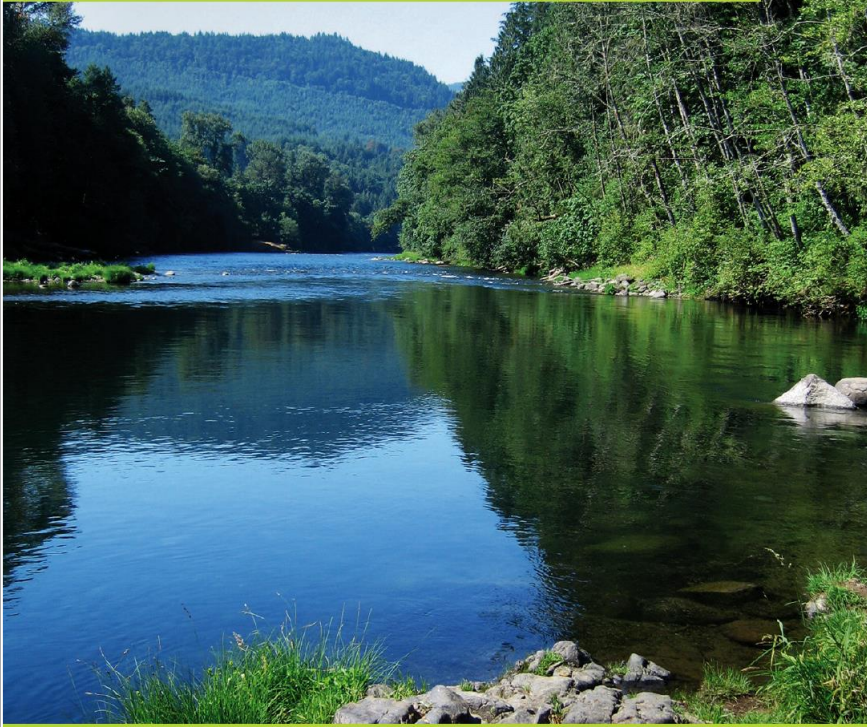
Connecting providers and beneficiaries of ecosystem services through partnerships and shared investments.

- Incentives for Private Landowners
- Damage Assessments
- Environmental Markets



Watershed Investment Partnership in Eugene, Oregon

Economic Analysis of the
Pure Water Partners Program



On average, each acre of healthy riparian forest protected through the program results in an **\$438 economic benefit per year**, with a **260% return on investment** over 20 years.

PREPARED BY

EARTH
ECONOMICS

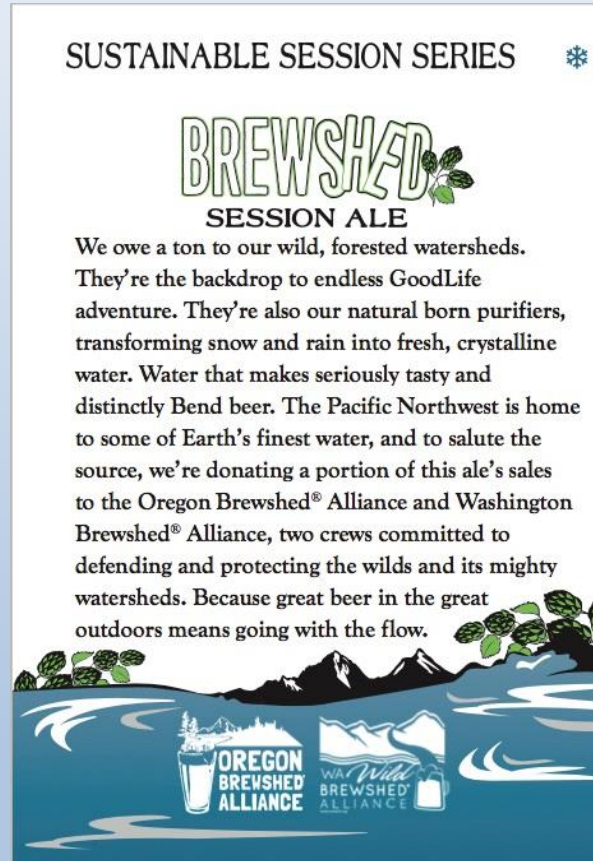
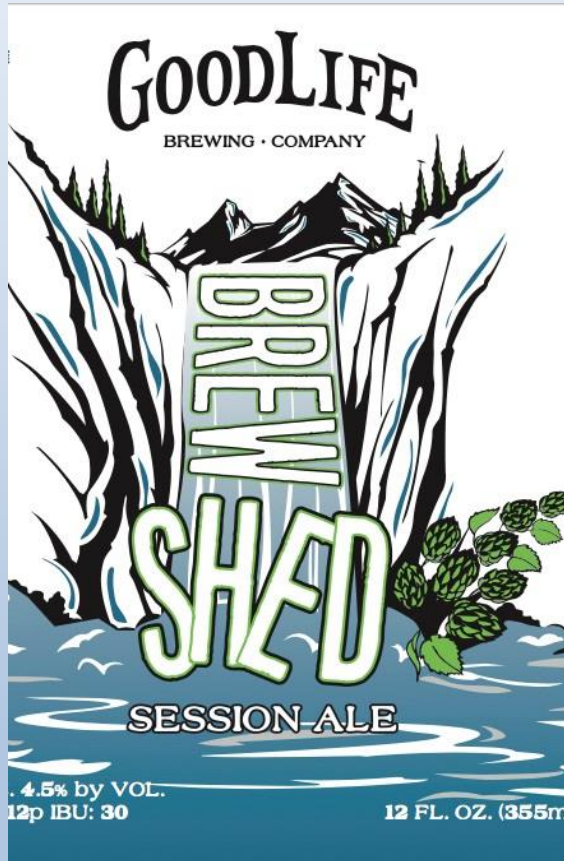
ecotrust

PREPARED FOR

EWEB

Private Sector Partnerships: Brewshed Investments

Deschutes National Forest, Oregon



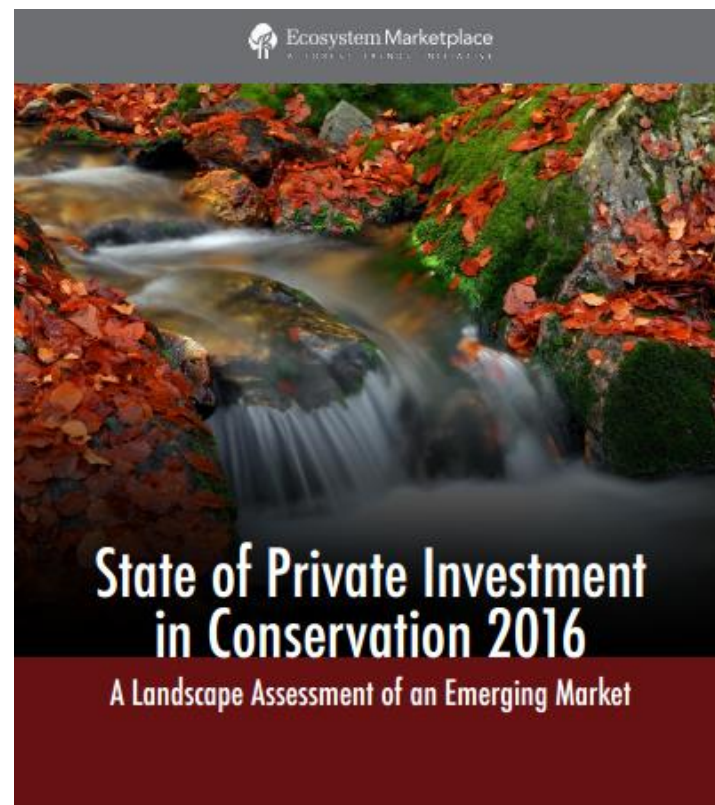
GREAT BEER *begins with*
CLEAN WATER



Leveraging Conservation Finance Opportunities

From 2004 to 2015, the private sector channeled **\$8.2 billion** of private capital into investments seeking measurable **environmental benefits in addition to financial return**

- ✓ Watershed investments
- ✓ Compensatory mitigation
- ✓ Corporate social responsibility
- ✓ Voluntary and regulatory carbon
- ✓ Voter initiatives



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Performance

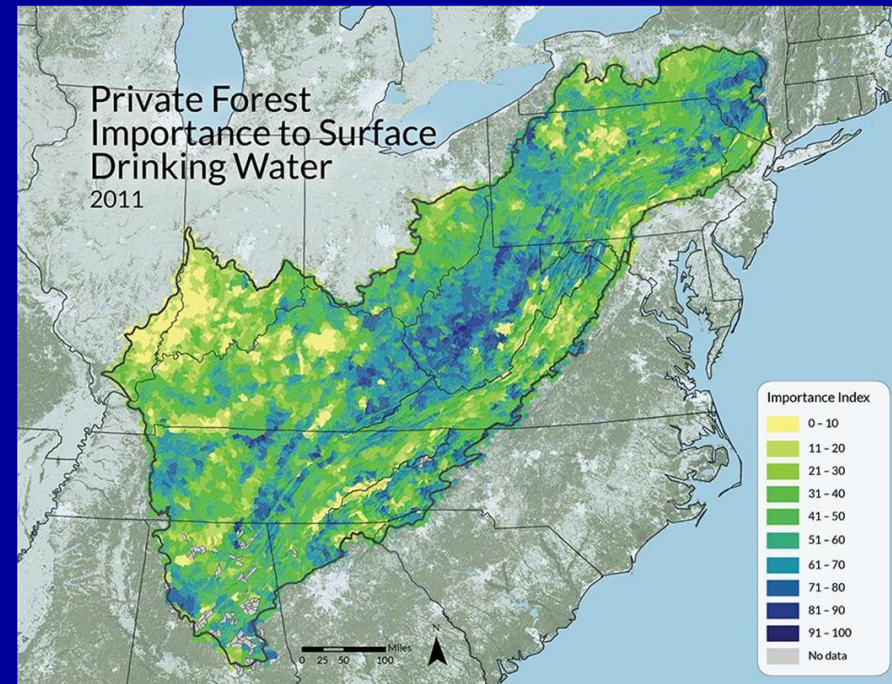
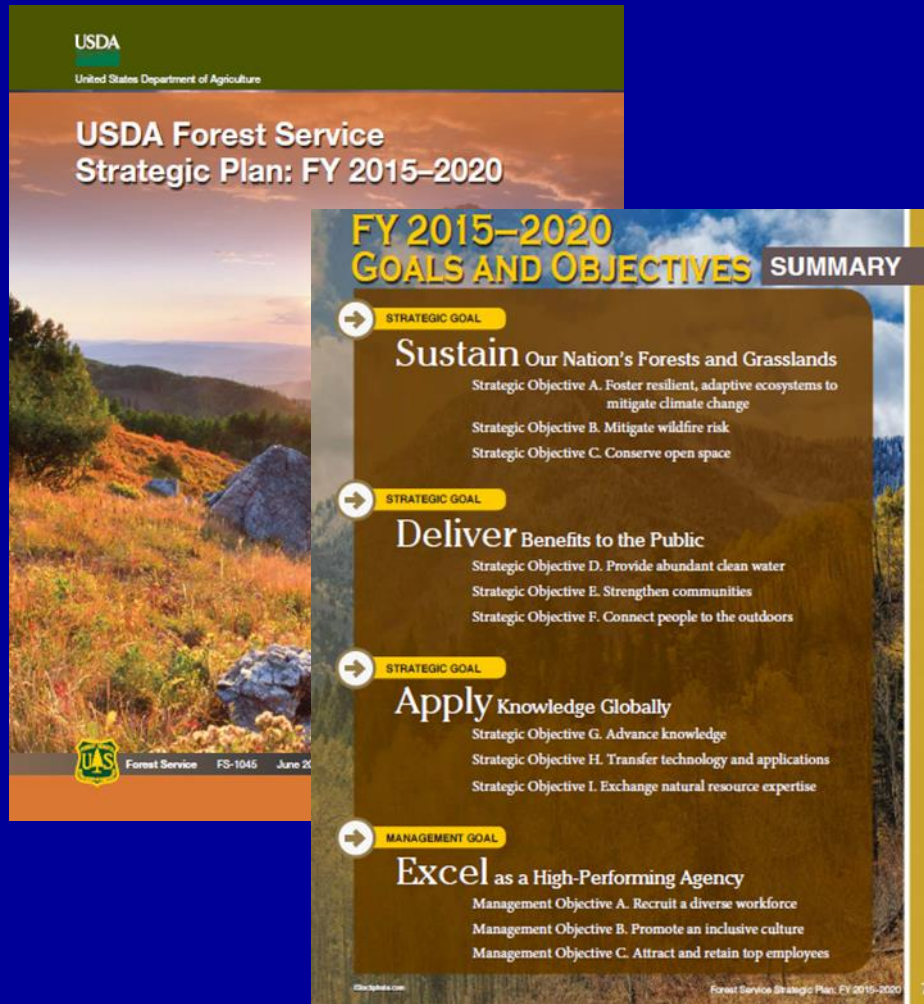
Quantifying and communicating the value of resources and impacts of management actions in terms of benefits to people

- National Assessments
- Performance Management
- Inventory Monitoring & Assessment



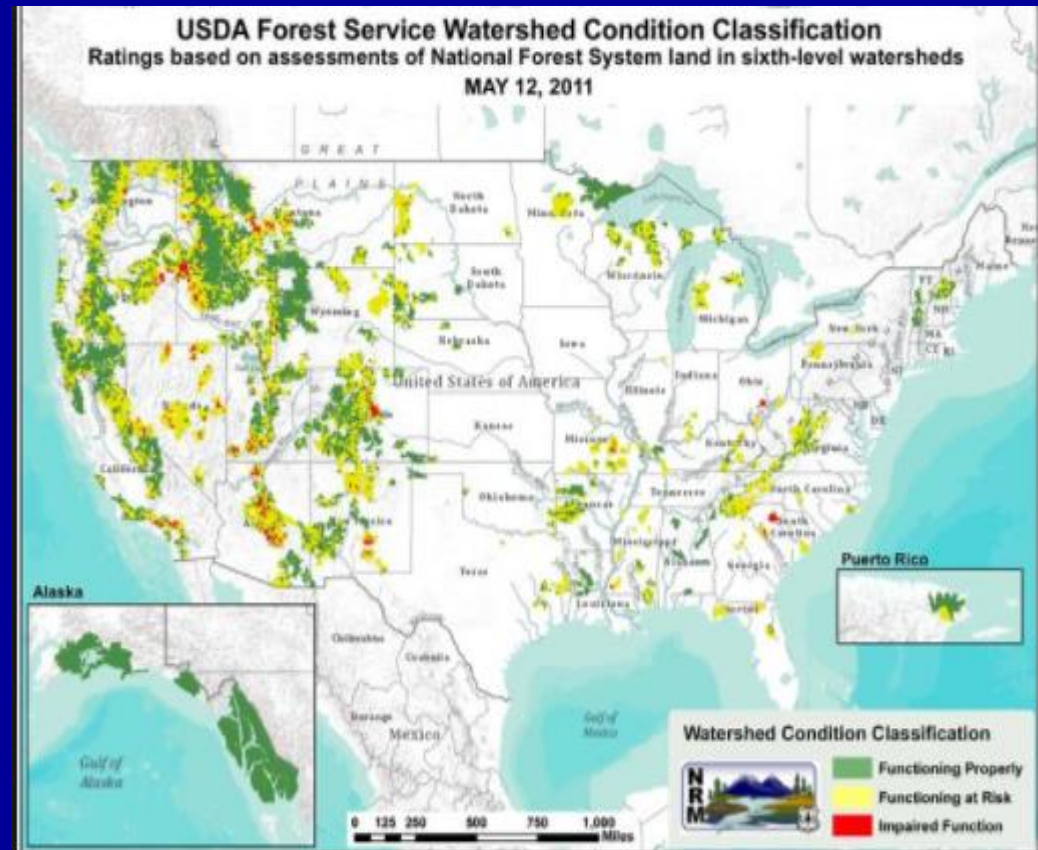
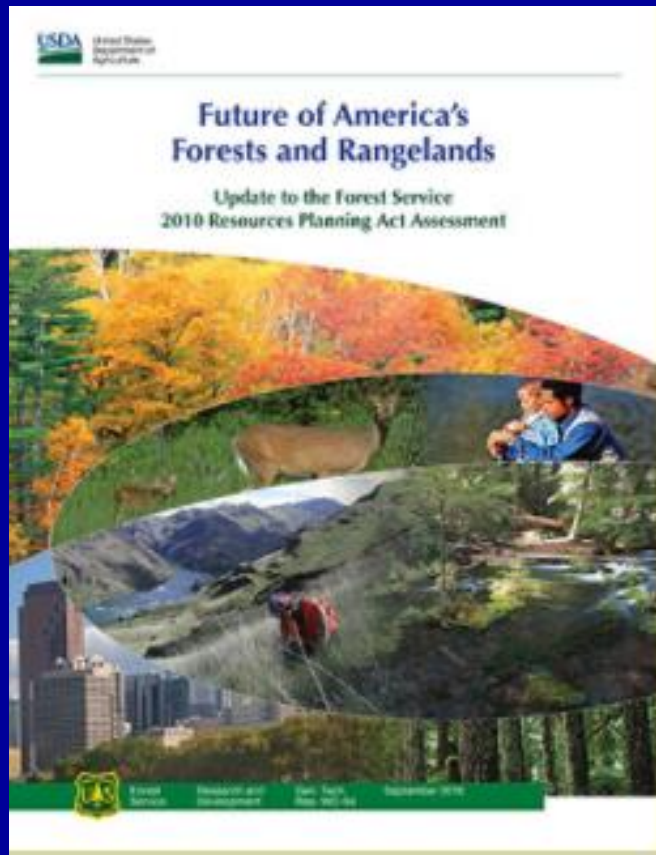
Performance Reporting

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



Performance Reporting

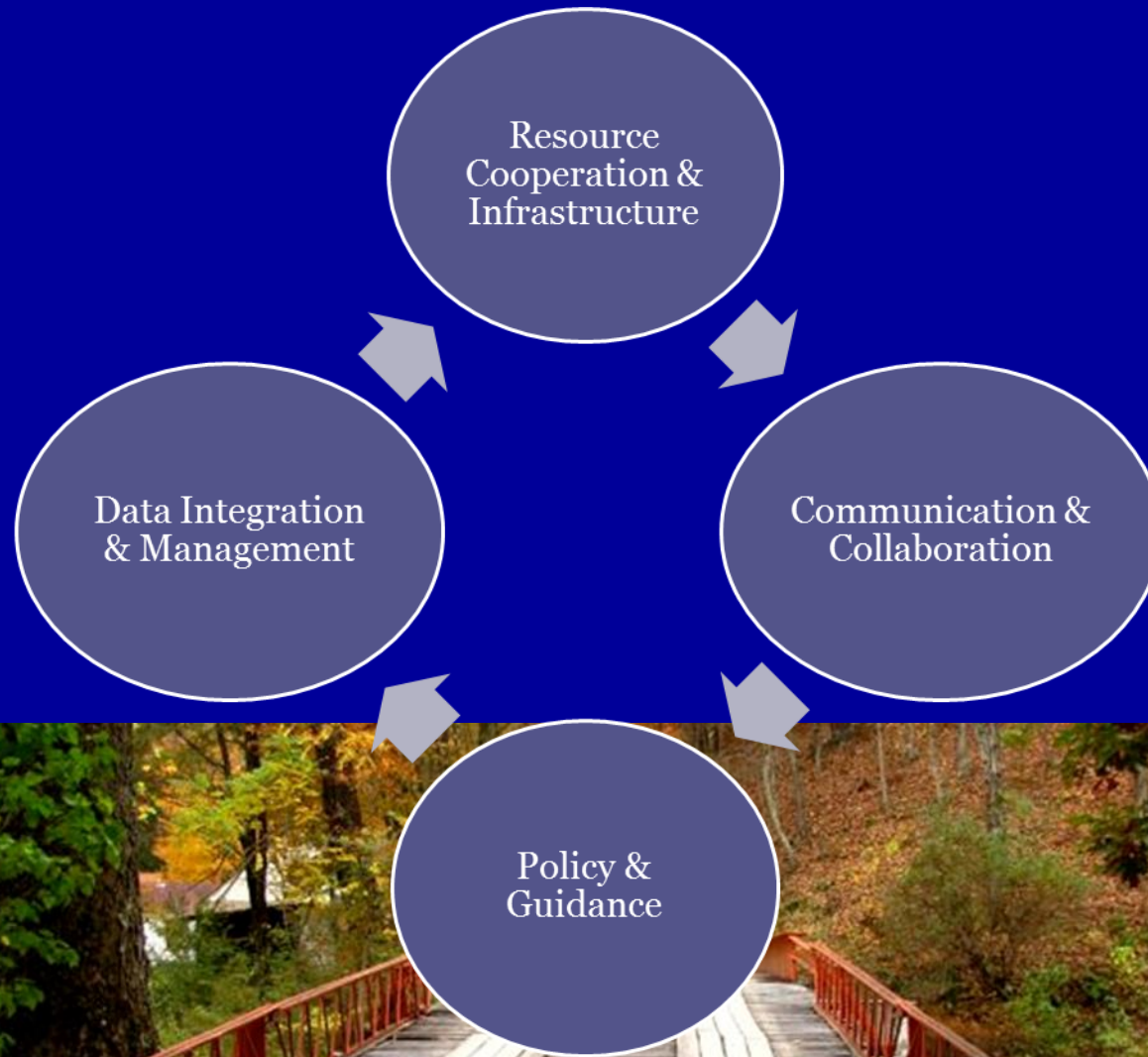
Creating standardized metrics & indicators that enhance national reporting, program management, and encourage third-party investment



Summary of Opportunities

- Ecosystem services **science** can help us analyze trade offs between management decisions and plan for continued public benefits at the landscape scale
- Ecosystem services **tools and methodologies** can help us quantify and communicate the impacts of Forest Service management
- Ecosystem services **concepts** can help us to build partnerships that connect providers and beneficiaries and invite diverse stakeholders to share in our agency's mission

Common Needs



Common Needs

Table 4—Core opportunities and needs for ecosystem services integration into U.S. Forest Service policy and operations

Opportunities	Needs											
	Resources and cooperation			Data			Communication		Policy			
	Staff capacity	Reference materials	Align funding, priorities	Metrics, performance, data	Valuation and mapping tools	Research strategy	Collaboration, partnerships	Communication strategy	Leadership signals	Strengthen policy	Clarify policy	Policy gaps
Consider ecosystem services approaches as a means to improve the transparency and success of analysis, decisionmaking, and priority setting.												
Forest planning	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
Project-level NEPA	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Program area priority setting	✓	✓	✓	✓	✓				✓			✓
State forest action plans	✓		✓	✓		✓			✓			
Quantify and communicate in terms of benefit to people through measuring, reporting, and outreach.												
National assessments		✓	✓	✓	✓	✓	✓	✓	✓			
Inventory monitoring and assessment	✓	✓	✓	✓	✓	✓	✓		✓			
Performance measurement	✓		✓	✓	✓	✓	✓	✓	✓			
Connecting providers and beneficiaries of environmental benefits and values through investments in ecosystem services.												
Incentives	✓		✓	✓	✓	✓	✓	✓	✓		✓	
Damage mitigation	✓	✓		✓	✓	✓	✓		✓	✓	✓	
Investment partnerships	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Environmental markets	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

NEPA = National Environmental Policy Act.

A changing political landscape...

- Tradeoffs, Decision-Making & Regulatory Streamlining
- Conservation Finance & Market-Based Solutions
- Metrics - Quantifying Outcomes
- Economic Valuation & Natural Capital
- Communications & Messaging

National Action Plan – 2017 & Beyond

Facilitate a Community of Practice

- Program/capacity mapping to identify strategically important points of contact
- Develop and refine a compendium of resources and continue monthly webinar series
- Develop internal training materials to foster greater understanding of ES & valuation in decision-making
- Liaise and build upon inter-agency foundation for Natural Capital



National Action Plan – 2017 & Beyond

Strategic Engagement with Leadership



National Action Plan – 2017 & Beyond

Strengthening Agency Communications



Context &
Background

Talking Points
& Statistics

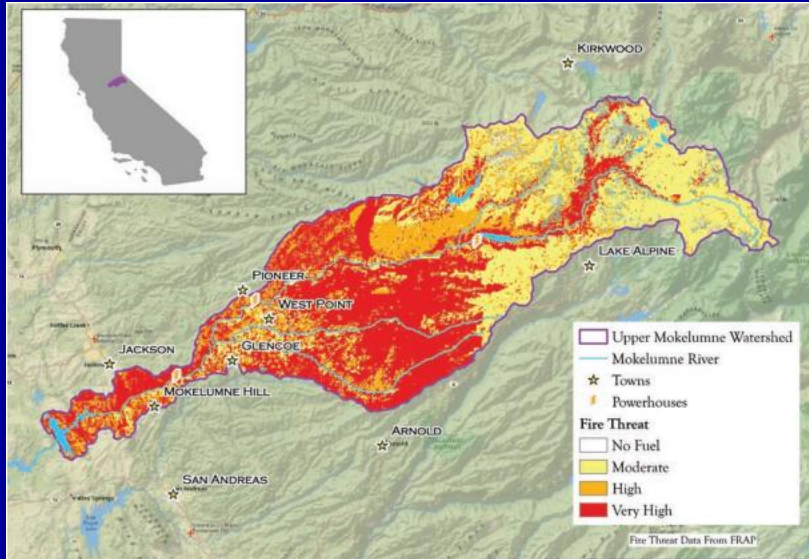


Q&A and
Case Studies

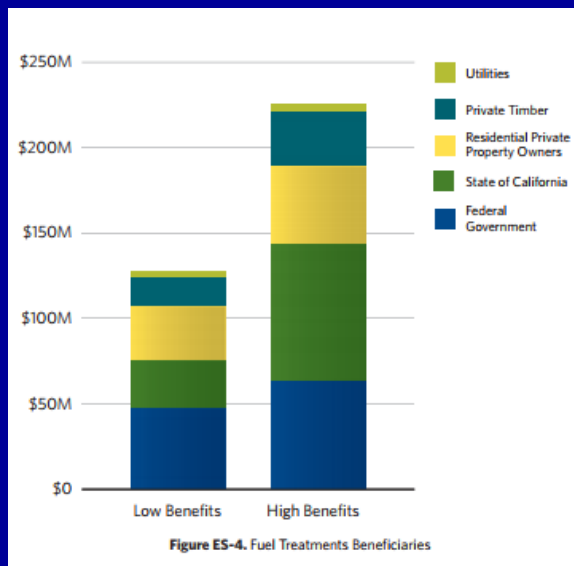
- Nature's Benefits narratives for Water, Air, Carbon, Soil, Fish & Wildlife, Forests-Food-Fiber, Energy, Recreation Access & Culture, Local Economies
- Update to Forest "Benefits" at a Glance
- Communications Framework in coordination with regional plans
- Website redesign

National Action Plan – 2017 & Beyond

Market-Based Solutions



- Mokelumne Avoided Cost Analysis
- Flagstaff Schultz Fire Analysis
- Denver Water Avoided Cost Analysis
- Pure Waters Partners Economic Analysis



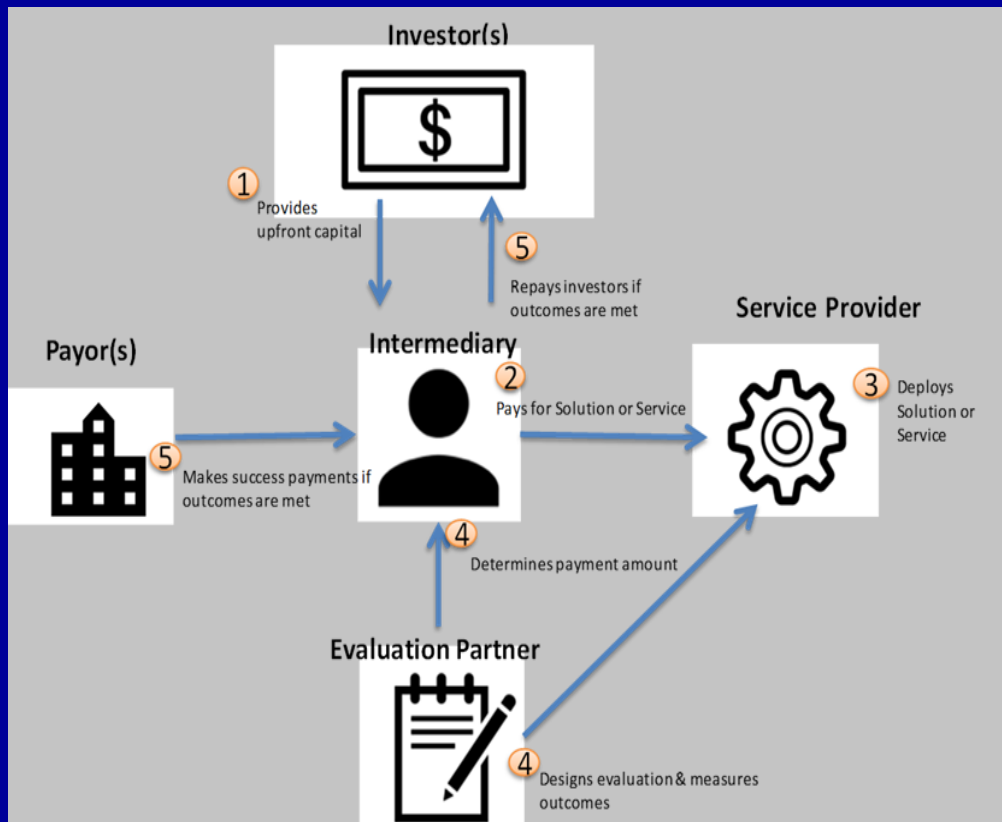
The Pay-for-Success Model

Does it make economic sense to increase investment in proactive forest management to reduce the risk of large, damaging wildfires?

National Action Plan – 2017 & Beyond

Market-Based Solutions

- Support pilot projects that enable innovative financing
- Watershed Investment Partnership toolkit

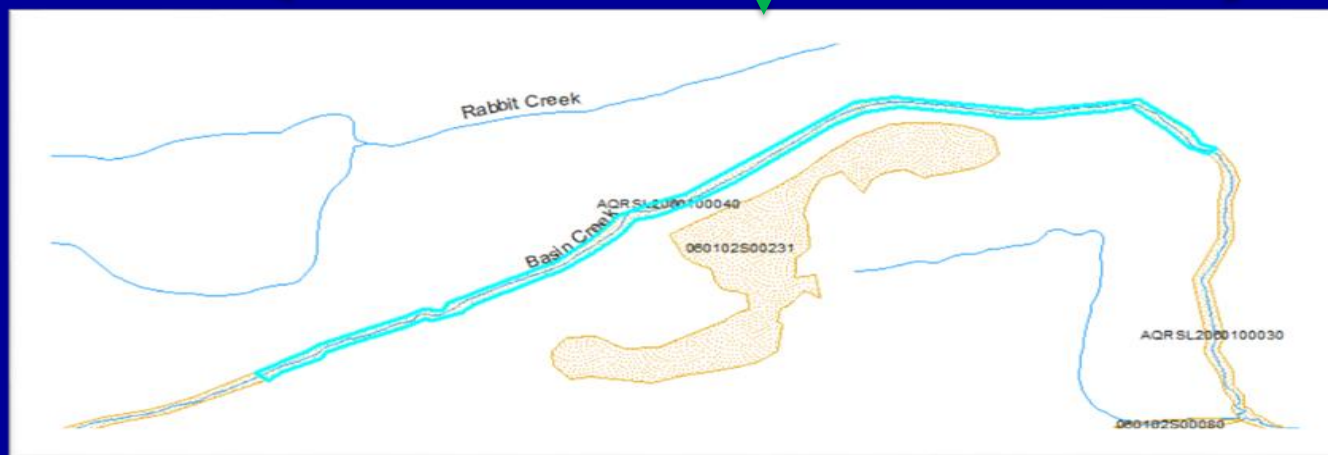
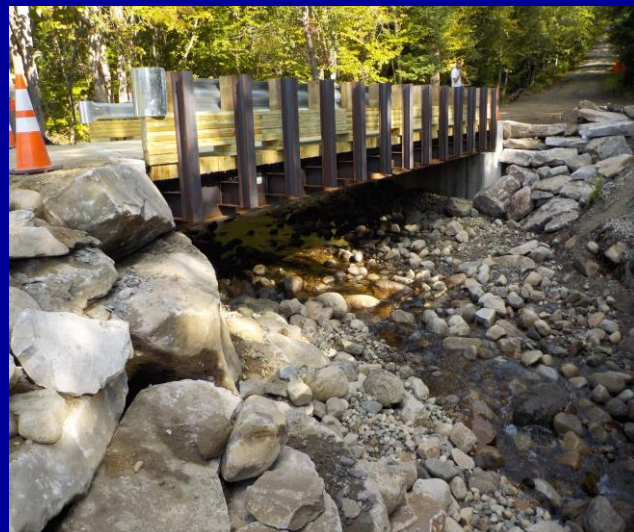


The Pay-for-Success Model

Does it make economic sense to increase investment in proactive forest management to reduce the risk of large, damaging wildfires?

National Action Plan – 2017 & Beyond

Quantifying Impact through Metrics



National Action Plan – 2017 & Beyond

Sharing Best Practices

You are here:

[Home](#)

Ecosystem Services Assessment Portal



Welcome to the USDA Ecosystem Services Assessment Portal, a collection of links to guides, databases, online tools, and downloadable software to help users identify, quantify, and value ecosystem services.

[All](#)

[Guidance](#)

[Mapping](#)

[Assessment](#)

Sponsorship

Ecosystem Services

Theme

- Any -

- Any -

- Any -

Apply

Title	Description	Sponsorship	Ecosystem Services	Theme	Matrix
A decision framework for identifying models to estimate ecosystem services gains from restoration	This report describes key characteristics of 13 tools that help to value ecosystem services.	Federal	General	General	Guidance
AGricultural Non-Point Source (AGNPS)	AGNPS is watershed model developed by the USDA Natural Resources Conservation Service that helps users to calculate changes in water and soil quality, outputting estimates of nitrogen, phosphorus, organic carbon, and several pesticides. In addition, the model calculates water and sediment yield by particle size class and source.	Federal	Provisioning services, Regulating and supporting services	Water, Habitat	Assessment
AgWa (Automated Geospatial Watershed Assessment)	AGWA is a GIS-based hydrologic modeling tool that estimates the hydrologic impacts of land-use change at the watershed scale. It is useful for estimating water runoff and erosion estimates.	Federal	Provisioning services, Regulating and supporting services	Water	Assessment
Air	Air is an application developed by the USFS that helps air resource managers analyze the effects of air pollution to resources managed by the Forest Service.	Federal	Regulating and supporting	Health	Mapping

Synthesis and Future Direction for NESST

- Moving from policy issues at national scales to Forest scale application of ecosystem services concepts.
- Need some additional examples of how Forests will be applying ecosystem services (e.g. USFS Planning Rule).
- Applications of ecosystem services at project scales.
- NESST team may be involved in trainings, workshops and webinars to get expertise out to the field.

Example: USFS R5 Ecosystem Services Framework

- **Coordinate Integration of Forest Benefits**
 - Regional Leadership and Program Priority Setting
 - Forest Management Plans and NEPA
 - Coordination with State Initiatives/Programs
- **Quantify and Communicate the Value of Resources and Impacts of Management Actions in Terms of Benefits to People**
 - Standardize Tools for Valuation of Benefits
 - Compile and Complete Connective Data and Narratives
 - Create Communication Tools and Messages
- **Connect Providers and Beneficiaries of Ecosystem Services**
 - Collaborative Frameworks and Authorities
 - Demonstration Projects
 - Outreach Initiatives and Communication Products

Regional Leadership and Program Priority Setting

- **Regional Leadership Goals** to increase agency relevancy by connecting the public to how their lives are made better by benefits received from our National Forests, and to
 - Incentivize citizen-stewardship, volunteerism, and restoration investment
- **ES Steering Committee** formed to provide broad guidance for communications, integration of work, and access to senior-level thinking and strategy.
 - Comprised of RO and NF leadership, meets quarterly
 - Identified initial priority Benefits to focus on – Water, Carbon, Local Economies
 - As leadership solidifies its thinking around its strategy, the R5 Regional Leadership Team from all 18 Forests will likely be asked to provide thoughts on engagement in this effort.
- **Dedicated staff** at RO to advance and coordinate **Ongoing** and New Ecosystem Service Programs
 - 1 full-time RO specialist reporting to Regional Forester team, focusing on coordination of program, communication strategies and products
 - 1 part-time RO specialist in State and Private Forestry focusing on coordination of program, data/analysis coordination and state initiatives

Standardize Tools for Valuation of Benefits

– Water Example:

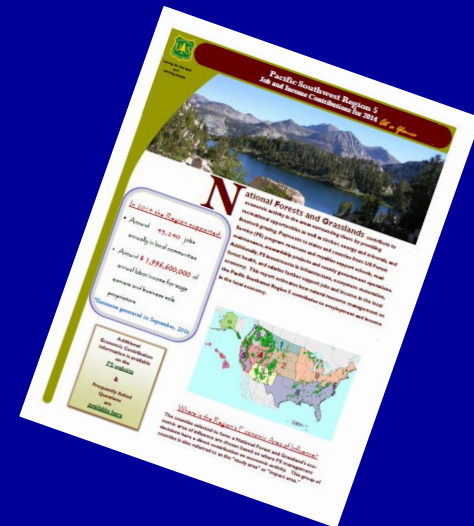
- Quantity from NF: Using mean water supply information (T. Brown 2016)
 - 34million acre feet annually from R5 NFs
 - 50% of CA's water supply
 - Enough for entire US population for 115 years!
 - Have estimated quantity by NF; Valuation ongoing
 - Tracking various project and research metrics (BFC, SoCal, etc)

– Carbon Example:

- WO OSC Carbon work
- FIA and CA on annual inventories;
- Adapting for SoCal Forests;
- Project level GGRF calculations

– Local Economies Example:

- Using At a Glance info as baseline #s



Nature's Benefits Demonstration Projects

➤ Coordinate with Ongoing Research Projects

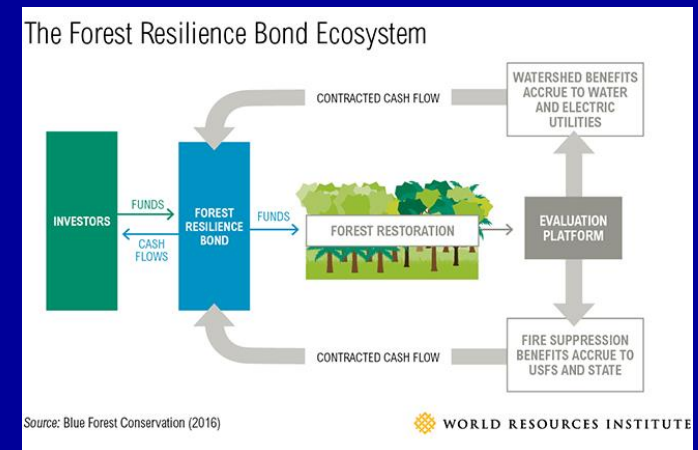
- Coordination with PSW; University research
- SoCal Ecosystem Service Project
- State Meadow Carbon Research

➤ Tapping into Existing Markets

- Compensatory Mitigation
- Voluntary Carbon
- GGRF (State Carbon Grants)

➤ Develop and Follow Innovative Upstream/Downstream Finance Mechanisms

- Exploring private financing - eg: Forest Resilience Bond & Blue Forest Conservation
- Good Neighbor and Stewardship Agreements
- Other Regional successes and NESST



Questions and Discussion



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