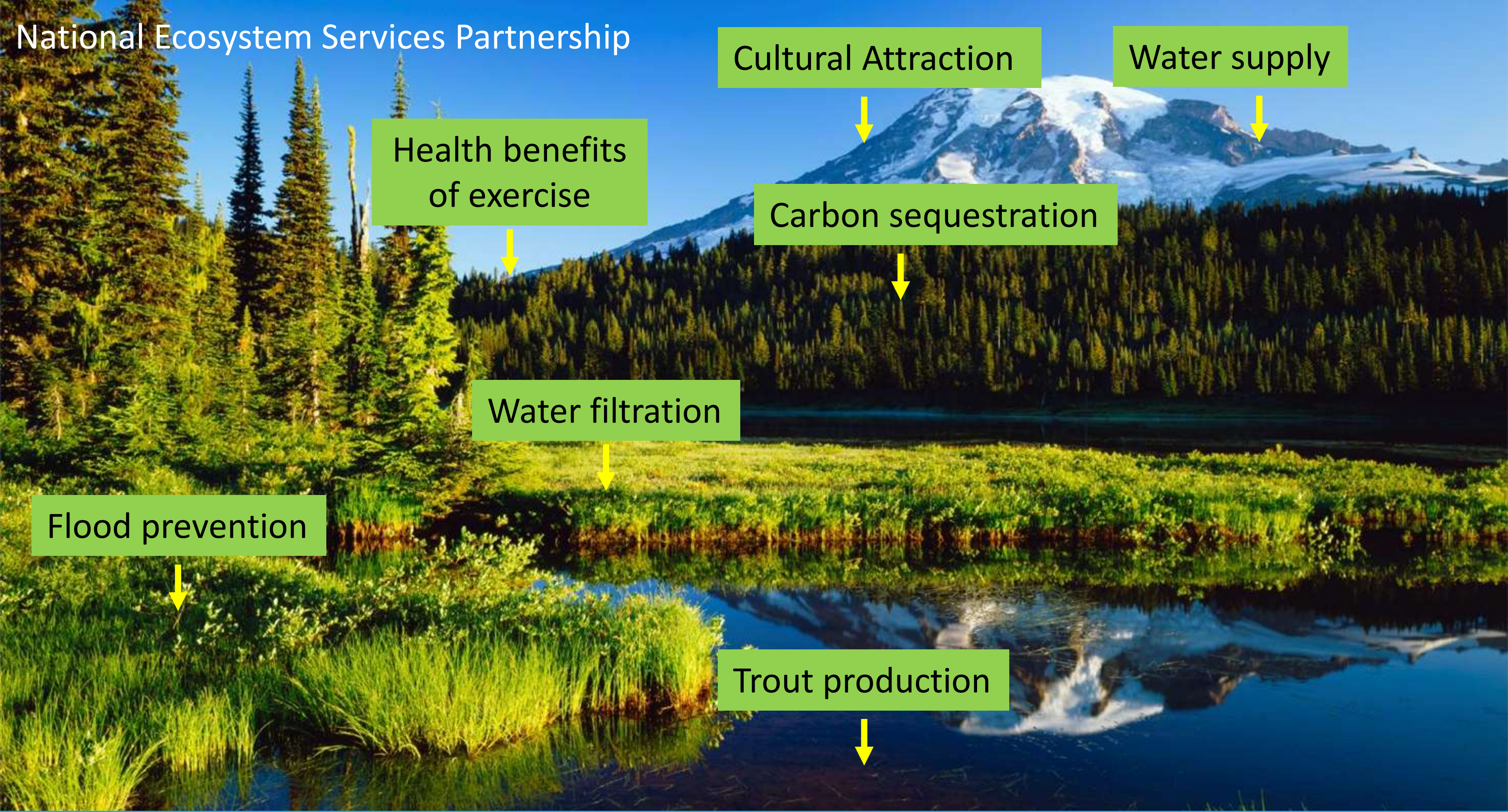
National Ecosystem Services Partnership



A proposal for generating consistency when incorporating non-value based measures of ecosystem services into decision making

Lydia Olander, Dean Urban, Robert J. Johnston, George Van Houtven, and Jimmy Kagan

Presented at ACES 2016, Jacksonville FL

Overview

1. Introduction
2. Why consistency is needed in decision making
3. Current inconsistencies
4. How we move toward consistency
   - Consistency in what services are selected
   - Consistency in what indicator and measures are used
5. Would using ecosystem services classification systems be helpful?
6. Next Steps


National Ecosystem Services Partnership

Policy Brief 16-01
November 2016

www.nicholasinstitute.duke.edu/nesp

Proposal for Increasing Consistency When Incorporating Ecosystem Services into Decision Making

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Introduction

What Are Ecosystem Services?

https://nicholasinstitute.duke.edu/sites/default/files/publications/nesp_pb_16-01.pdf

Introduction

CONTEXT –

EOP 2015 memo "Incorporating Ecosystem Services into Federal Decision Making" called for development of federal guidance

QUESTION –

How can consistency in the use of ecosystems services in decision making be achieved?

October 7, 2015

M-16-01

MEMORANDUM FOR EXECUTIVE DEPARTMENTS AND AGENCIES

FROM: Shaun Donovan, Director
Office of Management and Budget

Christina Goldfuss, Managing Director
Council on Environmental Quality

John Holdren, Director
Office of Science and Technology Policy

SUBJECT: Incorporating Ecosystem Services into Federal Decision Making

Overview. Nature provides vital contributions to economic and social well-being that are often not traded in markets or fully considered in decisions. This memorandum provides direction to agencies on incorporating ecosystem services into Federal planning and decision making. (Broadly defined, ecosystem services are the benefits that flow from nature to people, e.g., nature's contributions to the production of food and timber; life-support processes, such as water purification and coastal protection; and life-fulfilling benefits, such as places to recreate.)

Specifically, this memorandum:

(1) Directs agencies to develop and institutionalize policies to promote consideration of ecosystem services, where appropriate and practicable, in planning, investments, and regulatory contexts. (Consideration of ecosystem services may be accomplished through a range of qualitative and quantitative methods to identify and characterize ecosystem services, affected communities' needs for those services, metrics for changes to those services and, where appropriate, monetary or nonmonetary values for those services.)

(2) Sets forth the process for development of implementation guidance and directs agencies to implement aforementioned policies and integrate assessments of ecosystem services, at the

Which ES and effected populations? Context Matters

Englewood Ohio Reserve
Dam Removal

Why is consistency needed?

- Comparing projects, actions, plans or programs
- Tracking progress over time
- Coordinating with partners
- Streamlining application (**not** reinventing the wheel)
- Scaling up (**not** ideal)

Inconsistencies that need to be addressed

1) Inconsistency across decision contexts

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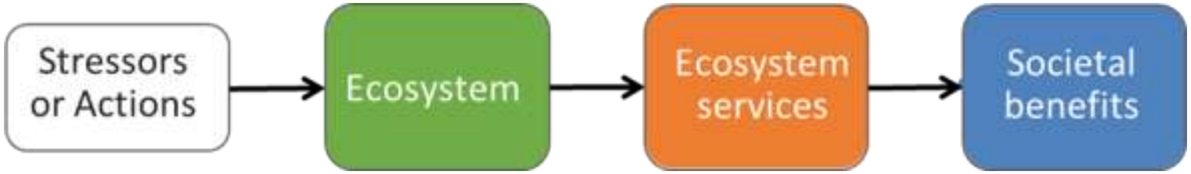
1) Inconsistency across decision contexts

- Solution – common elements in conceptual models



"**A conceptual models** is a simplified visual representation and written description of interactions among natural, social, and economic systems that affect or are affected by identified actions. Such documentation helps analysts and the public clearly understand how ecosystems contribute to the provision of services" - *From the Principles, Requirements and Guidelines, Chapter 3 Interagency Guidelines, Section 7 Content of Analysis as an example a step-by-step process for identifying and valuing ecosystem services.*

2) Inconsistency in indicators

Inconsistencies that need to be addressed

1) Inconsistency across decision contexts

- Solution – conceptual models

2) Inconsistency in indicators

- Solution – Benefit Relevant Indicators (BRIs) or linking indicators

Moving toward consistency

We propose that:

1. using a common set of **conceptual models** will increase consistency in the selection of services for assessment in a specified decision context and
2. selecting a common set of **benefit relevant indicators (BRIs)** can a help in selection of common measures

Why not use monetary valuation to provide consistency?

Monetary metrics

- use common units – dollars
- can provide comparable measure of value even if underlying services are different if…

However…

problem 1 – there can be inconsistencies in how valuation implemented

  - best if the selection of what is valued and approach for how it is valued is as consistent as possible –conceptual model can help with this too.

Problem 2 – it is difficult to value many important services. So….

The question then becomes ***how best to generate consistency in the selection and use of these "non-value based" measures*** *– what we call BRIs*

How to do this…

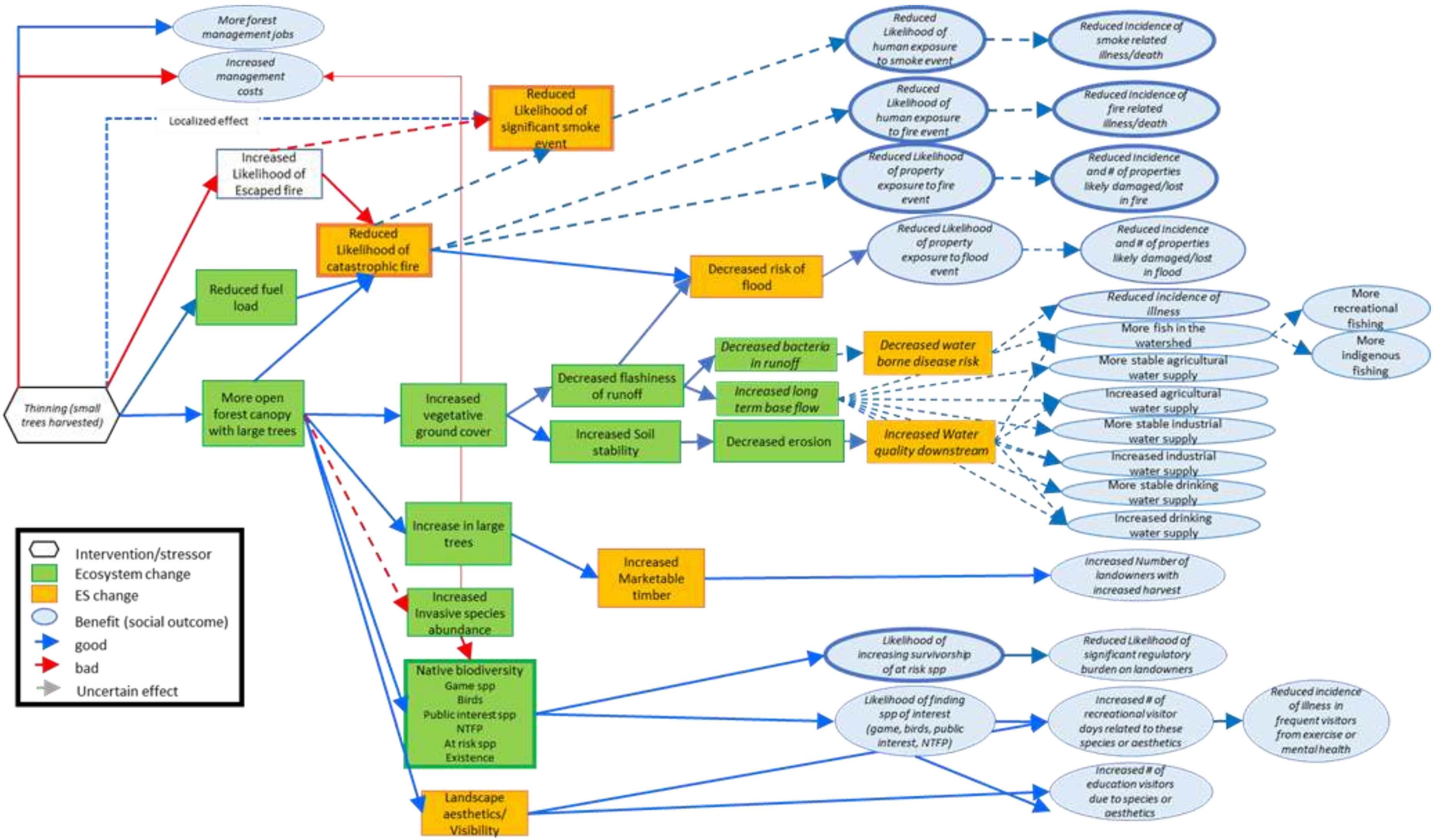
1. Know decision context
2. Identify typical/common goals and actions used to achieve them
3. Develop a conceptual diagram for each action
4. Select a set of ecosystem services found on these diagram across sites/decisions that are significantly affected by the decision or that are significant to effected communities
5. Identify an indicator (BRI) for each ecosystem service that should work across sites/applications.

National Forest Management Planning

Typical goals and actions for national forests

Goal	Actions
Fire risk reduction (reduce frequency and severity)	Thinning, prescribed burns, chemical treatment
Wildlife support	Habitat restoration, road removal
Timber production	Harvest, thinning, replanting
Drinking water provision	Fire suppression, riparian zone management, thinning to reduce evapotranspiration
Healthy forest system	Invasive species and pest management
Increase recreational opportunities	Improving access (paths, docks), improving viewsheds or siting opportunities.

Conceptual model for forest thinning scenario (one management alternative) for fire risk reduction in western US forests.



Initially developed at a workshop hosted by Heather Tallis, Eddie Game and Lydia Olander, with significant contributions from Jimmy Kagan. Refined at a second workshop with support from Sara Mason.

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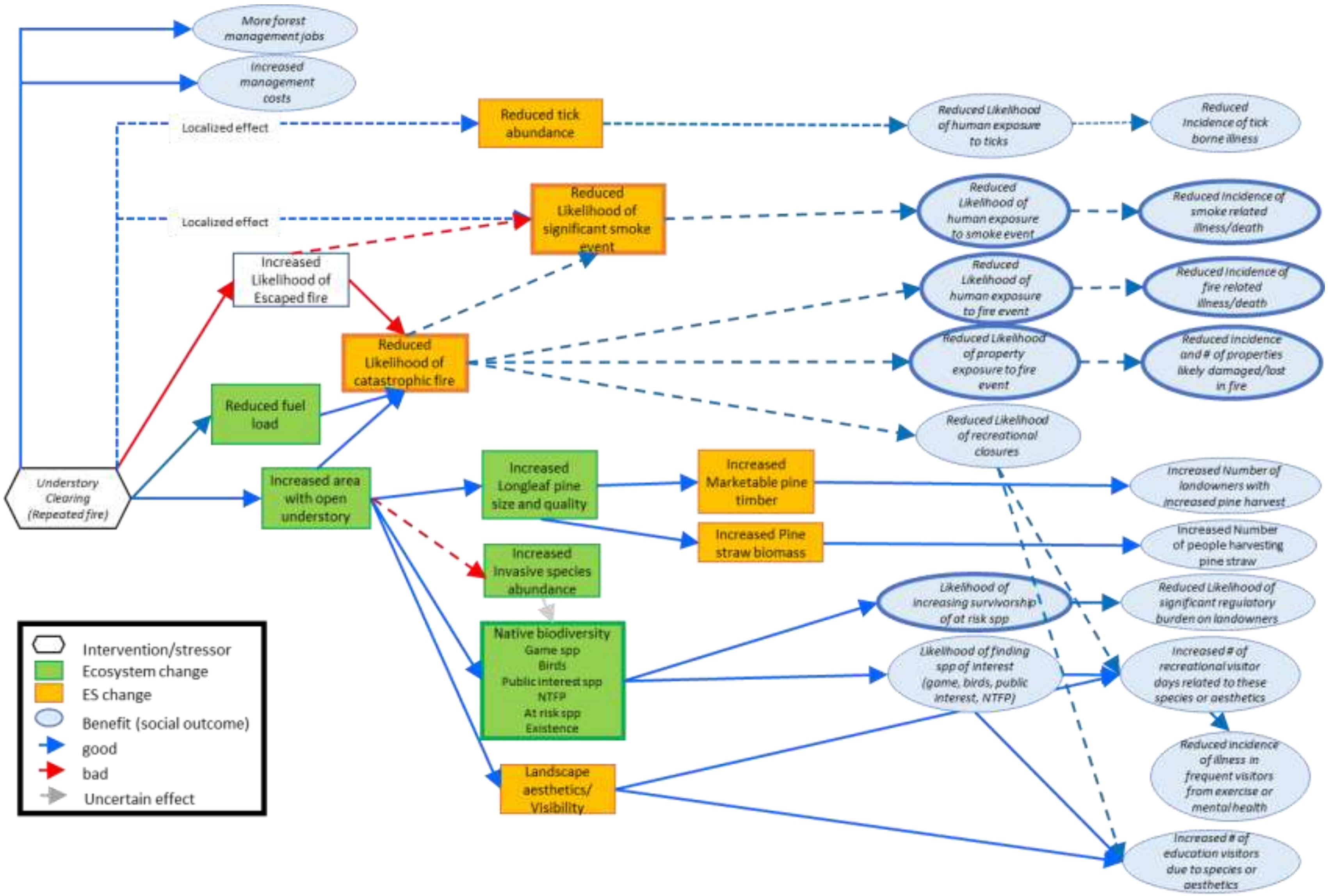
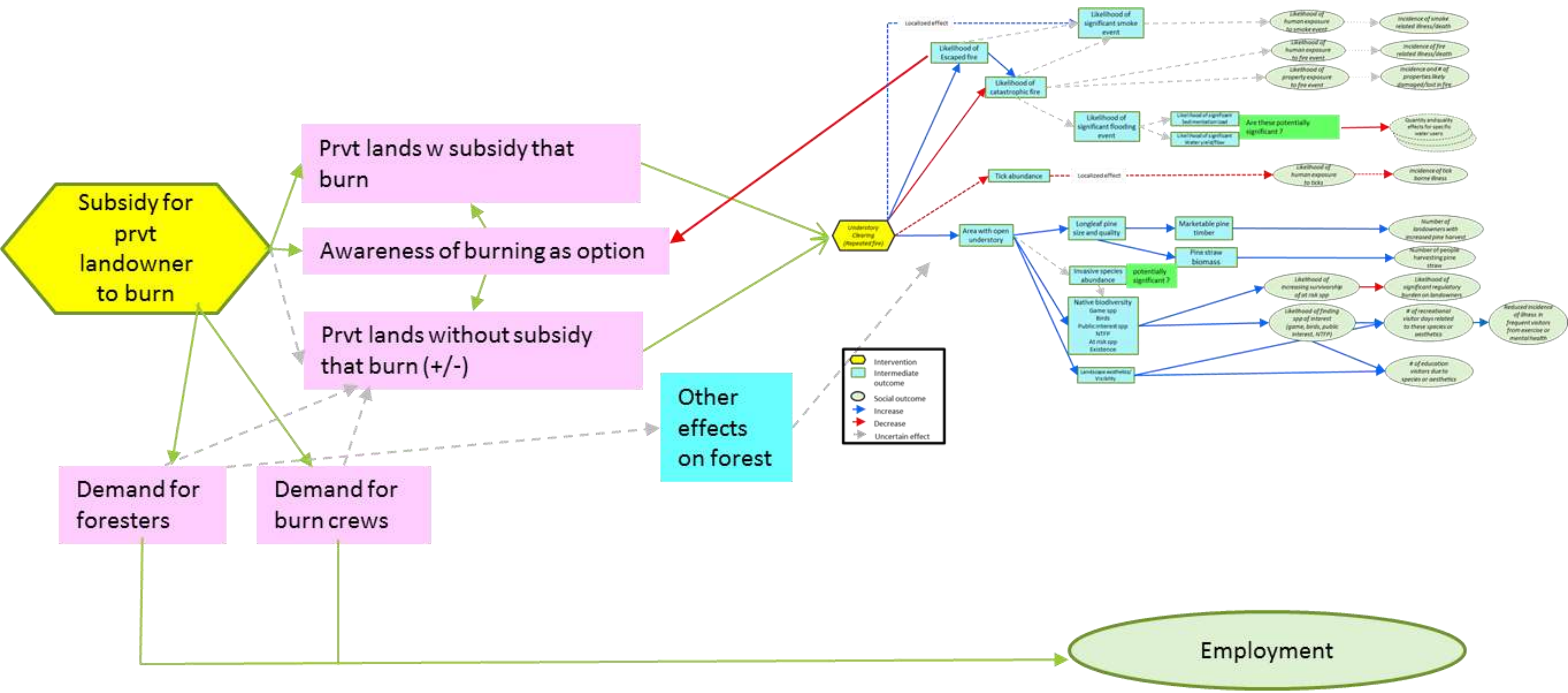
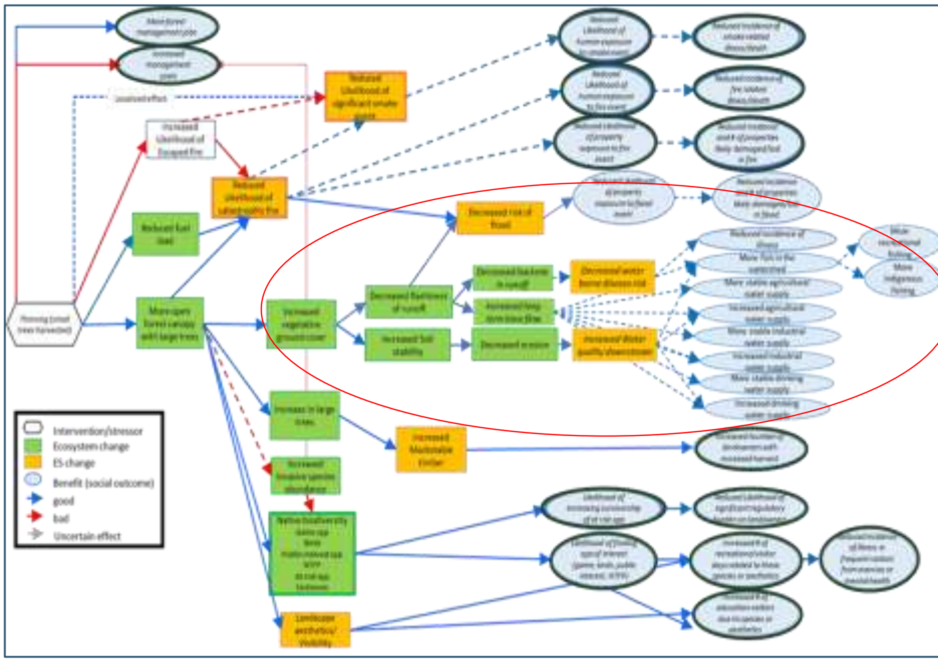
Conceptual model for understory clearing by prescribe fire for improved health of eastern US long leaf pine forests

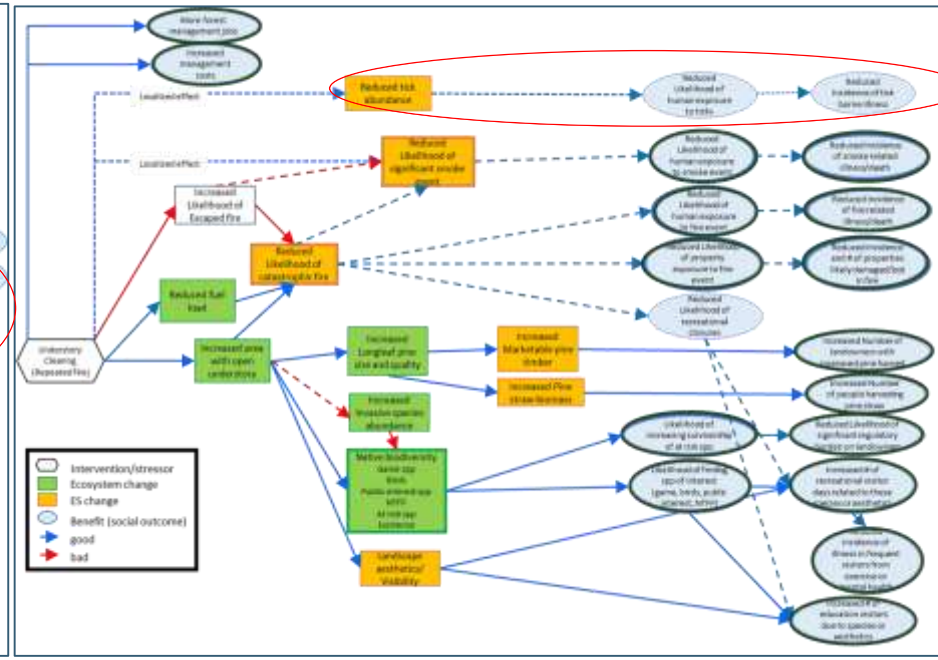


Adding programs to encourage prescribed burning on private forest lands will be needed for Eastern Forest Management



Common elements across conceptual models





Non-value based ecosystem services measures (BRIs) from conceptual maps for Western fire management alternatives and eastern fire management.

Benefit Relevant Indicators (assessing change in the following indicators)	Possible units	Common measure?	
		West – alt management	East Long leaf Pine
Incidence of fire related death in fire prone areas	Liklihood of and number of deaths from fire relative to the density of people and scale of the fire prone area each year.		
Flood related property damage in watershed of forest fire	Likelihood of # of homes lost or significant damaged from fire related flooding to the density of homes and scale of the fire prone area each year in the affected watershed.		
Population viability of widespread important wildlife species 1 for hunting	Population viability of specific species in fire prone area (over specified time period)		

Dark green indicates the same measure could be used across contexts

Light green suggests the category would be the same but the specific measures may differ (e.g., due to different species of importance)

White indicates the measure is only relevant in one context.

Would using an ecosystem services classification systems or human well being endpoints improve consistency?

Intervention → Action → Resulting effects → Outcomes → Human Welfare

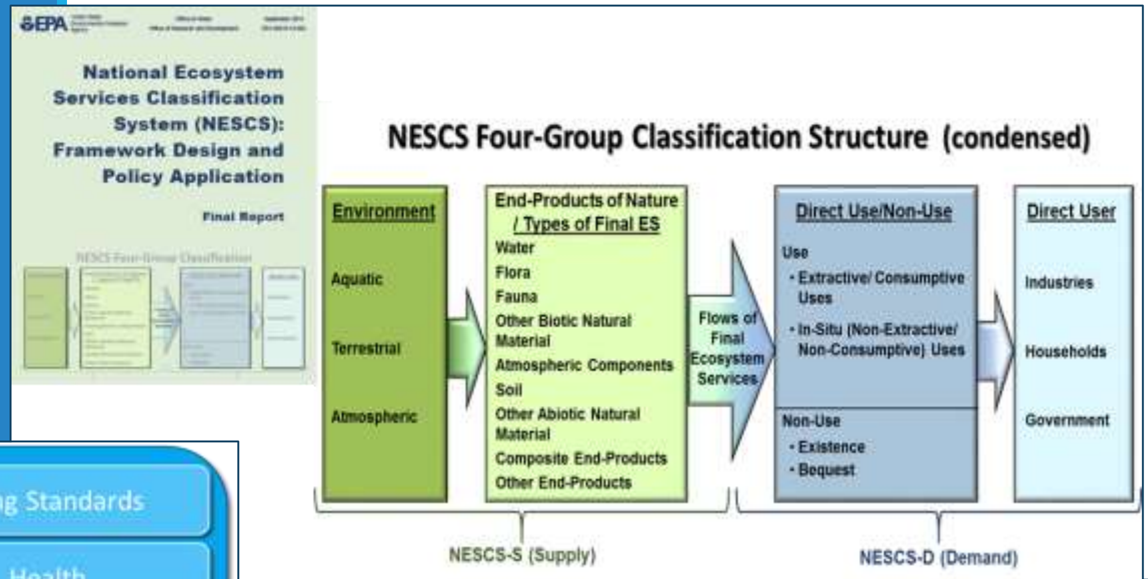
Outcomes

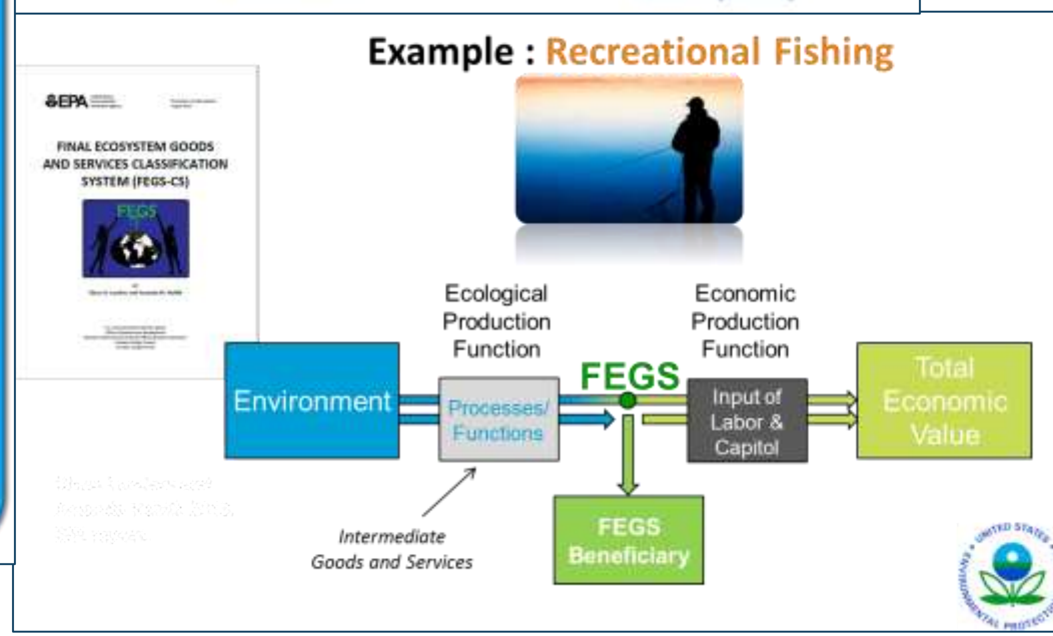
- Direct and environmentally mediated effects of the action (cascade)
- End with benefit relevant indicators; FEGS; things that can be valued

Human Welfare

- Economic implications
- Effects on critical players (e.g., landowners)
- Other well being endpoints
- Equity

Existing frameworks





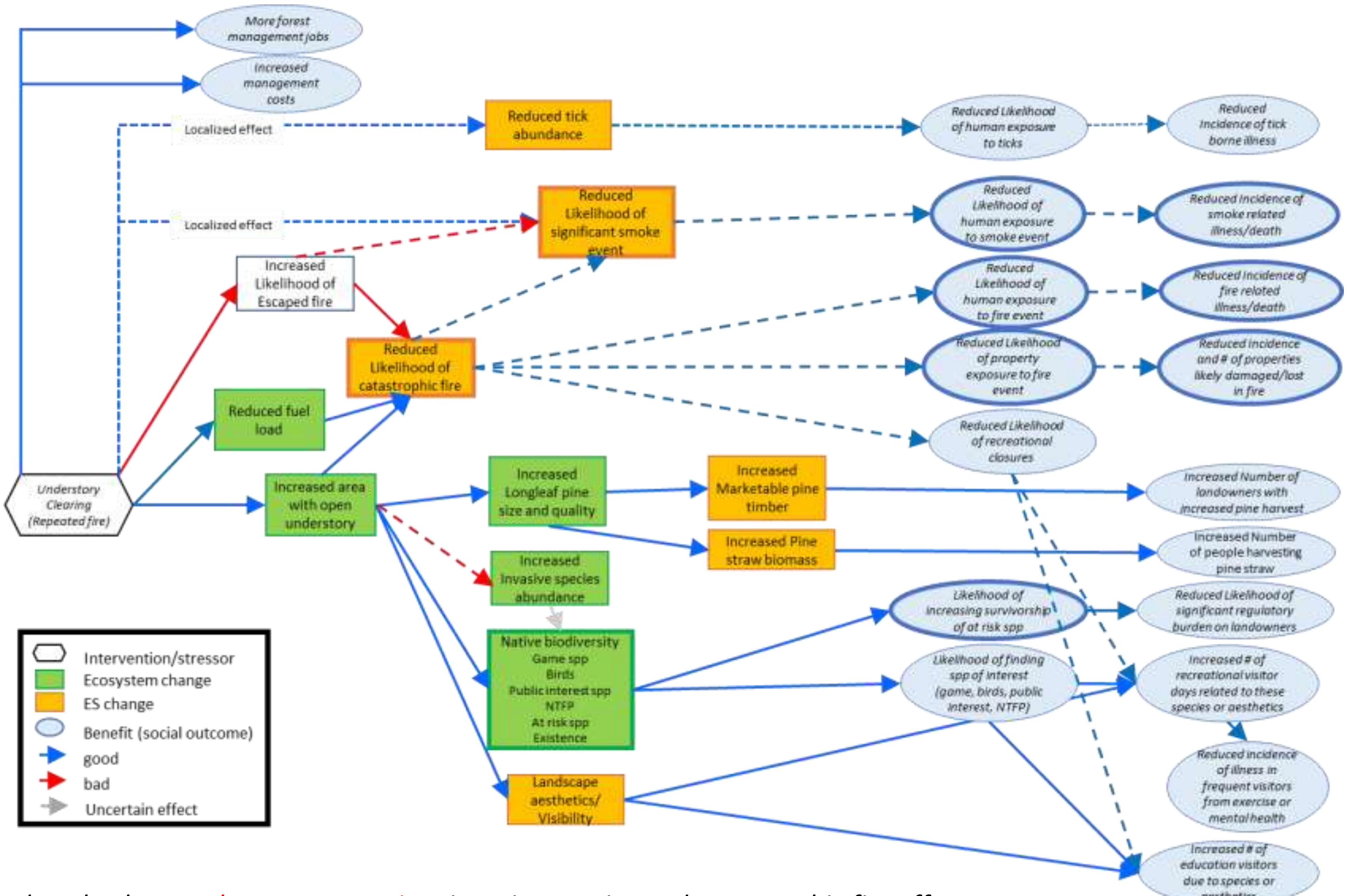
User caution and judgement will always be required

Next Steps

Pilot testing in partnership with agencies

- USGS/CEQ with NOAA and BLM
- EPA testing classifications with NPS and others

NEXT STEP- Incorporating evidence



? - Need to check on carbon sequestration, invasive species and catastrophic fire effects on water

Not fully vetted – workshop version

Literature review:
Is the change in carbon sequestration or storage important?

US FOREST SERVI
Treese
Title: Modeling the ef
Author: Gonzalez-Be John; Anderson, P.H.;
Date: 2015
Source: Forest Ecolo
Publication Series:
Description: Assessr assess the effects of s simulate in situ C poo the impacts of both th yield model with curre transportation and sil Thinning reduced C se reduced average C sto pine (Pinus elliottii En sequestered more C. year rotation slash pi for developing testabl management.

rch
View PDF (1.0 MB byte)
eveloped a hybrid model to in the southeastern U.S. To and explicitly accounts for ducts from the growth and s for C emissions due to d by rotation length. ducts. Prescribed burning e C dynamics with slash ble rotation, slash pine leaf pine and unthinned 25- vides an important new tool g future longleaf pine

JOURNAL OF SUSTAINABLE FORESTRY
http://dx.doi.org/10.1080/10549811.2016.1154471
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Taylor & Francis Group

BERLYN REVIEW

A meta-analysis of management effects on forest carbon storage

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ABSTRACT
Forest management can have substantial impacts on ecosystem carbon storage, but those effects can vary significantly with management type and species composition. We used systematic review methodology to identify and synthesize effects of thinning and/or burning, timber harvesting, clear-cut, and wildfire on four components of ecosystem carbon: aboveground vegetation, soil, litter, and deadwood. We performed a meta-analysis on studies from the United States and Canada because those represented 85% of the studies conducted worldwide. We found that the most important variables in predicting effect sizes (ratio of carbon stored in treated stands versus controls) were, in decreasing order of importance, ecosystem carbon component, time since treatment, and age of control. Management treatment was the least important of all the variables we examined, but the trends we found suggest that thinning and/or burning treatments resulted in less carbon loss than wildfire or clear-cut. This finding is consistent with recent modeling studies indicating that forest management is unimportant to long-term carbon dynamics relative to the effects of large-scale natural disturbances (e.g., drought, fire, pest outbreak). However, many data gaps still exist on total ecosystem carbon, particularly in regions other than North America, and in timber production forests and plantations.

KEYWORDS
Ecosystem carbon; fuel reduction treatment; harvest; plantation; prescribed fire; wildfire

Using existing models..