



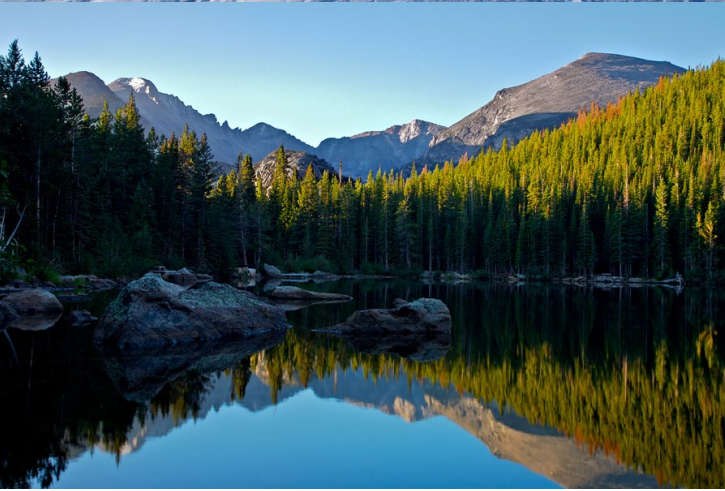
Accounting for the Benefits of Public Lands

Science You Can Use
April 6, 2022

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National Ecosystem Services Strategy Team (NESST)
National Ecosystem Services Partnership





Ecosystem Services Toolkit:

Moving to statements of need to work on the ground.

- Accessible and management-relevant tools and data
- Catalogue resources for forest managers

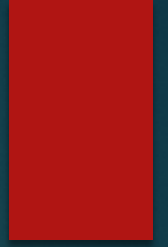
<https://nicholasinstitute.duke.edu/project/ecosystem-services-toolkit-for-natural-resource-management>

National Ecosystem Services Strategy Team (NESST)

- Associate Deputy Chiefs chartered the National Ecosystem Services Strategy Team (NESST) in 2013 and rechartered in 2016..
- NESST was established to:
 - Collaboratively develop national strategy and policy around ecosystem services and...
 - Integrate them into Forest Service programs and operations.

Why an ecosystem services approach to management?

1. Recognizing that **nature has value**, not putting a value on nature
2. **Enhances and expands on multiple use** - Allows forests to value traditional commodities like timber and drinking water, as well as values that are difficult to monetize such as cultural resources or mental health
3. **Describe and measure activities as outcomes** (stronger economies) to complement output-related metrics (board feet)
4. Encourages **cross-disciplinary** and **landscape-scale** perspectives
5. Promotes **transparency** and **trust**



“ In our capacity-constrained environment, I see staff on the Forests struggle with application of models and toolkits unless there is someone specifically on point to do so. That doesn't mean it's impossible – we just need clear intention and staffing to make it happen.

”

NEEDS IN THE FOREST SERVICE:

- 2012 National Forest System land management planning rule
- Conservation finance: Quantitative work able provide granular level of data to support partner investments and enhance shared stewardship
- Communication: Communications (internally and for our public) around nature's benefits remain limited
- Carbon!

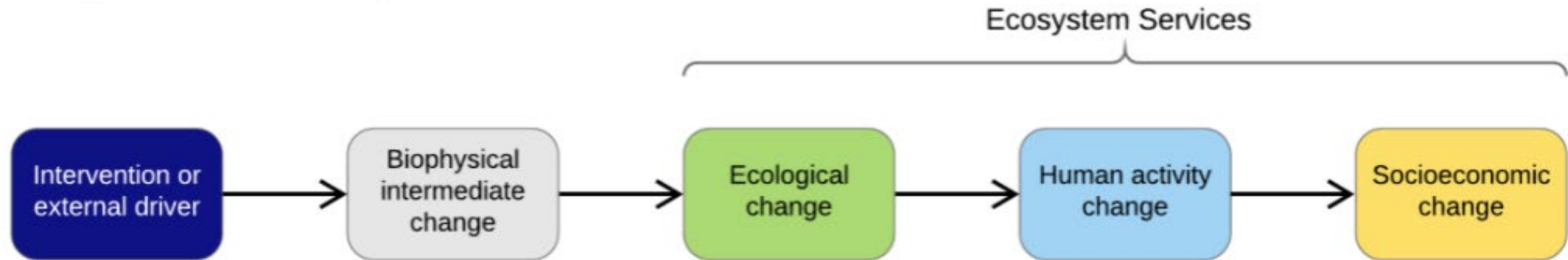


Ecosystem Services Toolkit:

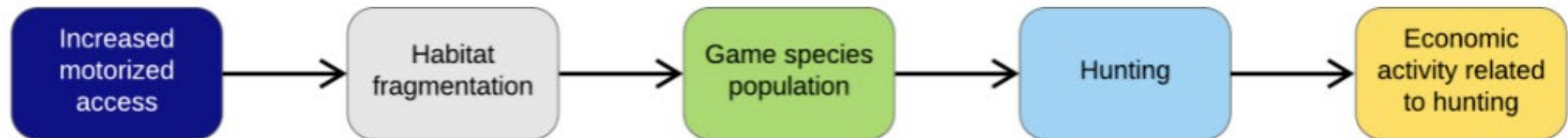
Key components

- Ecosystem Service Conceptual Models (ESCMs)
- Ecosystem service metrics
- Predictive model libraries and contacts database
- Case studies & Workshop guides

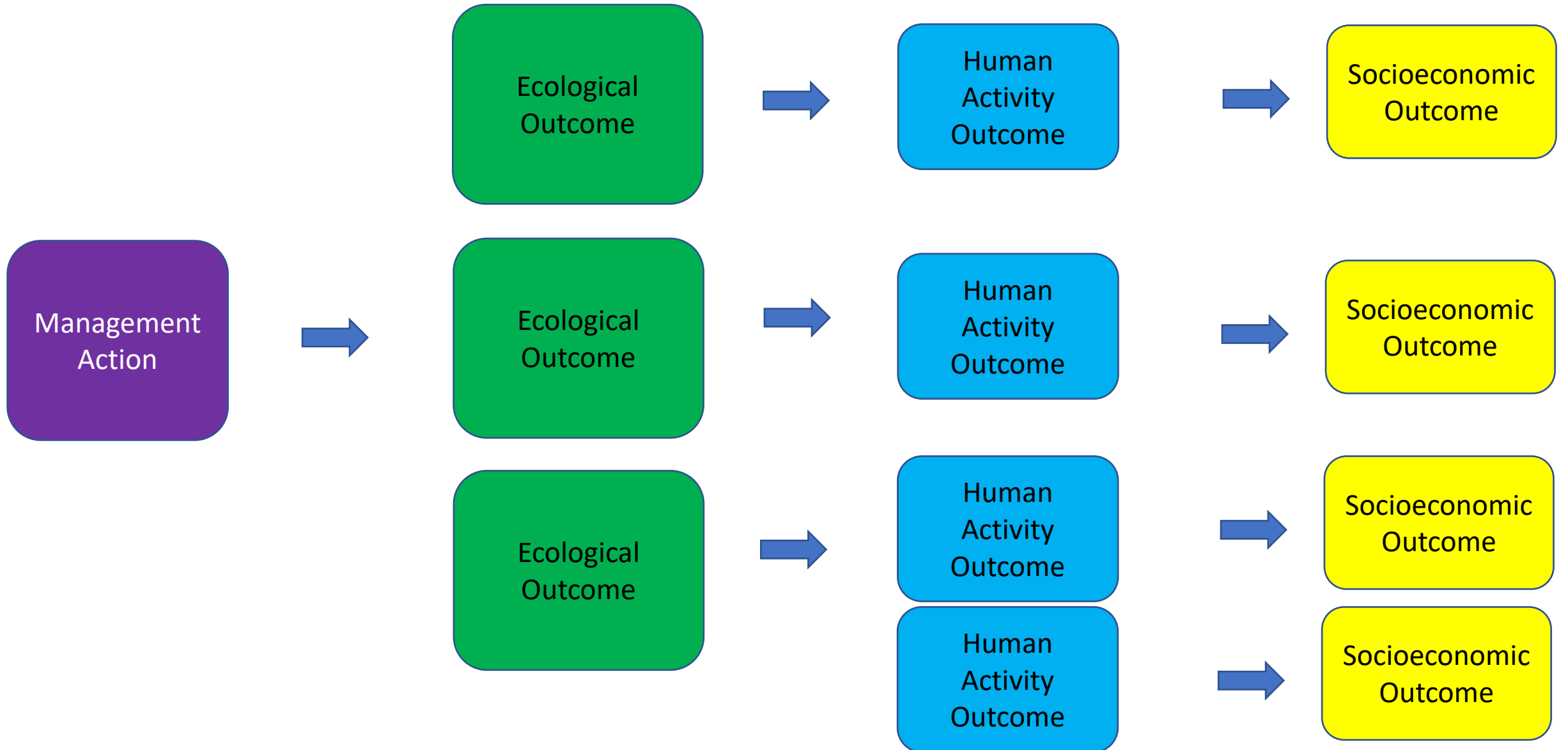
Ecosystem Service Conceptual Model Structure:

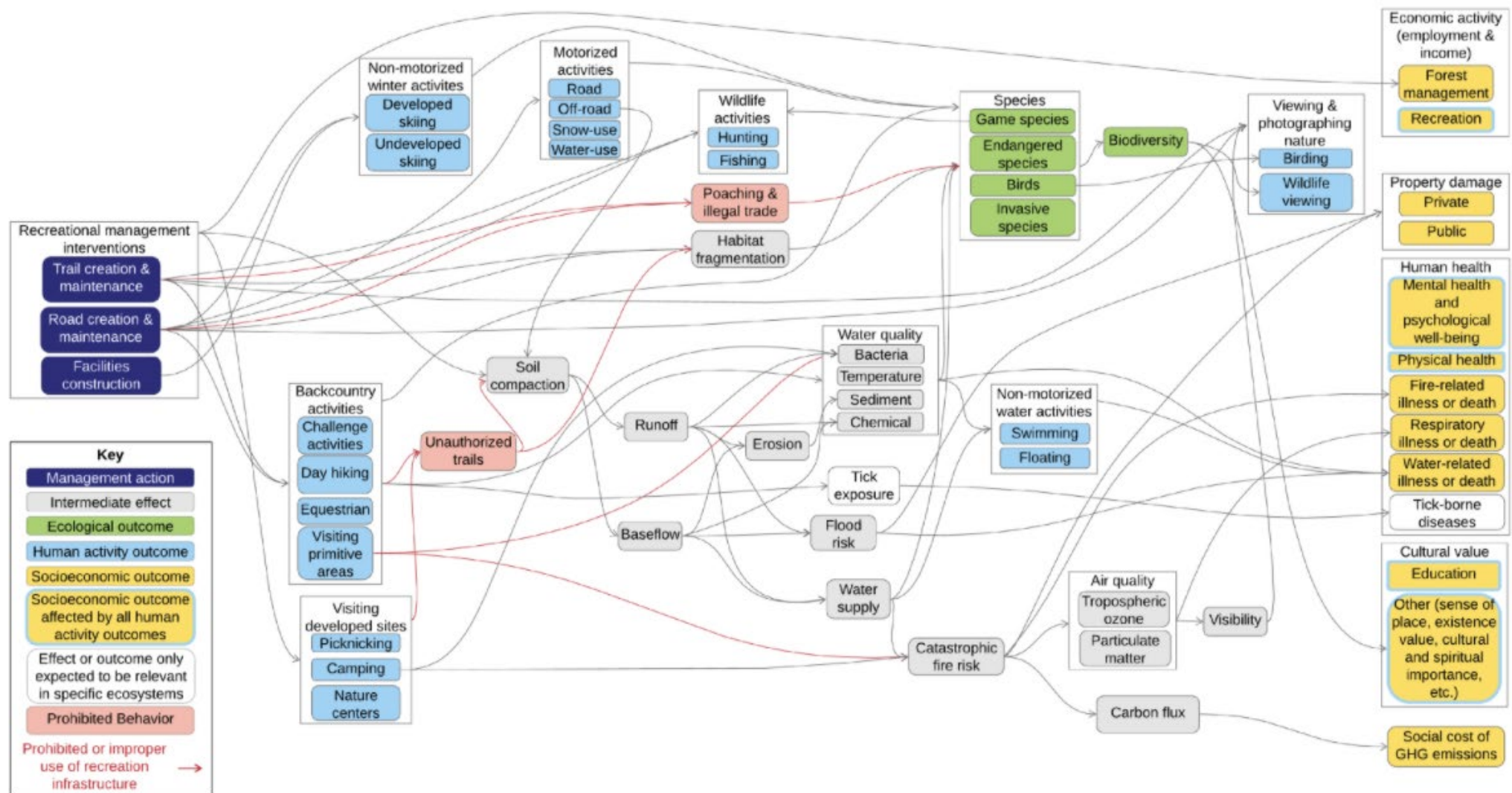


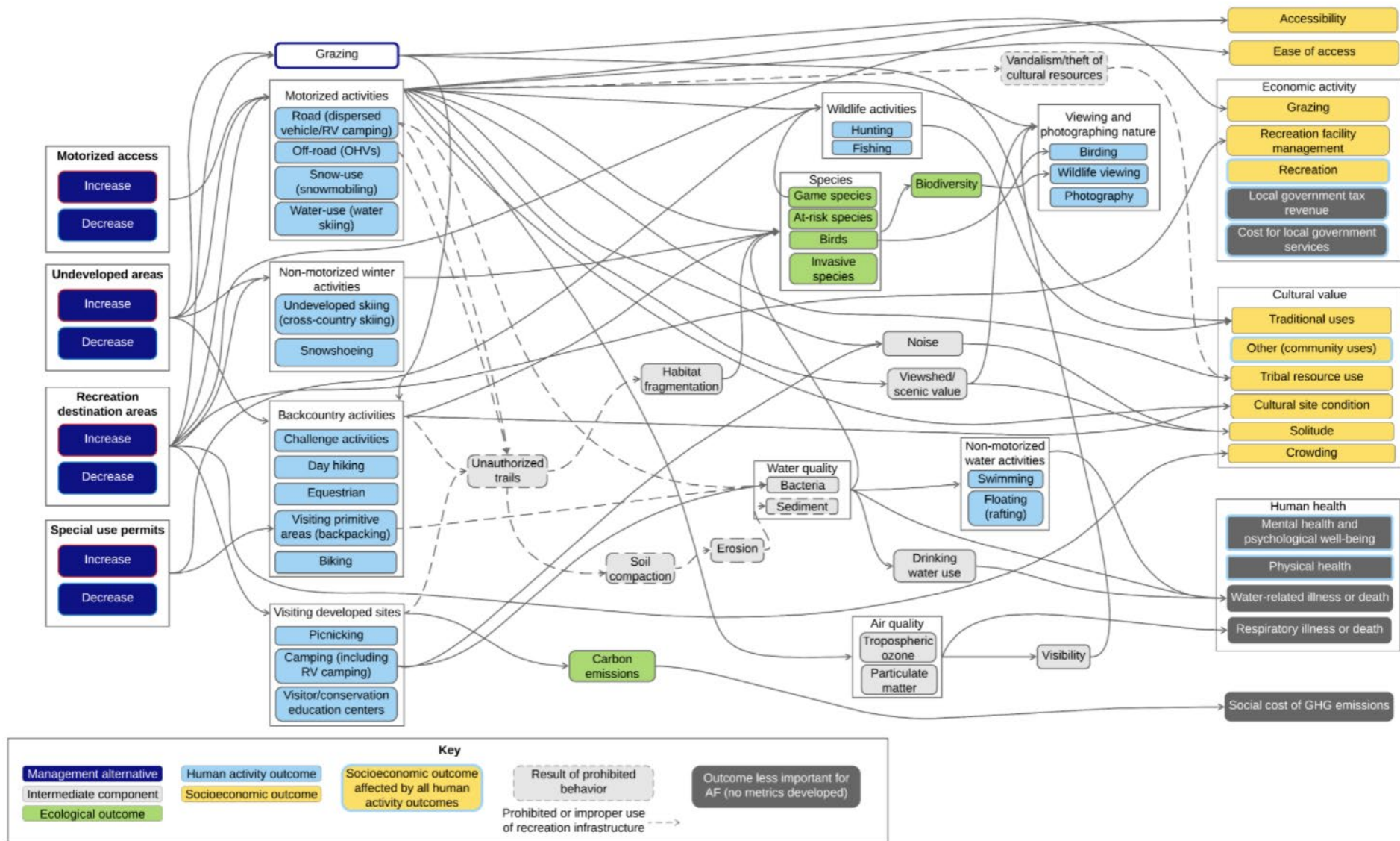
Ecosystem Service Conceptual Model Example:



Ecosystem Service Conceptual Models (ESCMs)









PROJECT

Ecosystem Services Toolkit for Natural Resource Management

Simply put, ecosystem services are benefits people receive from nature. An ecosystem services based approach to natural resource management requires connecting nature to people when making management decisions. Though the concept of ecosystem services is not new, the application of ecosystem services concepts to management practices is performed ad hoc, with researchers and managers individually determining how these services are understood, assessed, considered, and measured.

The **National Ecosystem Services Partnership (NESP)** was formed over a decade ago to create a national network for sharing ecosystem services information, to establish pathways for implementation of ecosystem services concepts, and to help integrate ecosystem services information into decision-making. In service of these goals, NESP has created a set of resources for the natural resource management community. These resources are meant to establish an ecosystem services framework that is flexible, while being standardized, intuitive, and credible.

These resources are centered on a set of Ecosystem Services Conceptual Models (ESCMs). These ESCMs offer an entry point for incorporating a suite of ecosystem services considerations into a program or project. The models illustrate the way that a management intervention cascades through an ecological system and results in ecosystem services and other human welfare impacts. The resources shown on this page were developed through projects supported by the US Forest Service, the **NOAA National Estuarine Research Reserve System Science Collaborative**, and the National Academies of Science Gulf Research Program.

Ecosystem Services Domains



Coastal Ecosystem Services



Forest Ecosystem Services



Agricultural Ecosystem Services

WEBSITE



Ecosystem Service Metrics



SMART Metrics

- Specific
- Measurable
- Achievable
- Relevant
- Time-based

Ecosystem Service Metric Types:

Ecological metrics: Metrics that measure changes in ecological outcomes and processes including individual species, entire habitats, and important abiotic conditions.

Ecosystem service *supply*

Human activity metrics: Metrics that identify how human activities or experiences are altered by the environment. These represent the link between ecological and social effects.

Ecosystem service *use*

Socioeconomic metrics: Metrics that measure changes in social or economic conditions that contribute to human wellbeing.

Economic or human wellbeing conditions

	A	B	C	D	E
1	Socioeconomic metrics for the Ashley National Forest				
2	Lydia Olander, Katie Warnell, Travis Warziniack, and Zoe Ghali				
3	Notes: Some metrics would require new primary data collection to measure. We assume that primary data collection would not happen as part of the current forest planning process in the Ashley National Forest, but it may be helpful to identify additional information that could be collected in the future.				
4					
5	Outcome group	Outcome	Suggested metric	Data source or method/approach	Planning or Implementation level?
29	Cultural value	Crowding (Effect on satisfaction)	Access/quality of experience matrix (see description in row 14): Change in areas with overcrowding, satisfaction with crowd levels	Surveys (NVUM) - most recent survey results for AF have satisfaction with crowding - detail on the # of people who thought the places they visited were too crowded, broken down by type of site visited. Satisfaction information needs to be combined with information on changes in different types of uses in the access/quality of experience matrix, and with information about how crowding is expected to change with plan alternatives.	Planning: Access/quality of experience matrix can address qualitative change in satisfaction level predicted based on mgmt. change by alt.
30	Accessibility	Accessibility (ABA facilities)	Number of accessible parking spaces, toilets	Accessibility of developed recreation sites was evaluated a few years ago across AF	Implementation
31	Accessibility	Accessibility (ABA facilities)	Change in accessibility of facilities for forest plan alternatives using access/quality of experience matrix. Categorical method.	Categorical method.	Planning
32	Accessibility	Accessibility (ABA sites)	Number of sites with accessible parking and toilets		Implementation
33	Ease of access	Ease of access (to motorized and developed areas)	Access/quality of experience matrix (see description in row 14): Change in areas with easy access (areas with motorized trails, recreation destination areas). Categorical.	Motor vehicle use map, acres of recreation destination areas under plan alternatives	Implementation
			Change in access to recreation opportunities (hunting, fishing,	To focus on the role or ability of Ashley NF in meeting regional demands, share of access to sites on NFS lands compared to non-NFS lands. This depends on the type of site. For rivers, for example, comparison of river access sites on and off forest. Similarly, it is possible	

Metrics list



Example access/quality of experience matrix for the Ashley National Forest recreation planning

Hypothetical example for Alt C (compared to no Action), increasing wilderness areas

	Area Type					Specific amenities					
User group	Wilderness areas	Destination Recreation Areas	Backcountry Recreation Areas	General Recreation Areas	Remote areas with low utilization	Disability-accessible trails, restrooms, parking areas	Developed recreation sites such as camp grounds, picnic areas, interpretive sites	High-quality game species habitat	High-quality fishable waterways	Trails with mechanized access	Trails with motorized access
Boy Scouts			-		+						
Solitude-seekers	+				+						
Large groups		-		-			=				
Mobility impaired visitors ¹		-		-		=	=				-
Hunters	+		-	-				+			-
Anglers	+			-					+		-
Commercial outfitters (boat trips)		-		-					+		
Mountain bikers				-						-	
OHV users		-		-							-
Cultural/historic site visitors		-		-			=				
Tribal populations	+		-	-	+			+	+		
EJ populations		-		-			=				

¹including those with mobility disabilities and elderly visitors

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graph LR
    A[Increased motorized access] --> B[Habitat fragmentation]
    B --> C[Game species population]
    C --> D[Hunting]
    D --> E[Economic activity related to hunting]
  
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Ecological metrics: Metrics that measure changes in ecological outcomes and processes including individual species, entire habitats, and important abiotic conditions.

Human activity metrics: Metrics that identify how human activities or experiences are altered by the environment. These represent the link between ecological and social effects.

Socioeconomic metrics: Metrics that measure changes in social or economic conditions that contribute to human wellbeing.

Ecosystem service supply

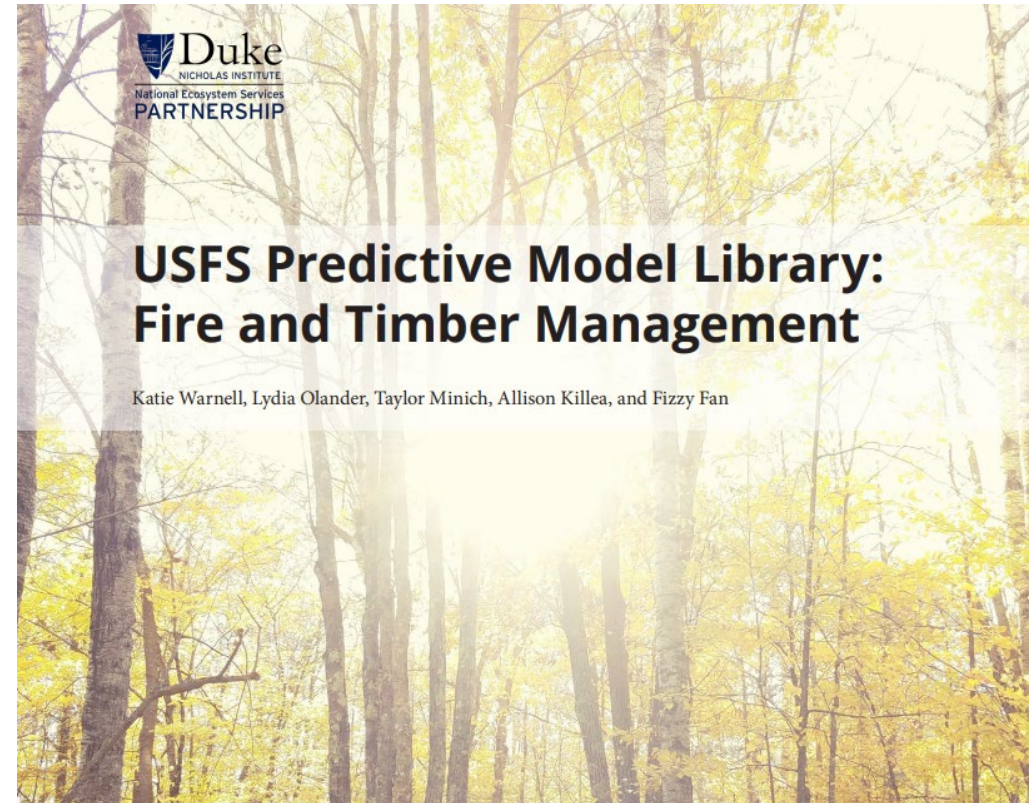
Ecosystem service use

Economic or human wellbeing conditions

Resource Type	Description
Workshop guidance	Download [PDF] - Guidance and example materials for workshops to help a U.S. Forest Service planning team identify key ecosystem service management outcomes and develop socioeconomic metrics for those outcomes using ecosystem service conceptual models (ESCMs), adapted from workshops held in summer 2020 with the Ashley National Forest.
Metric criteria	Download [PDF] - Pages 9-10 of the workshop guidance document include a list of criteria used to assess socioeconomic metrics during workshops held with the Ashley National Forest.
Metrics database	Example ecosystem services metrics [Excel] from a workshop with the Ashley National Forest, including measurement approaches for each metric and whether the metric is useful for planning or implementation Example access/experience matrix [PDF] for assessing impacts of planning alternatives on visitors' use of the Ashley National Forest (blank, editable version of matrix [Excel])
Reference list	Download [PDF] - A list of resources for finding socioeconomic metrics that have been used within USFS and related data sources.
Predictive model library	Predictive models are useful for quantifying the differences in effects of alternatives during scenario planning. This predictive model library [PDF] summarizes available predictive models related to fire and timber management.

Predictive Model Library and Contacts Database

- Model name and description
- Data requirements
- Model outputs
- Connectivity to other models
- Capacity required
- USFS contact or resource
- Evaluation



Case Studies & Workshop Guides

Ashley National Forest

- Recreation management
- Planning

Bridger-Teton National Forest

- Pre-planning

Climate change vulnerability (ongoing)

Facilitation guide (website)



Next steps:

1. Contact Travis Warziniack for development and workshops
2. Tune in for NESST seminar on recreation June 9
3. Bookmark
<https://www.fs.usda.gov/rmrs/tools/ecosystem-service-toolkit>



Thank you!

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