

# HOW FEDERAL BENEFIT COST ANALYSIS AND NATURAL CAPITAL ACCOUNTING WILL IMPACT RESTORATION

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NCER 4-18-24



# Executive Order Earth Day 2022

- EO 14072 Strengthening the Nation's Forests, Communities and Local Economies
  - **Sec. 4 . *Deploying Nature-Based Solutions to Tackle Climate Change and Enhance Resilience***
    - 1. Report on key opportunities for greater deployment of nature-based solutions** across the Federal government, including through policy, guidance, and program changes
    - 2. Guidance on valuation of ecosystem and environmental services and natural assets** in Federal regulatory decision-making
    - 3. National Nature Assessment**

This led to two  
important  
outcomes

1. **A new guidance on ecosystem services for benefit-cost analysis (BCA)**
2. A federal strategy to build national natural capital accounts

# Account for Nature in Benefit-Cost Analysis



- Benefit-cost analysis underpins decisions on major regulations, programs and funding
- Costs and benefits from changes in environment often not fully accounted for—missing costs & opportunities
- Modernizing Regulatory Review
  - Updated federal guidance on regulatory review, BCA, and added **a new guidance on ecosystem services**

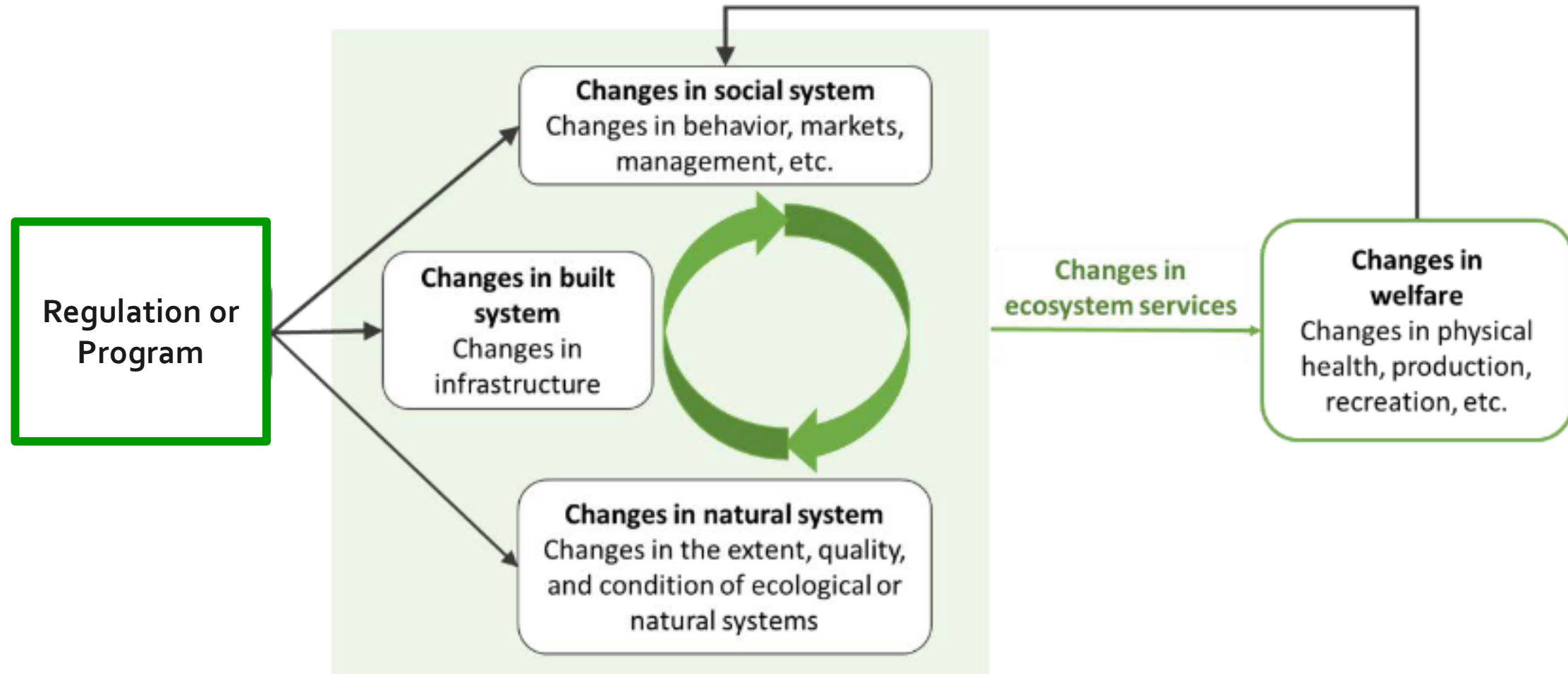
## Definition and Human Welfare Framing

“For the purposes of this guidance, ecosystem services are contributions to human welfare from the environment or ecosystems”

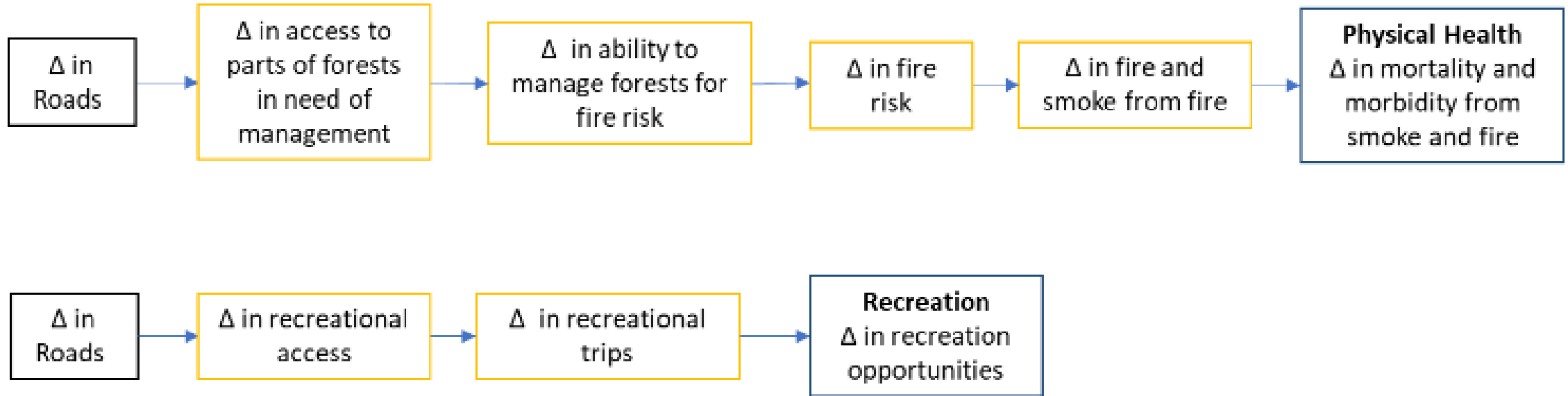
BCA focuses on **expected changes** in human welfare, including:

- Mental and physical health & safety
- Property value
- Production of goods and services
- Outdoor recreation & other leisure experiences
- Non-use values (bequest, existence, avoided costs)
- Culturally valued experiences

# Conceptual Framework



# Example Roadless Rule



Types of  
rules ( $A_4$ ) or  
programs ( $A_{g_4}$ )

- Infrastructure Management
- Natural Resources • Disaster mitigation
- Vehicle fleets or production • Labor or education
- Energy • Housing
- Economic Development • Health
- Agriculture
- Waste



## Economic Value of Klamath Dam Removals

## Cost Benefit Analysis for removal of Klamath Dams

Benefits	\$ millions
Dam operations, maintenance, etc.	\$188.9
Irrigated Agriculture	\$29.9
Wildlife refuge recreation	\$4.3
Troll Chinook fishery	\$134.5
Ocean recreational Chinook fishery	\$50.5
In river Chinook fishery	\$1.8
Costs	
Dam removal / mitigation	-\$166.8
Klamath Basin Restoration Activities	-\$472.1
Foregone hydropower	-\$1320.1
Foregone reservoir recreation	-\$35.4
Foregone whitewater recreation	-\$6.0

Sources  
 Klamath River Basin Restoration Nonuse Value  
 Survey – Final Report January 2012 by Mansfield  
 et al. RTI  
 Klamath Facilities Removal Environmental  
 Impact Statement/Environmental Impact Report  
 – Dec 2012.

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**Use values only**

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Wildlife refuge recreation	\$4.3
Troll Chinook fishery	\$134.5
Ocean recreational Chinook fishery	\$50.5
In river Chinook fishery	\$1.8
<b>Total Quantified Use Benefits</b>	<b>\$409.9</b>
Ecosystem Service Costs	
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<b>Total quantified costs</b>	<b>-\$2,000.4</b>
<b>NET BENEFITS (use values only)</b>	<b>-\$1,590.5</b>

## Economic Value of Klamath Dam Removals

**Nonuse values** were estimated using a stated preference (SP) survey.

The majority of respondents are concerned about declines of Chinook salmon and steelhead trout and the extinction of fish species in the Klamath Basin.

Conservative methodology only included the benefit of decreasing the risk of coho salmon extinction --identified \$15.6 billion in nonuse benefits nationwide.

*Sources  
Klamath River Basin Restoration Nonuse Value Survey – Final Report January 2012 by Mansfield et al. RTI  
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<b>NET BENEFITS (use &amp; non-use values)</b>	<b>14,054.5</b>

## Critical to know for accounting for nature in BCA

- Include all effects likely to be significant – even if they cannot be monetized or quantified (GOAL IS NET BENEFITS)
- Not all effects need to be monetized – quantified and described effects can be used when monetization is not feasible and should be equally considered in decisions.
- The analysis focuses on the change or marginal value, not the value of the current state (e.g., value of the change in service provision)
- ES should be included in estimates of net benefits – it is not a separate analysis

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2. **A federal strategy to build national natural capital accounts**

# National Strategy to develop NCA

## Goals:

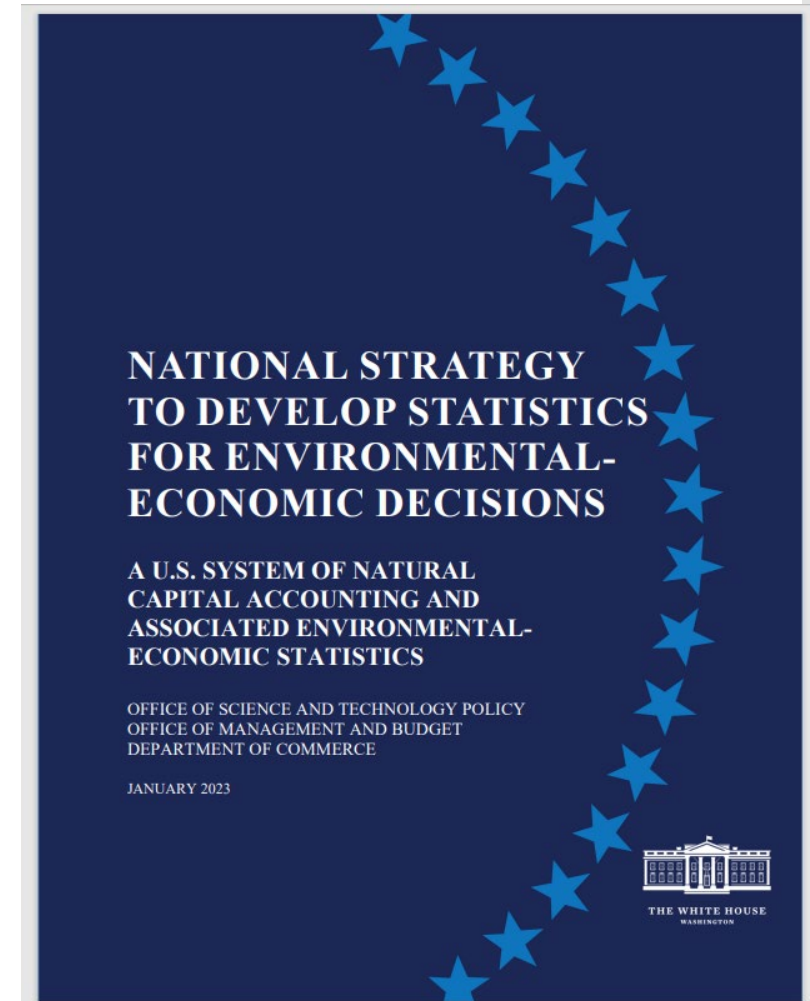
Guide sustainable development

Inform federal decision making

Support private sector  
competitiveness

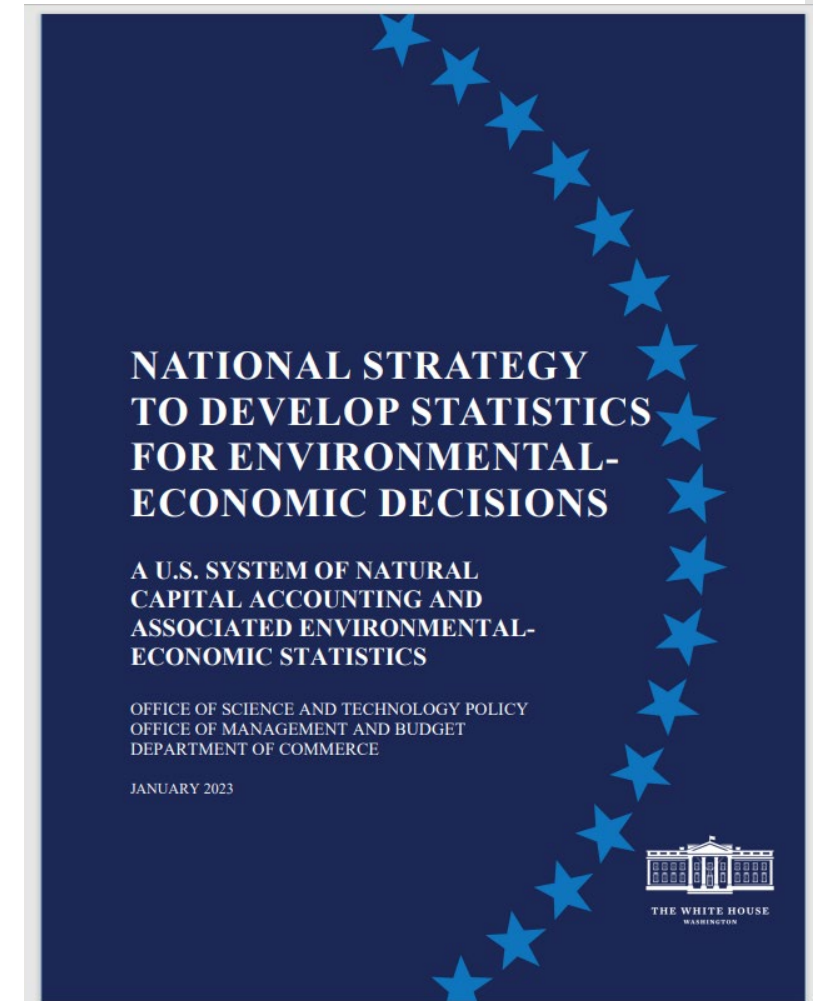
Support state, territorial,  
Indigenous and local community  
decision making

Facilitate conservation and  
environmental strategies and  
policy



# Economic value created by nature

- Nature starts many **supply chains** – food, timber, clothes, technology
- Nature motivates many modern **innovations**.
- Nature undergirds many **business** successes, -tourism, fishing, grocery stores,...
- Nature **protects property** – reducing the damage caused by storms, floods...
- Nature provides **recreational opportunities and community and cultural connections**.
- Nature **promotes health** - mental health, reduced heat stress, saving money on health care,
- Nature improves **quality of life**

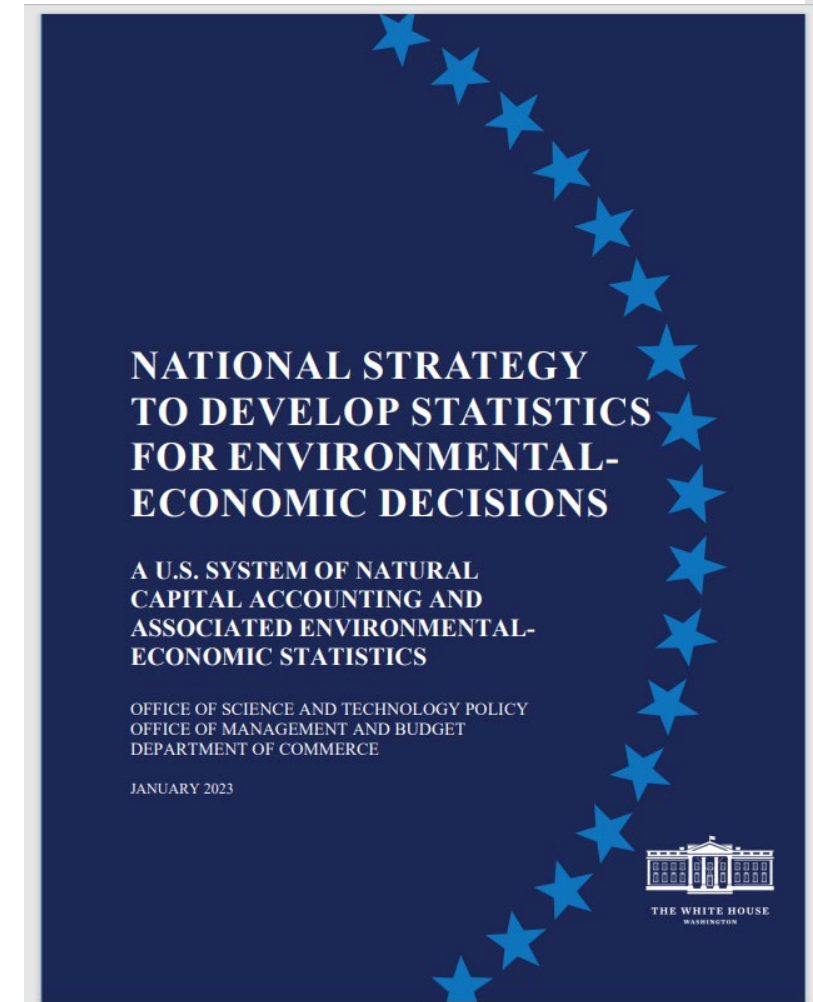


Interagency!!

## Federal Agencies Involved

### OSTP, OMB, DOC

- USDA (ERS, NASS, USFS)
- DOC (BEA, Census, NOAA)
- DOD
- DOE (EIA)
- HHS (CDC – health statistics)
- DOI (BLM, BOEM, USGS)
- DOL (BLS)
- DOS
- DOT
- EPA
- EOP (CEA, CEQ, NEC, NSC, CPO)
- US Trade Rep
- Federal Reserve System
- NASA





# Examples of what we can learn from accounts





Ecosystem Services

Volume 51, October 2021, 101347



## Editorial special issue natural capital accounting: The content, the context, and the framework ☆

[Alessandra La Notte](#)<sup>a</sup>  , [Sara Vallecillo](#)<sup>a</sup>, [Joachim Maes](#)<sup>a</sup>, [Carl D. Shapiro](#)<sup>b</sup>,  
[Kenneth J. Bagstad](#)<sup>c</sup>, [Jane Carter Ingram](#)<sup>d</sup>, [Pierre D. Glynn](#)<sup>b e</sup>

<https://doi.org/10.1016/j.ecoser.2021.101347>

Understanding what types of habitats are most important for recreational birding

Southeastern US 2011

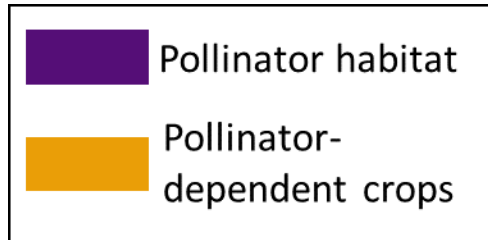
Ecosystem type (land cover)	Thousands of birding days
Offshore	1,236
Open Water	5,207
Developed - Open	10,022
Developed - Low	7,420
Developed - Medium	3,553
Developed - High	1,046
Barren	1,408
Deciduous Forest	7,173
Evergreen Forest	3,816
Mixed Forest	692
Shrub/Scrub	1,966
Grassland/Herbaceous	1,833
Pasture/Hay	4,050
Cultivated Crops	2,634
Woody Wetlands	4,964
Emergent Herbaceous Wetlands	3,695
Total	60,715

- Developed land supplied more than 1/3 of birding days in the southeast
- Forests, open water, and wetlands also important ecosystem types for birding

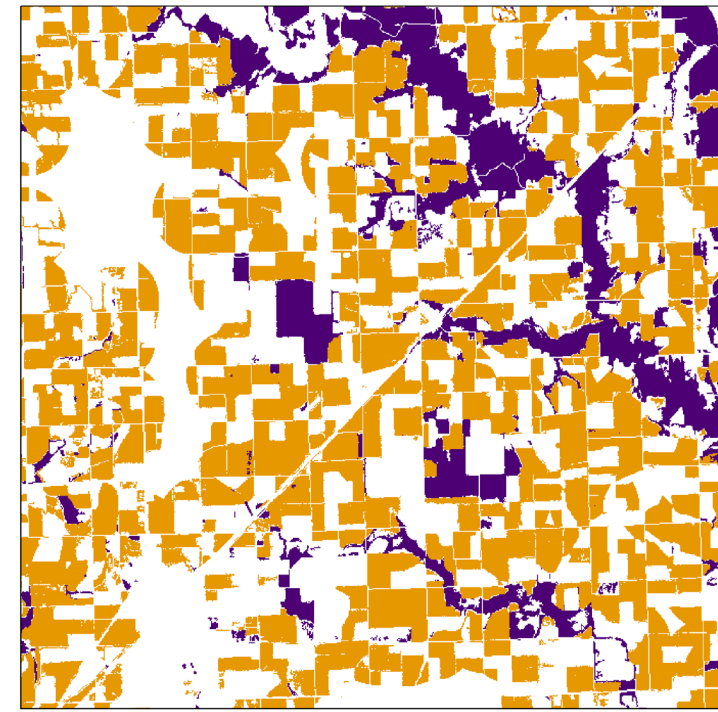
Evaluating where pollinator habitat restoration or protection may be important

Ratio of pollinator habitat to pollinator-dependent crops

State	Ratio
AL	7.96
AR	0.57
FL	3.22
GA	9.85
LA	1.51
MO	1.25
MS	2.00
NC	5.84
SC	7.95
TN	3.01



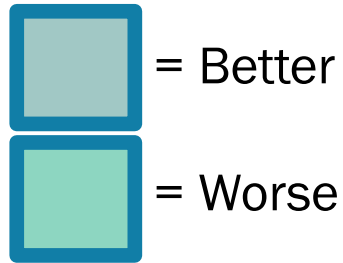
Arkansas



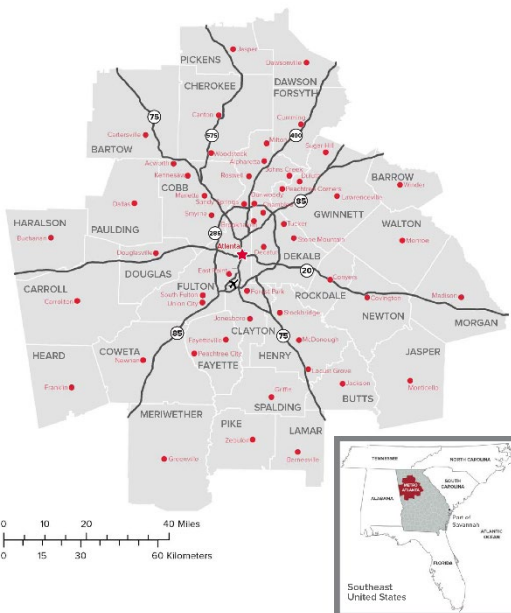
Georgia



# Integration with other accounts

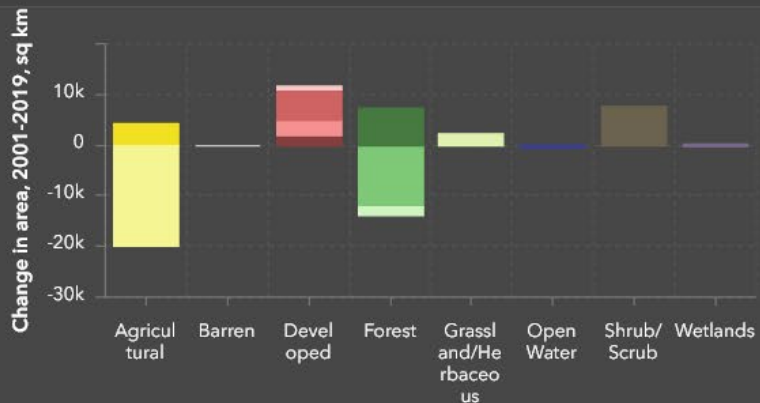


Atlanta MSA



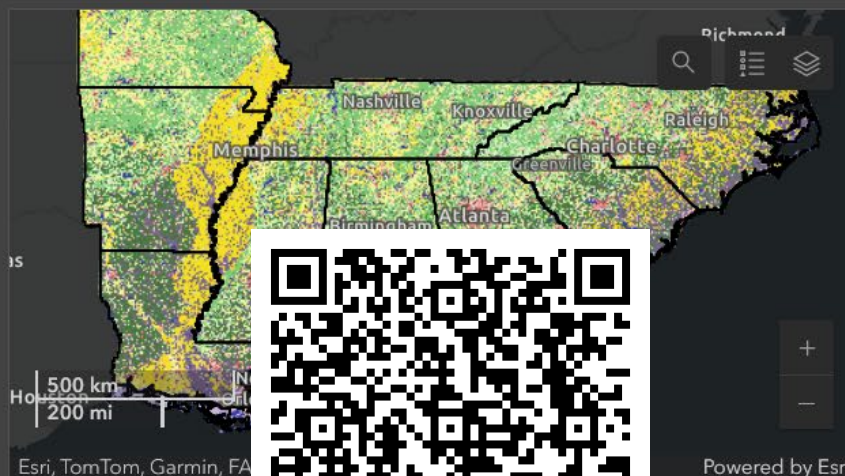
Account	Metric	% change, 2001-2011
Land accounts	Developed land cover	17.2%
	Agricultural land cover	-6.3%
	Forested land cover	-9.3%
	Other land cover	18.6%
Water accounts	Total water use (million gallons/day, 2000-2010)	-57.8%
	Water productivity (\$/100 gallons water use, 2000-2010)	153.3%
	% of water-quality monitoring sites reporting significant declines, 2002-2012)	Nitrate (n=7) 57%
		Specific conductance (n=6) 67%
	Total suspended solids (n=4) 25%	
Ecosystem accounts	% of flowpath in purifying land cover	-18.2%
	Mean annual concentration, CO (2010-2015)	21.3%
	Mean annual concentration, PM <sub>2.5</sub> (2010-2015)	-10.2%
	Mean annual removal rates, CO (2010-2015)	25.3%
	Mean annual removal rates, PM <sub>2.5</sub> (2010-2015)	11.0%
	Recreational birding-days	209.6%
Economic accounts	Carbon storage (2001-2010)	-1.6%
	GDP, all industries	8.8%
	Population (2000-2010)	24.0%

## Ecosystem extent



Ecosystem extent change, '01-'19

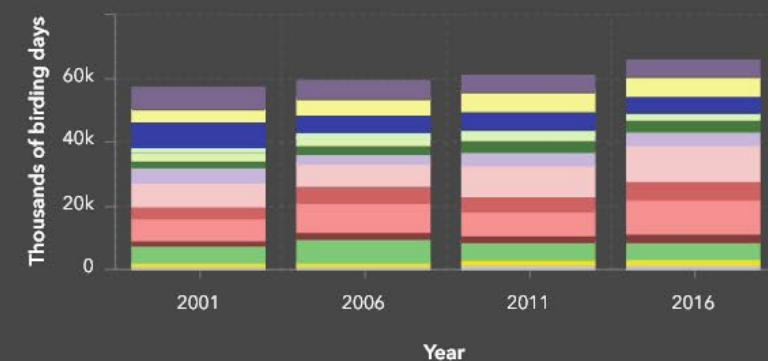
Info



Introduction

Powered by Esri

## Recreational birding



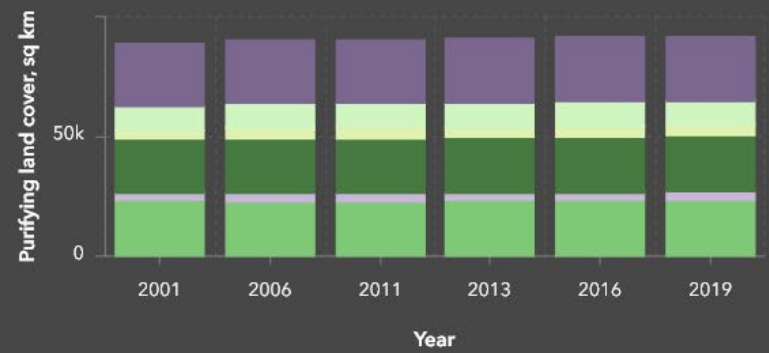
Birding days

Info

## Wild pollination



Ratio

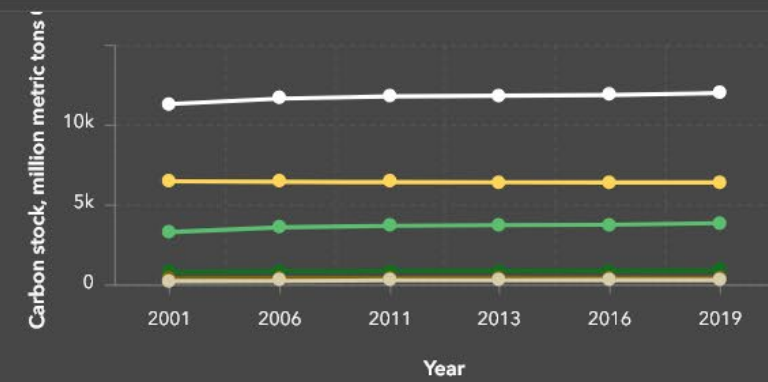


Water purifying land cover

% purifying land cover

Info

## Forest carbon



Forest carbon

Info

Note: 2001 data are only available for Arkansas and Mississippi. 2006 data are only available for Arkansas, Louisiana, Mississippi, and Missouri.



# Thank you

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