Natural capital accounting: Applying international lessons learned to the United States

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Acknowledgments/Project team

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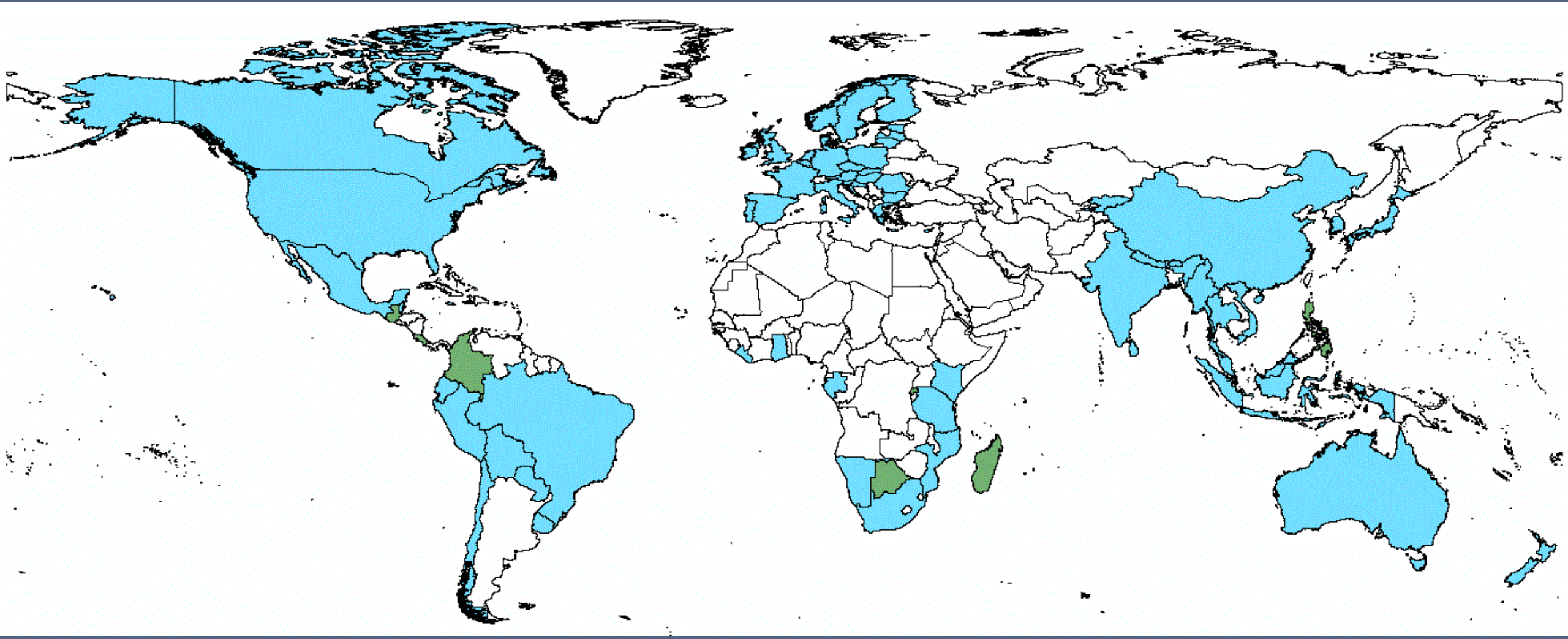
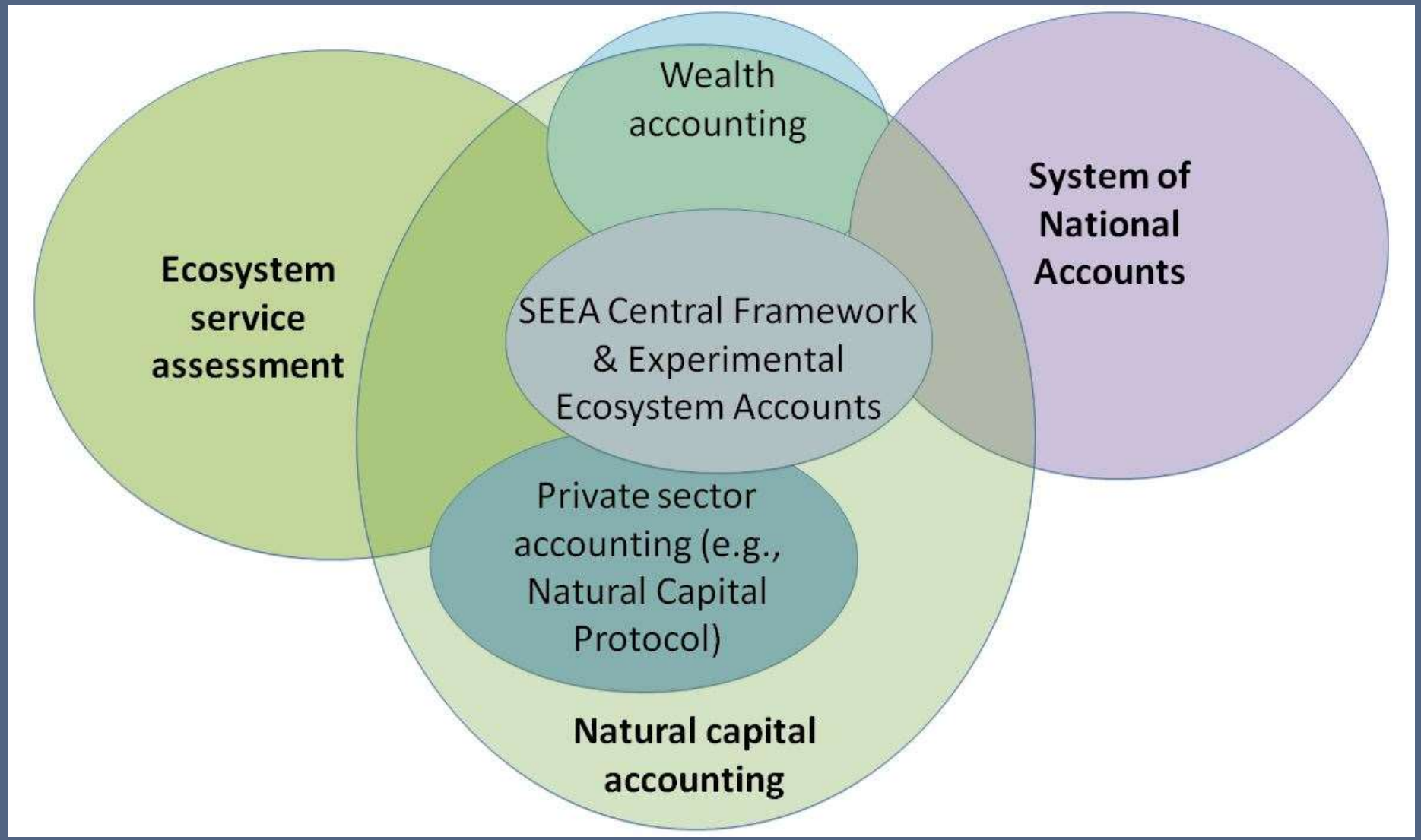
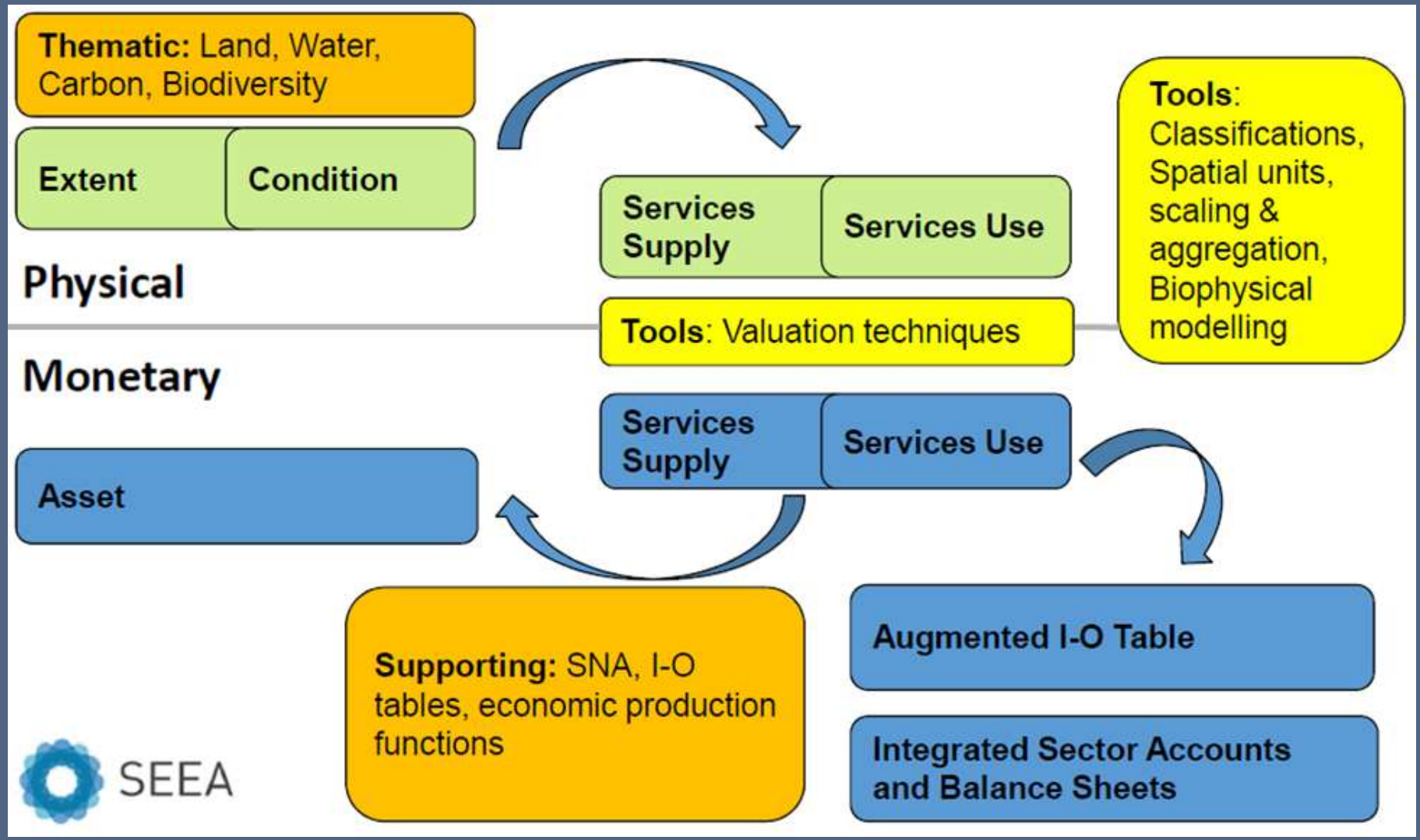
Global expansion of natural capital accounting



Toward a common understanding of accounting

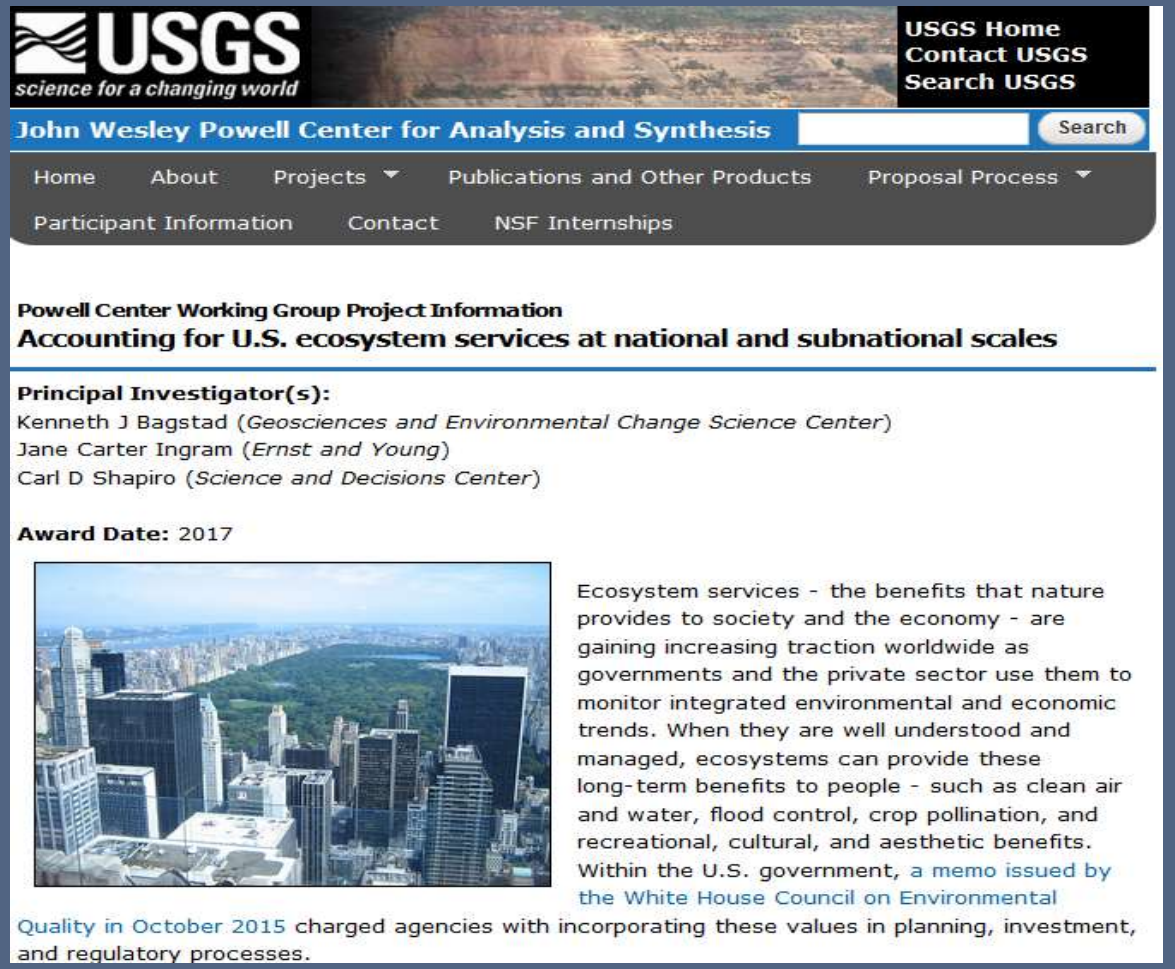


SEEA ecosystem accounting



Goals and Objectives

- **Goal:** By 2019, we will have demonstrated that NCA in the US is feasible and we will illustrate how to achieve that
- **Objectives:**
  - Develop a methodological and institutional strategy for NCA in the US
  - Develop the “proof of concept” for NCA in the US
  - Raise awareness of NCA among key private and public stakeholders



tinyurl.com/us-nca

Key activities

- Research tasks:
  - Synthesize readily available data that support NCA
  - National scale ecosystem services mapping and modeling
  - Subnational NCA and economic valuation
- Engagement with key USG agencies and private sector for information exchange throughout the project (i.e., Advisory Group)
- Strategic communications

Advice from our international colleagues

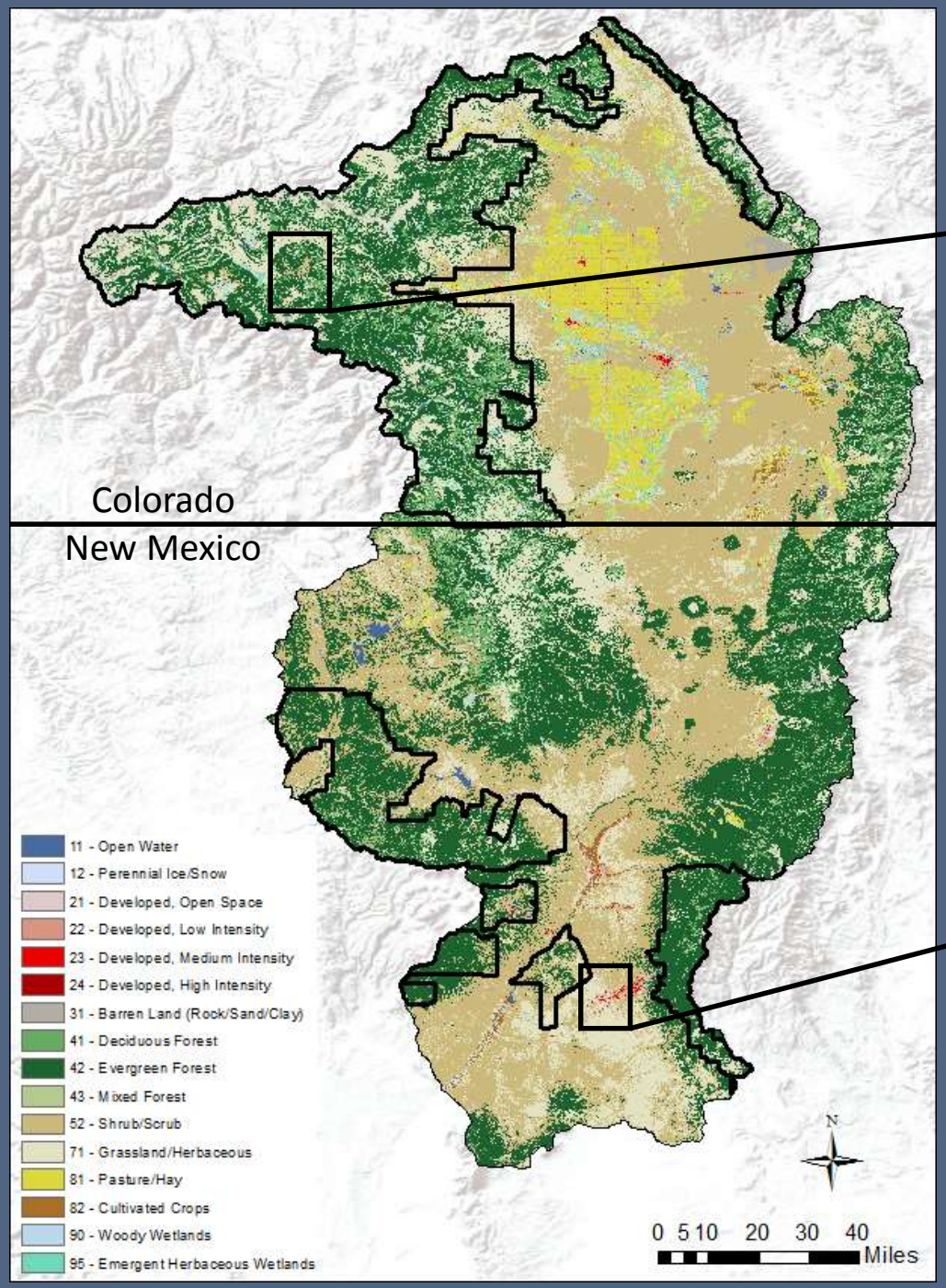
1. Understand & communicate the value proposition of accounting
2. Start with a small number of accounts, develop them, get feedback, and iterate
3. Pick policy-relevant accounts
4. Facilitate communication across agencies (statistical offices, natural resource agencies, economic planning agencies)
5. Develop graphically appealing indicators that summarize key findings

Implementing that advice

1. Understand & communicate the value proposition of accounting
   - Value as a national/international standard, starting point for subnational ES assessment, strengthen ties of ES to private sector & Dept. of Commerce, etc.
2. Start with a small number of accounts, develop them, get feedback, and iterate
   - Start with land & water accounts from roughly 2000-2010; add more accounts as we go
3. Pick policy-relevant accounts
   - Pick a policy-relevant subnational case study (TBD)
4. Facilitate communication across agencies (statistical offices, natural resource agencies, economic planning agencies)
   - Working group includes representatives from BEA, NOAA, DOI, USGS, USEPA, U.S. State Department. Briefings to OMB, CEQ, others.
5. Develop graphically appealing indicators that summarize key findings
   - TBD once initial findings developed

Multi-year workplan

- **2016-2017:**
  - Introductory journal article on NCA in the U.S.
  - First iteration U.S. & subnational land account
  - First iteration U.S. & subnational water account
  - Solicit critical feedback on land & water accounts
- **2017-2019:**
  - Second iteration U.S. & subnational land & water accounts
  - Pilot test national-scale ecosystem accounts for selected ecosystem services
  - Conduct public & private-sector outreach



2006

2011

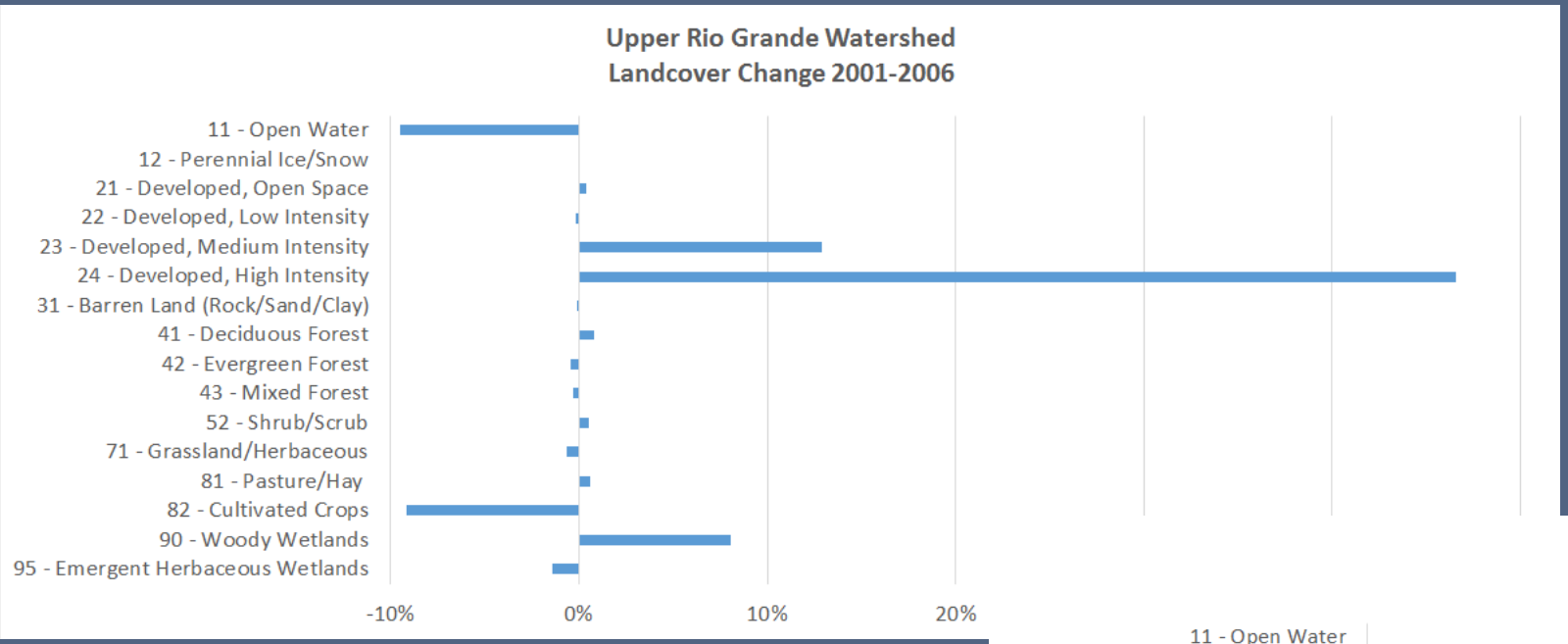
2001

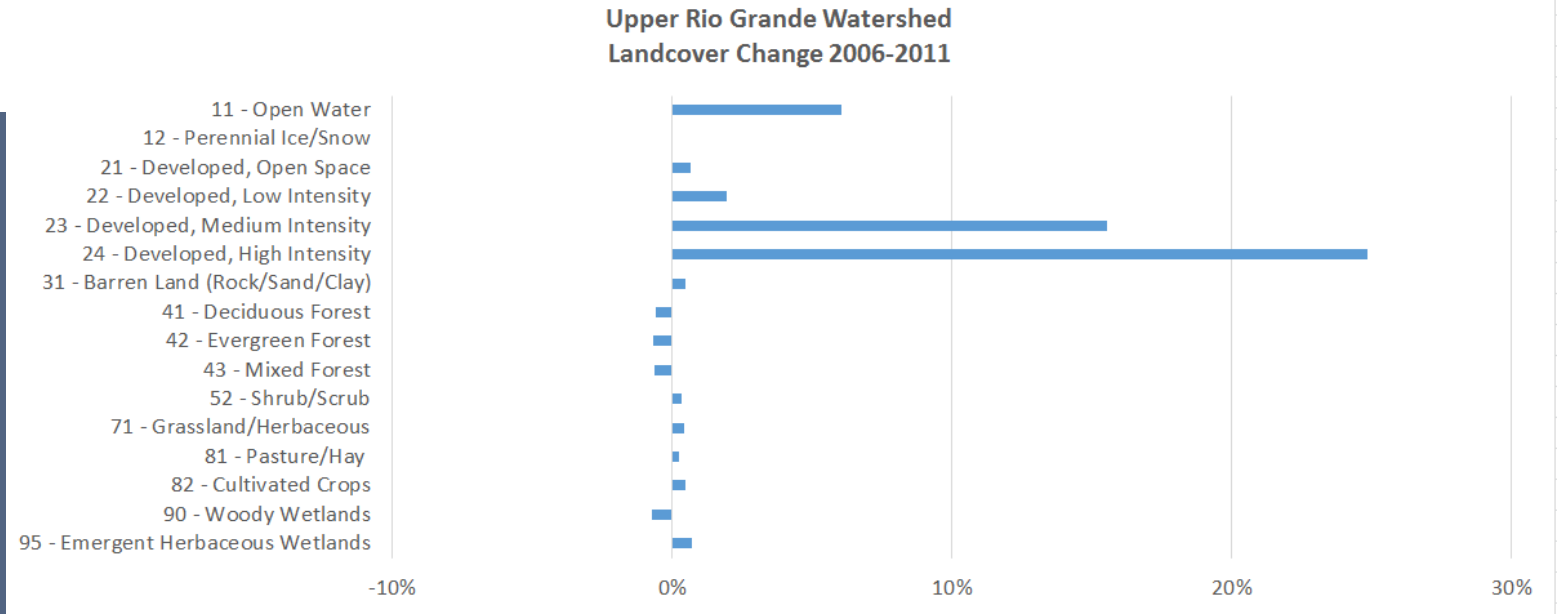
2011

Land accounts, Upper Rio Grande watershed

	Upper Rio Grande watershed									
Landcover Class	Open water	Perennial ice/snow	Developed open space	Developed low intensity	Developed medium intensity	Developed high intensity	Barren land	Deciduous forest	Evergreen forest	Mixed forest
2001 (Opening stock, ac)	31,316	266	83,116	43,647	7,333	781	117,049	431,498	3,277,611	93,095
Additions	0	0	320	0	945	364	0	3,282	0	0
Reductions	-2,979	0	0	-77	0	0	-145	0	-13,920	-301
% Change 2001-2006	-9.5%	0.0%	0.4%	-0.2%	12.9%	46.6%	-0.1%	0.8%	-0.4%	-0.3%
2006 (Closing/Opening stock, ac)	28,336	266	83,436	43,571	8,278	1,145	116,904	434,780	3,263,690	92,794
Additions	1,712	0	545	840	1,286	285	530	0	0	0
Reductions	0	0	0	0	0	0	0	-2,662	-22,564	-607
% Change 2006-2011	6.0%	0.0%	0.7%	1.9%	15.5%	24.9%	0.5%	-0.6%	-0.7%	-0.7%
2011 (Closing stock, ac)	30,048	266	83,981	44,411	9,564	1,430	117,434	432,118	3,241,127	92,187

Land accounts, Upper Rio Grande watershed

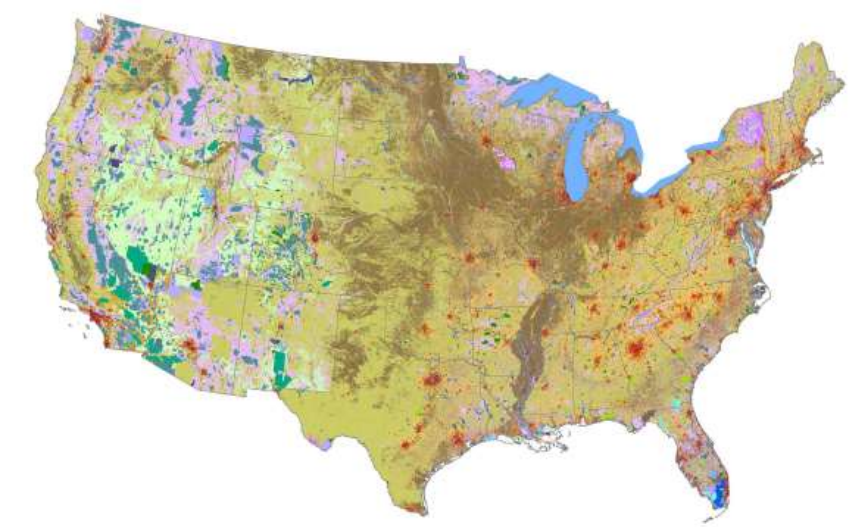




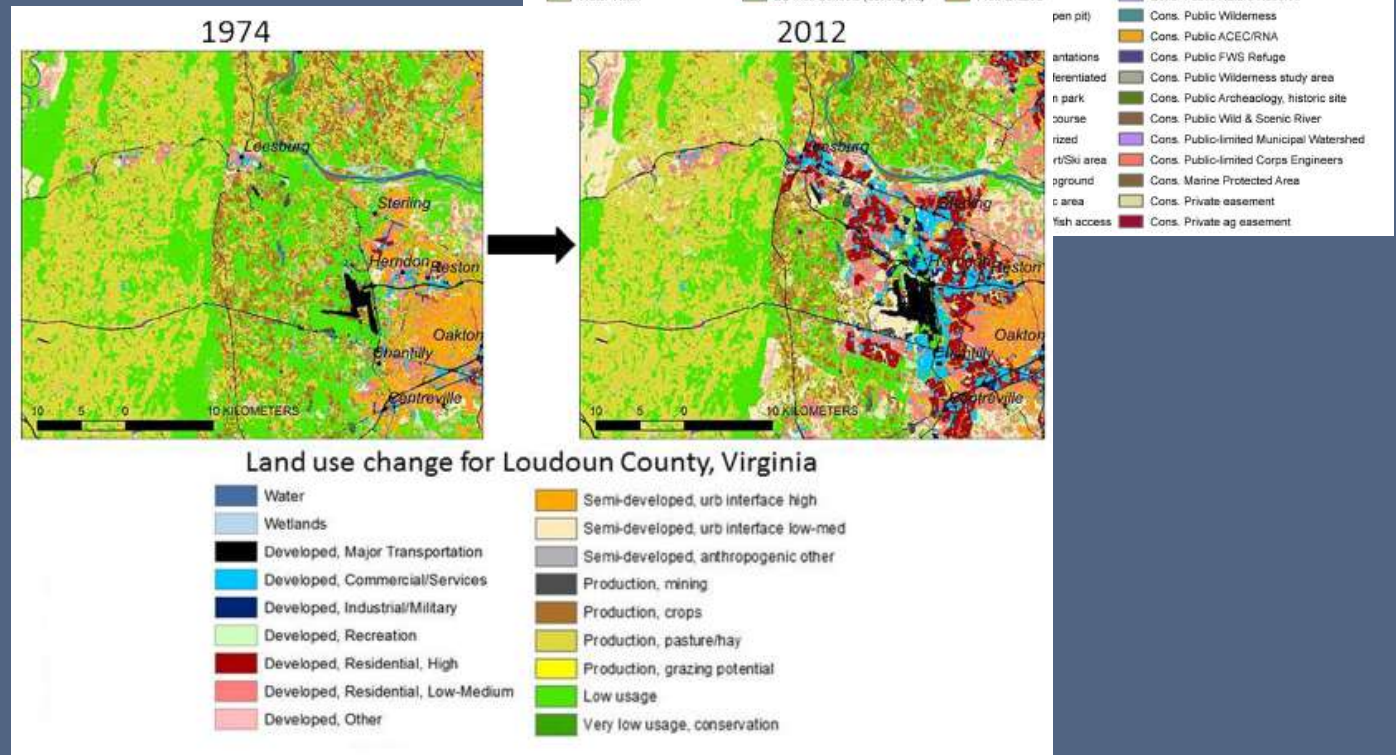
Next steps, land accounts

- Add land use data to land cover data
- Add property value from BEA/Zillow
- Future possibilities: Use CCAP data for coastal zones with NOAA; Update to 2016 NLCD (late 2018)

Theobald 2014 →



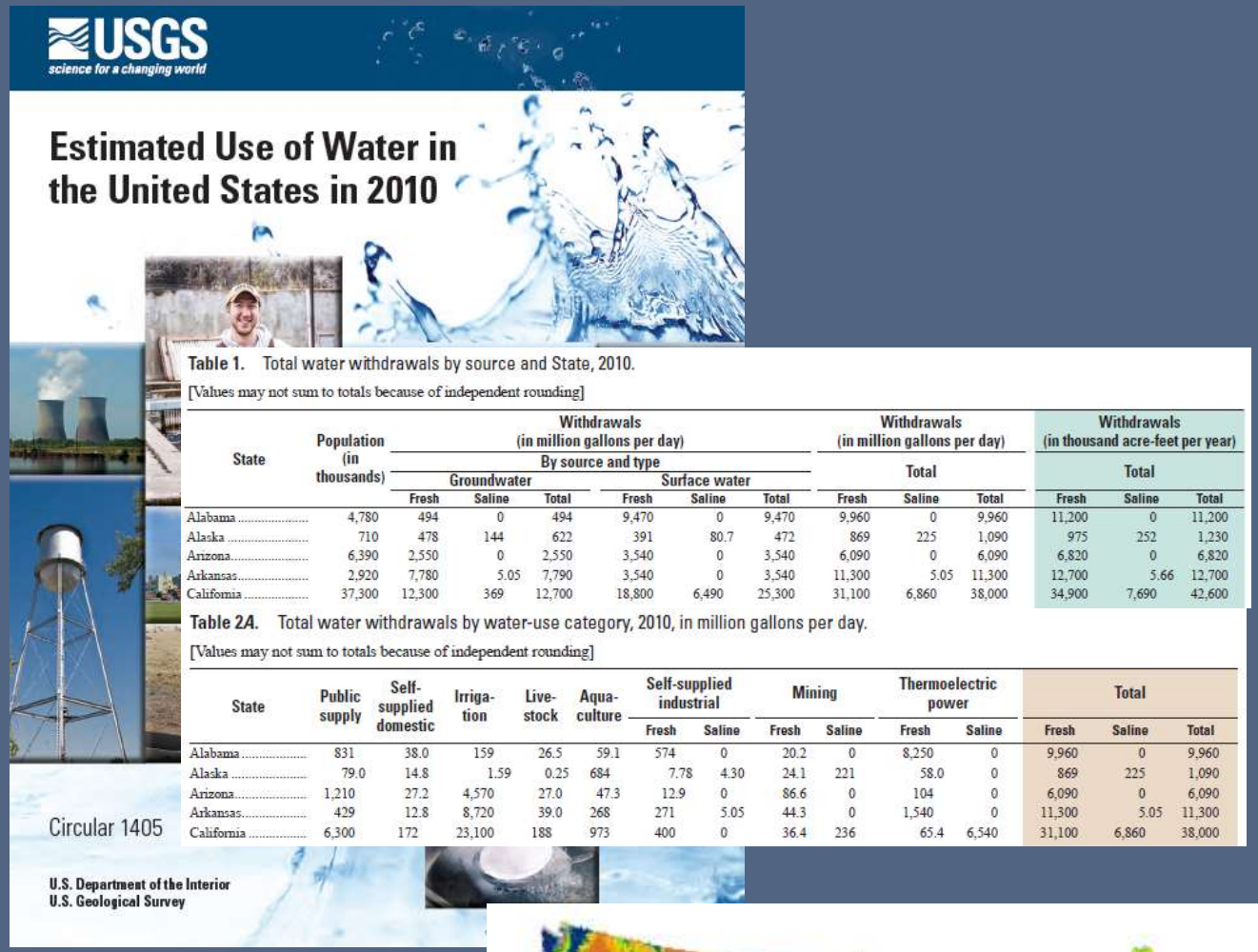
Falcone et al. 2015 ↓



Water accounts

Work starting January 2017

1. USGS Water Use data, 2000-2005-2010
2. USGS & USEPA water quality data
3. BEA water & wastewater infrastructure asset values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Estimated Use of Water in the United States in 2010

Circular 1405

U.S. Department of the Interior
U.S. Geological Survey

Table 1. Total water withdrawals by source and State, 2010.

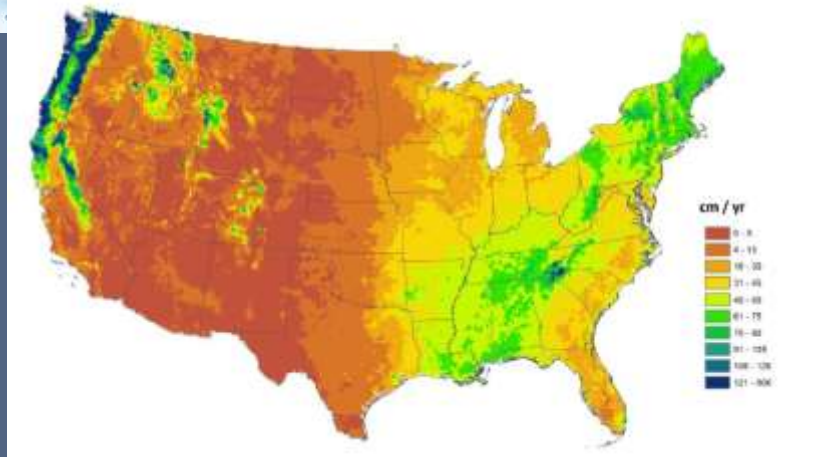
[Values may not sum to totals because of independent rounding]

State	Population (in thousands)	Withdrawals (in million gallons per day) By source and type Groundwater Fresh	Groundwater Saline	Groundwater Total	Surface water Fresh	Surface water Saline	Surface water Total	Withdrawals (in million gallons per day) Total Fresh	Total Saline	Total Total	Withdrawals (in thousand acre-feet per year) Total Fresh	Total Saline	Total Total
Alabama	4,780	494	0	494	9,470	0	9,470	9,960	0	9,960	11,200	0	11,200
Alaska	710	478	144	622	391	80.7	472	869	225	1,090	975	252	1,230
Arizona	6,390	2,550	0	2,550	3,540	0	3,540	6,090	0	6,090	6,820	0	6,820
Arkansas	2,920	7,780	5.05	7,790	3,540	0	3,540	11,300	5.05	11,300	12,700	5.66	12,700
California	37,300	12,300	369	12,700	18,800	6,490	25,300	31,100	6,860	38,000	34,900	7,690	42,600

Table 2A. Total water withdrawals by water-use category, 2010, in million gallons per day.

[Values may not sum to totals because of independent rounding]

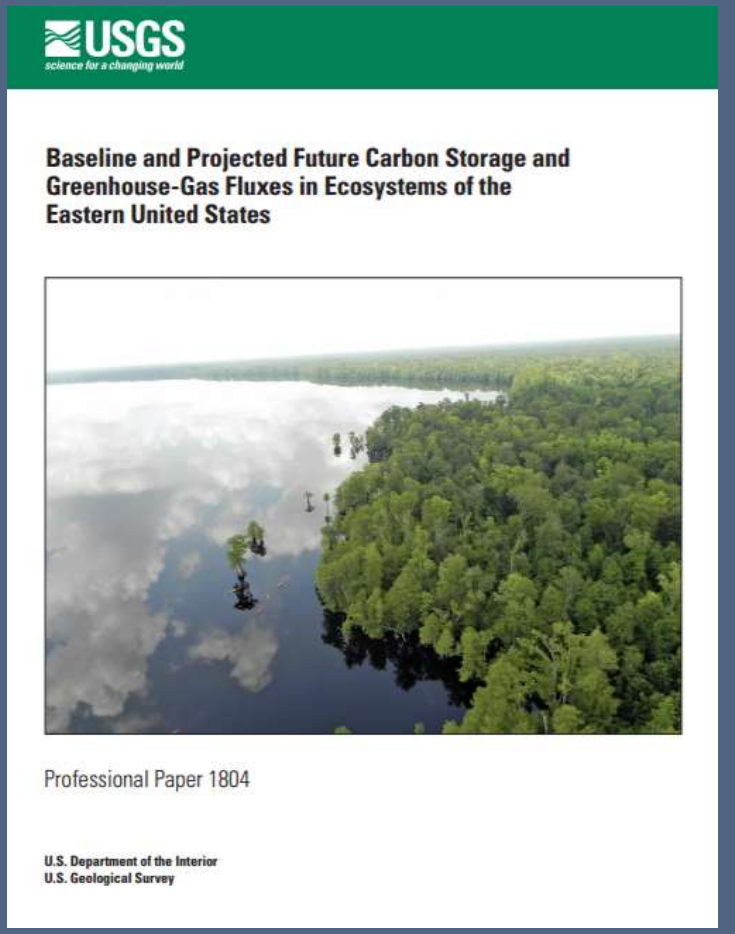
State	Public supply	Self-supplied domestic	Irrigation	Livestock	Aquaculture	Self-supplied industrial Fresh	Self-supplied industrial Saline	Mining Fresh	Mining Saline	Thermoelectric power Fresh	Thermoelectric power Saline	Total Fresh	Total Saline	Total Total
Alabama	831	38.0	159	26.5	59.1	574	0	20.2	0	8,250	0	9,960	0	9,960
Alaska	79.0	14.8	1.59	0.25	684	7.78	4.30	24.1	221	58.0	0	869	225	1,090
Arizona	1,210	27.2	4,570	27.0	47.3	12.9	0	86.6	0	104	0	6,090	0	6,090
Arkansas	429	12.8	8,720	39.0	268	271	5.05	44.3	0	1,540	0	11,300	5.05	11,300
California	6,300	172	23,100	188	973	400	0	36.4	236	65.4	6,540	31,100	6,860	38,000

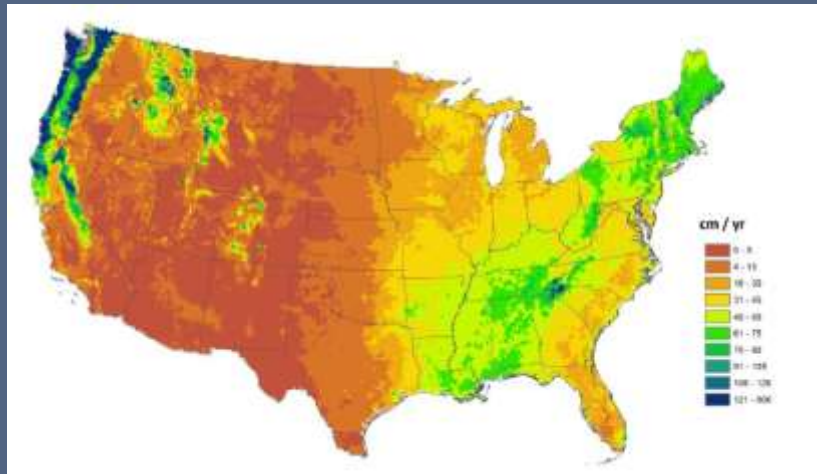


Brown et al. 2016

Next steps, ecosystem accounts

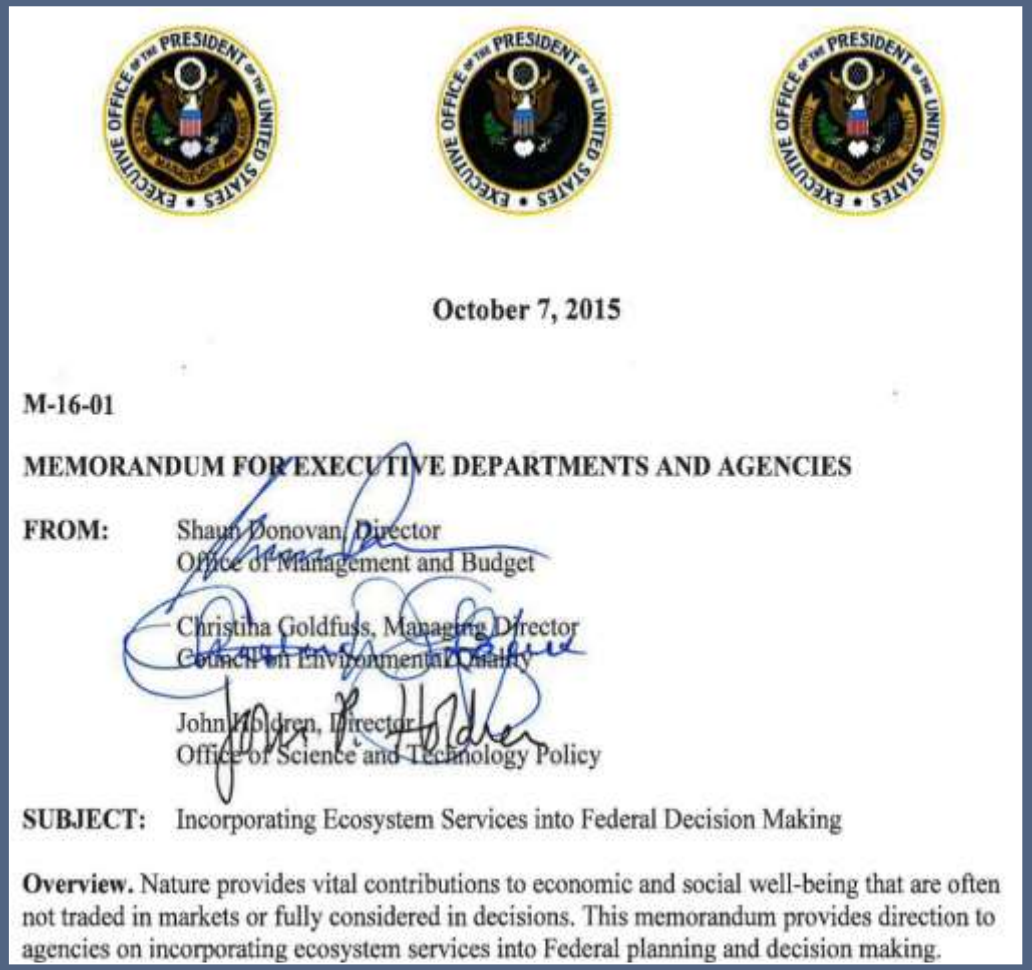
- Carbon thematic accounts – Based on NLCD 2001-2006-2011 and USGS LandCarbon C stock & flow models
- USGS Benefit Transfer Toolkit already separated out into NCA-compliant and non-compliant valuation studies (recreation)
- National modeling of changes in sediment & nutrient regulation, water yield, and other services at high resolution using national-scale data and supercomputers/cloud computing





Brown et al. 2016

Answering the demand for national-scale assessment



October 7, 2015

M-16-01

MEMORANDUM FOR EXECUTIVE DEPARTMENTS AND AGENCIES

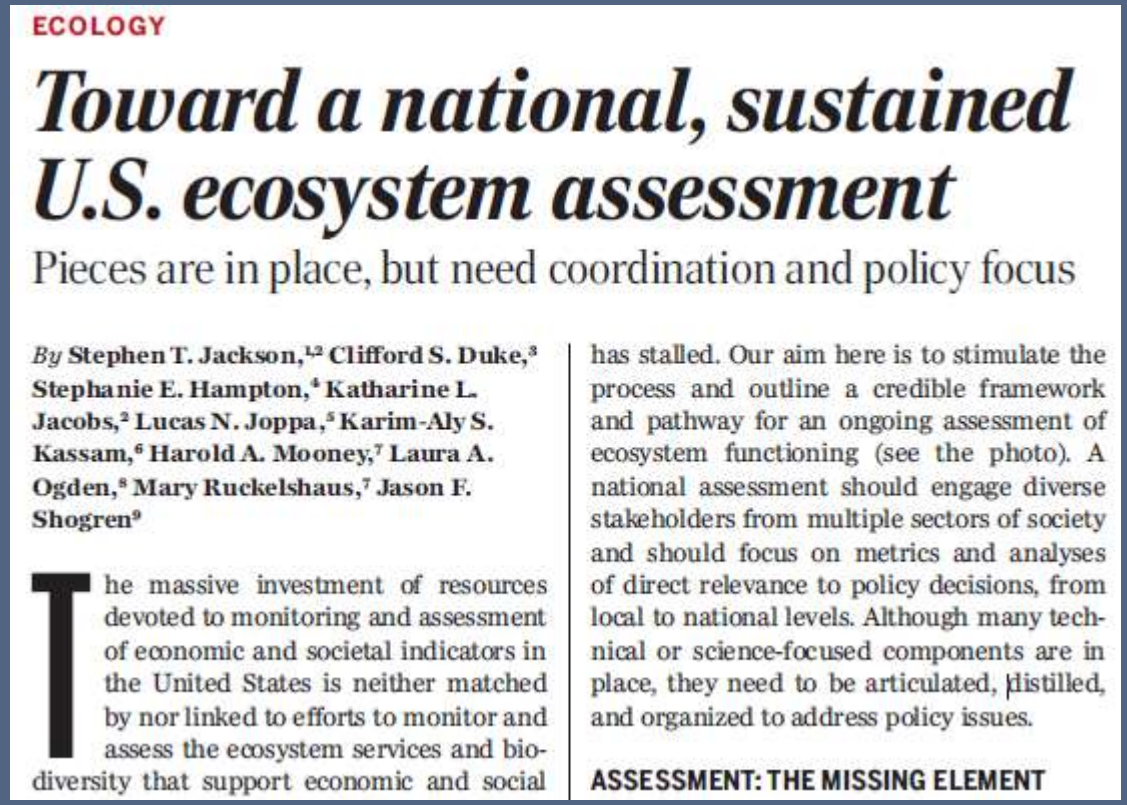
FROM: Shaun Donovan, Director
Office of Management and Budget

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.



ECOLOGY

Toward a national, sustained U.S. ecosystem assessment

Pieces are in place, but need coordination and policy focus

By **Stephen T. Jackson,[1,2] Clifford S. Duke,[3] Stephanie E. Hampton,[4] Katharine L. Jacobs,[2] Lucas N. Joppa,[5] Karim-Aly S. Kassam,[6] Harold A. Mooney,[7] Laura A. Ogden,[8] Mary Ruckelshaus,[7] Jason F. Shogren[9]**

The massive investment of resources devoted to monitoring and assessment of economic and societal indicators in the United States is neither matched by nor linked to efforts to monitor and assess the ecosystem services and biodiversity that support economic and social has stalled. Our aim here is to stimulate the process and outline a credible framework and pathway for an ongoing assessment of ecosystem functioning (see the photo). A national assessment should engage diverse stakeholders from multiple sectors of society and should focus on metrics and analyses of direct relevance to policy decisions, from local to national levels. Although many technical or science-focused components are in place, they need to be articulated, distilled, and organized to address policy issues.

ASSESSMENT: THE MISSING ELEMENT

Science 354:838-839 (Nov. 18, 2016)

Join us!

We envision our group's role as a *project broker* – synthesizing rather than generating all NCA-relevant data. Join us by:

- Learning more about NCA methods & applications;
- Contacting the authors to understand key data gaps & priorities to improve the scientific & decision-making value of NCA;
- Collaborating & contributing ecosystem service data, models, & accounts to the broader effort within the NCA framework.