



ECOLOGICAL RESEARCH PROGRAM

BUILDING A SCIENTIFIC FOUNDATION FOR SOUND ENVIRONMENTAL DECISIONS

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Introduction to ORD's Ecological Research Program

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National Program Director
Office of Research and Development
USEPA
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The Vision Beyond Ecosystem Services Research

Our vision of the future is a society with a full range of stable, resilient, productive ecosystems supplying human communities with the essential foundation of social, economic and cultural well being. This foundation consists of services supplied by ecosystems at multiple spatial and temporal scales.

ERP Goal

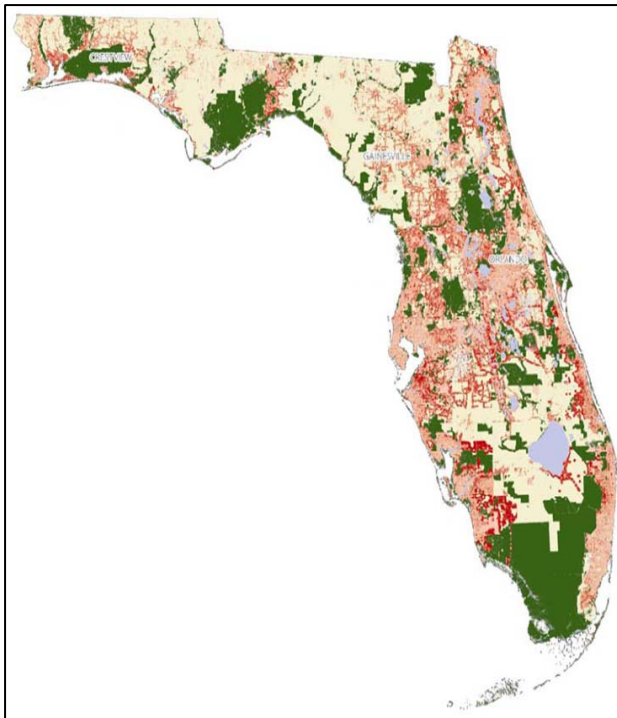
To transform the way we understand and respond to environmental issues by

making clear the ways in which our choices affect the type, quality and magnitude of the services we receive from ecosystems –

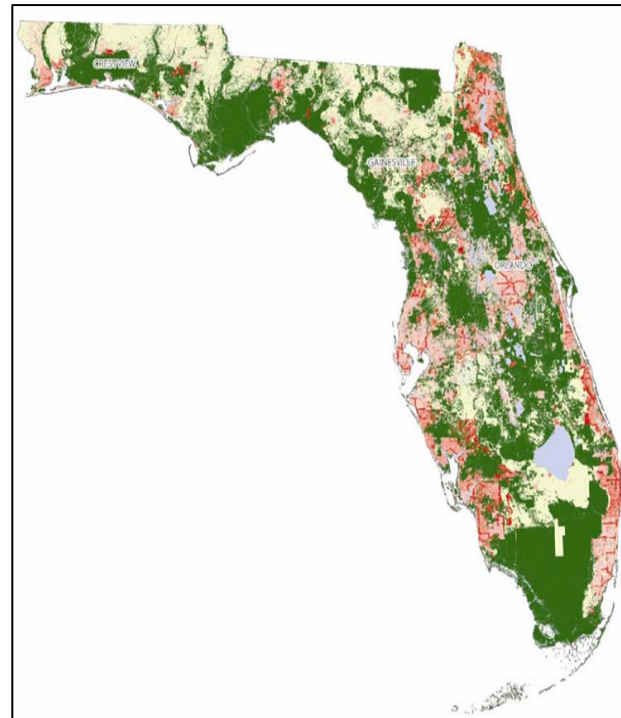
such as clean air, clean water, productive soils and generation of food and fiber.

Multiple Future Scenarios

2060 Current Trend



2060 Alternative

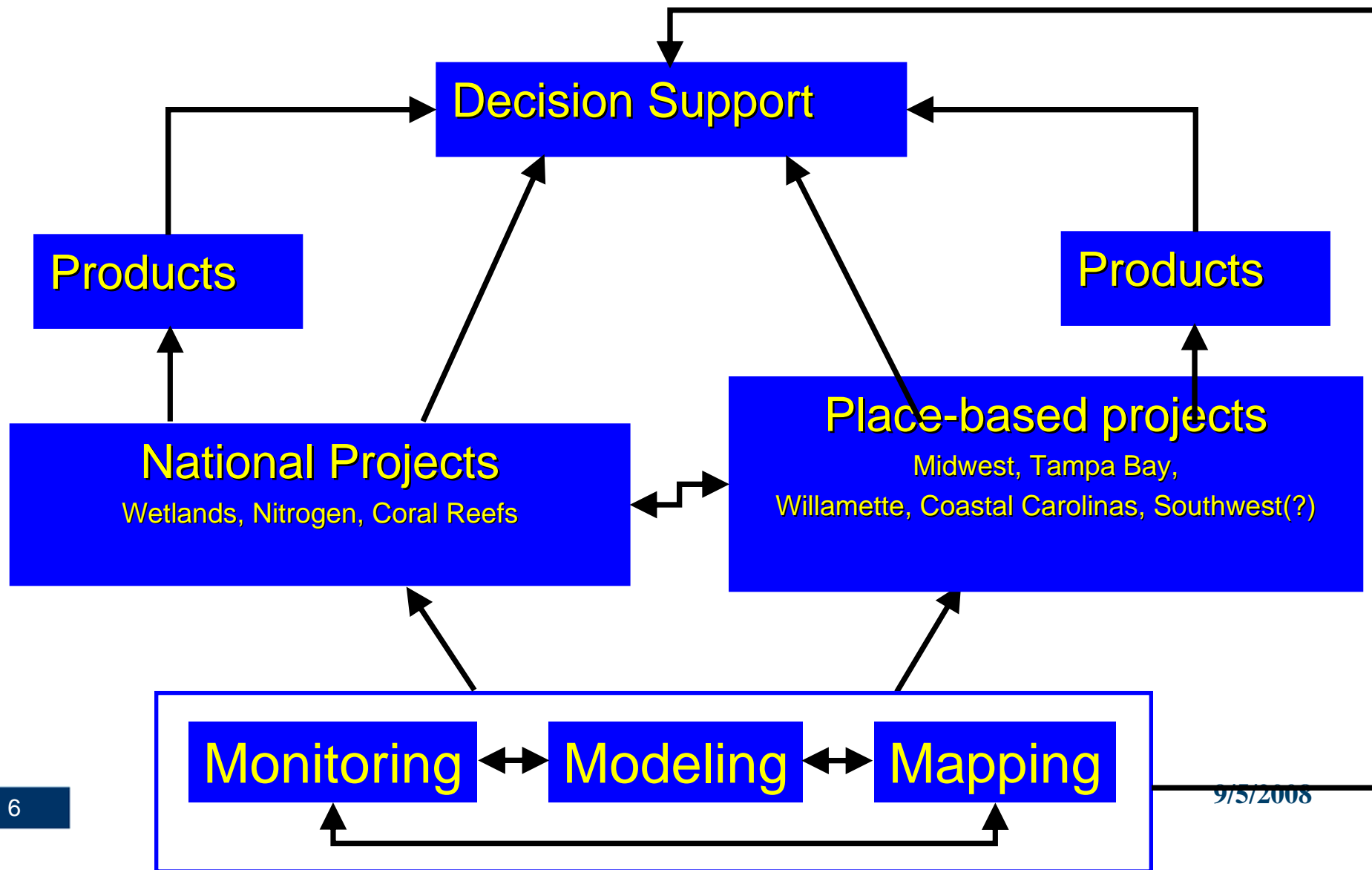


Advancing the “art of the possible”

New tools being created by ERP’s research may provide the Agency new ways to protect human health and the environment using a “systems approach.”

-- e.g., maps, alternative future scenarios, decision support tools to assess trade-offs, and new restoration methods.

- Provides new solutions not currently available.
- Shifting from reactive to proactive management.
- Supports sustainable environmental outcomes.



Decision support platform:

Envisions tools tailored to different uses, e.g.:

- Screening tools
- Tools related to spatial analysis and site-selection
- Optimization tools
- Tools for use in “operational” aspects of management

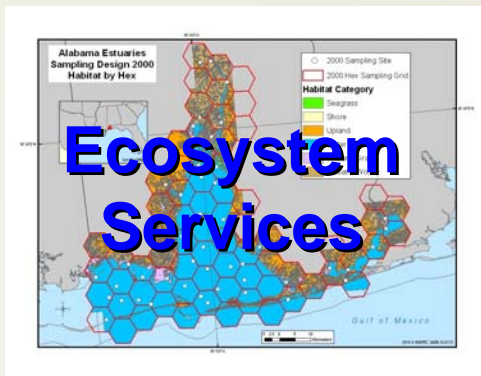
Mapping



Modeling



Services

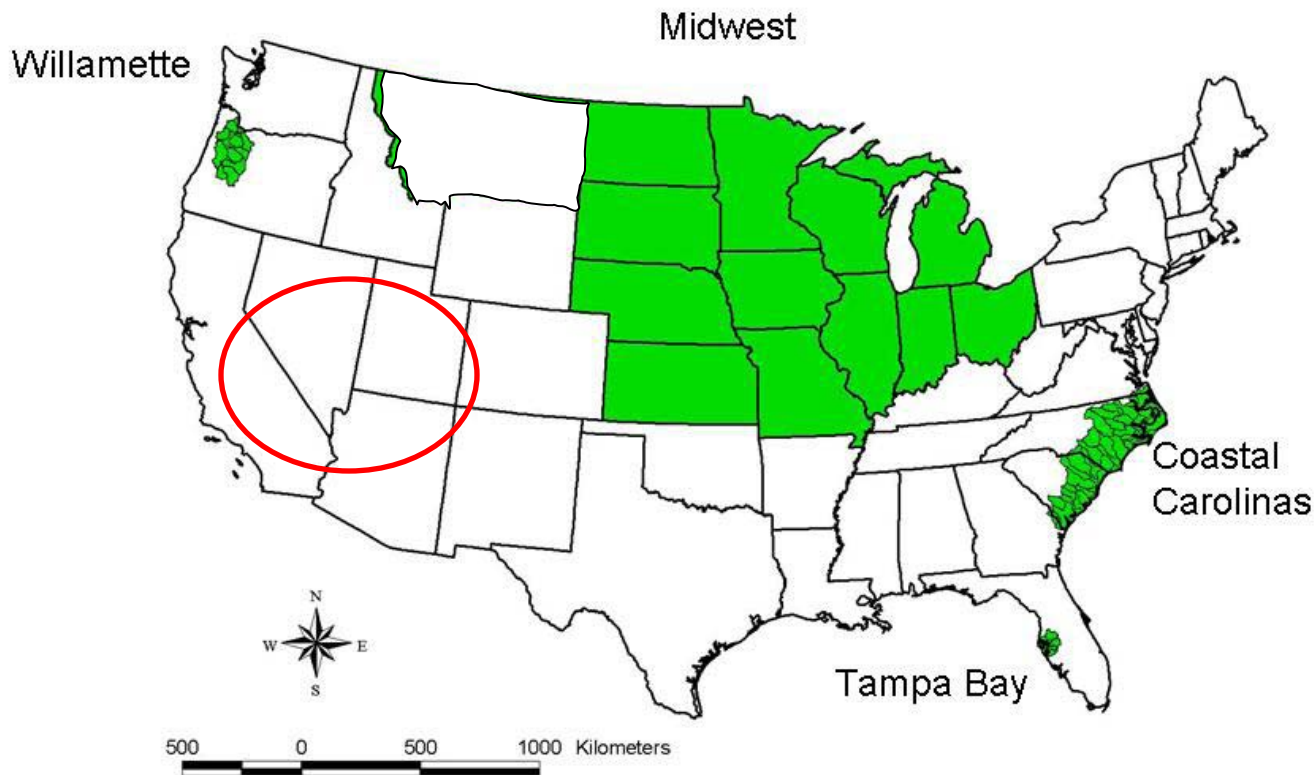


Monitoring

ERP Elements: a three pronged approach to research on ecosystem services

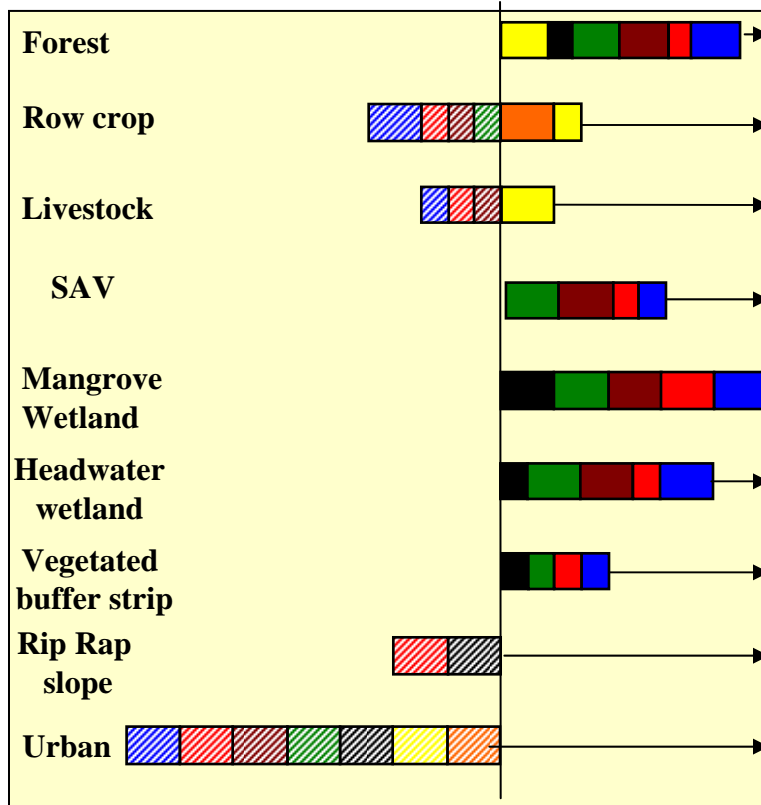
- **Pollutant-based research**
 - How does a regulated pollutant affect, positively and/or negatively, the suite of ecosystem services at multiple scales?
- **Ecosystem-based research**
 - How does the suite of ecosystem services provided by a single ecosystem type change under alternative management options at multiple scales?
- **Place-driven research**
 - How does the suite of ecosystem services for within a defined area change under alternative management options/drivers?

We are using place-based studies to develop, “ground-truth” and compare methods for a variety of environmental settings, scales, & stakeholder issues

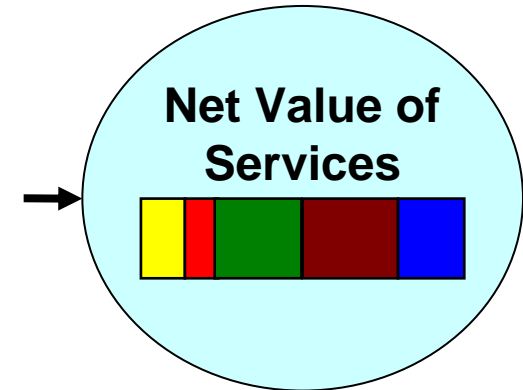
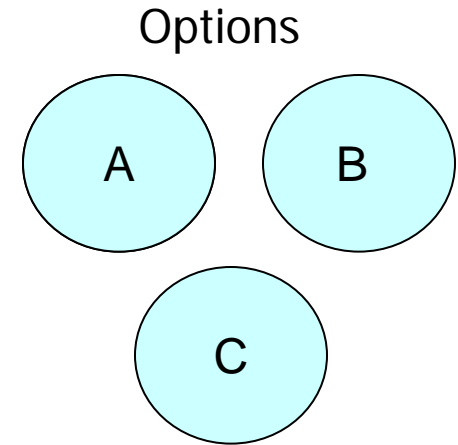


End Product

Relative Ecosystem Services Within an Ecosystem District



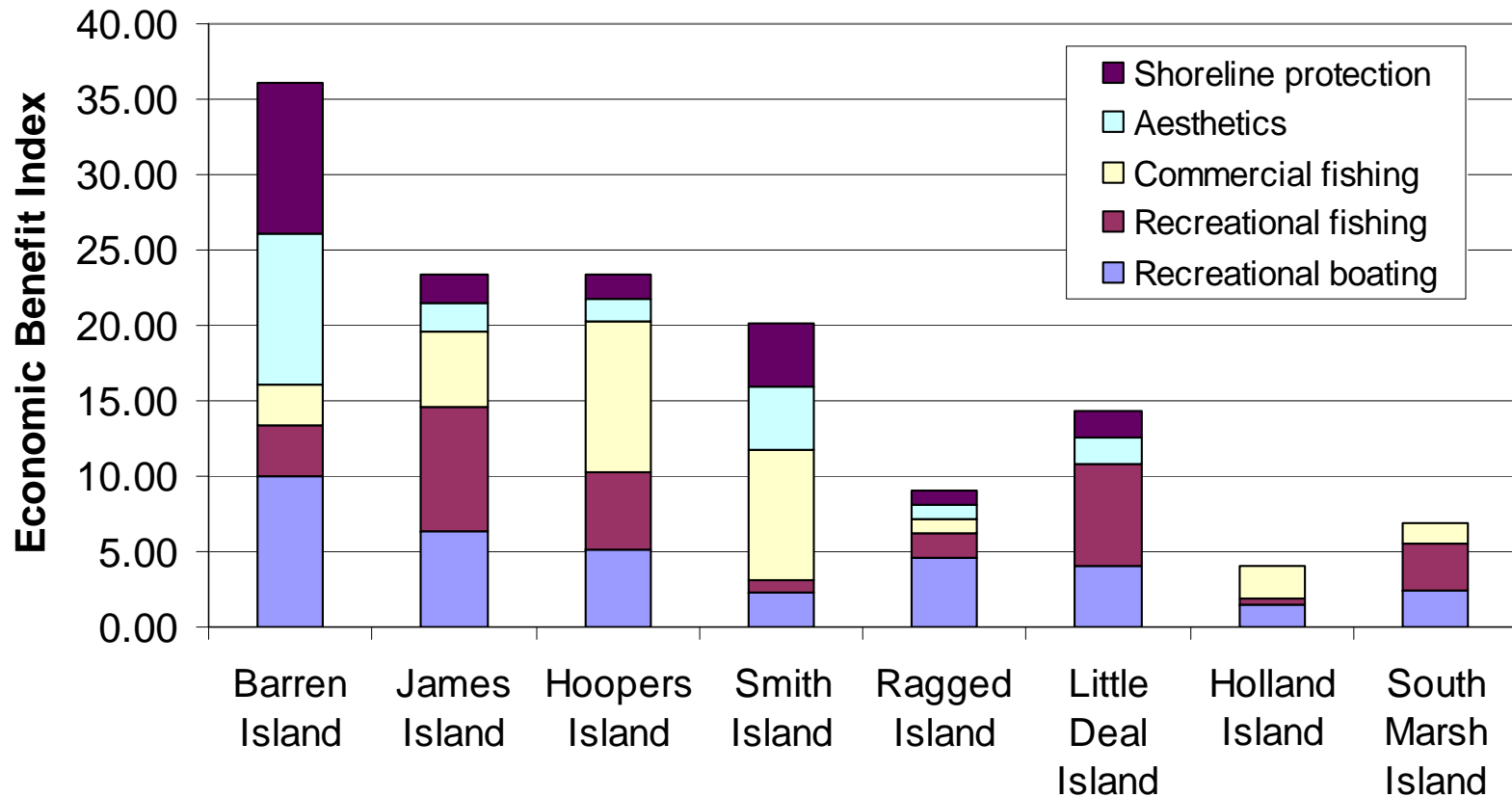
Scaling and Aggregation Under Alternative Management Scenarios



Management Option X

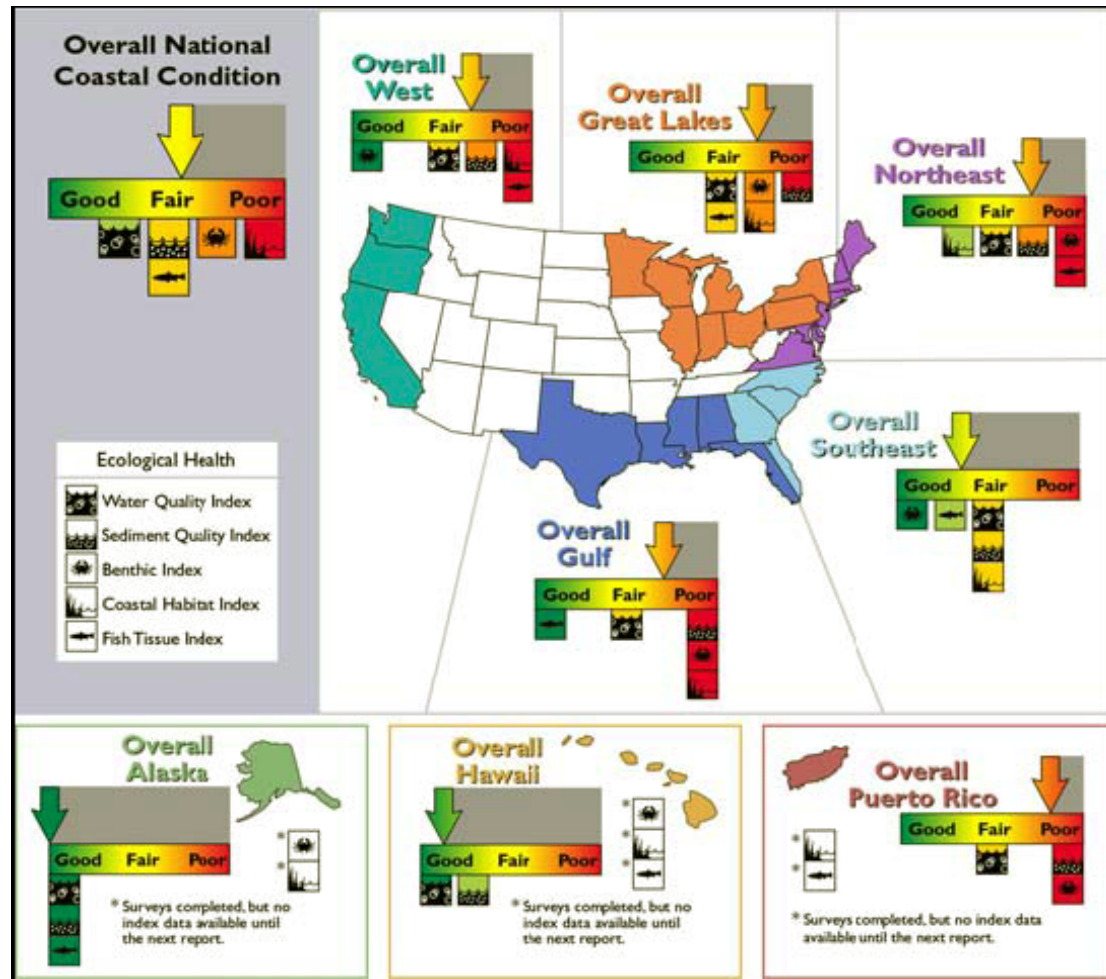
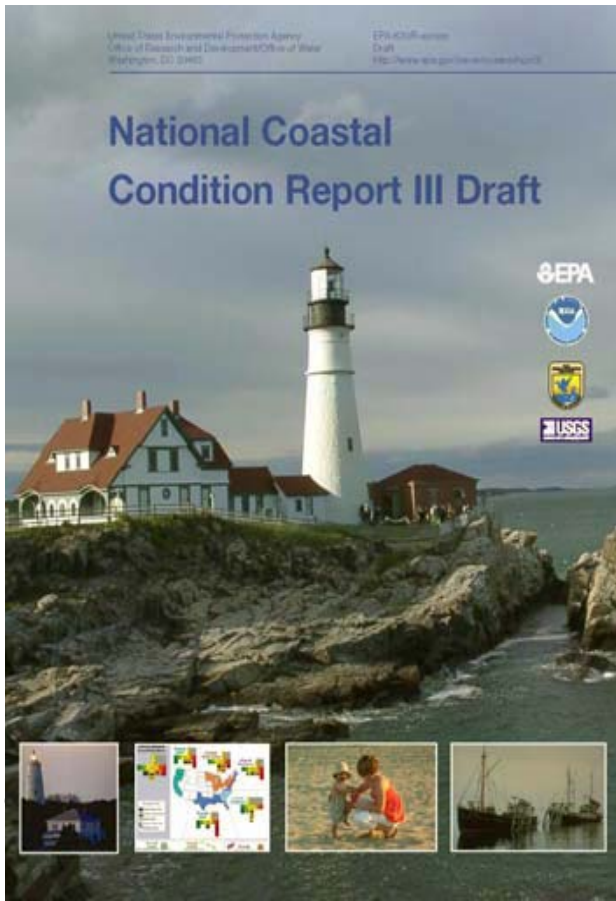
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Bundling Services ***Economic Benefit Indicators for*** ***Chesapeake Bay Island Sites***



“Mock-up” of potential future product to monitor trends in ecosystem services: example for coastal areas

Services include: storm surge/ flood protection, nutrient cycling, fisheries, recreation, and resilient human communities



Core ecosystem services: all will be quantified in biophysical metrics, some will be monetized

- ***Supporting Services:***
 - Carbon storage
 - Habitat/maintenance of biodiversity
- ***Regulating Services:***
 - Nutrient cycling
 - Flood reduction
 - Storm-surge protection
- ***Provisioning Services:***
 - Food and Fiber production
 - Fuels
 - Water-provisioning (described separately as water quality, quantity, and timing of flows)
- ***Cultural Services:***
 - Recreational opportunities
 - Sense of place

Applications of the Research

- ***Setting policies and guidelines***
 - that can achieve ecological protection through a variety of policy instruments that do not have the legal force of national rules;

- ***Quantifying benefits for national rule-making***
 - in response to the Office of Management and Budget data requirements for benefit–cost assessments;

- ***Developing environmental metrics and indicators for ecosystem services***
 - for use in periodic reports on the environment or for establishing environmental accounts within our national Gross Domestic Product accounts;

Applications of the Research

- ***Catalyzing market innovations***
 - that engage the private sector in achieving environmental protection objectives; and

- ***Evaluating management actions***
 - that assist decision makers and stakeholders in making choices with a common understanding of the implications and tradeoffs.



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