Ecosystem Services as a key to habitat conservation

Steve Schill, Caribbean Program

- Leveraging geospatial technology to understand patterns in ecosysten value across the Caribbean

Judy Haner, AL Coastal Program

- Living shorelines – evaluating the triple bottom line

Jen Molnar, Central Science

- Ecosystem, services and profits – engaging Dow Chemicals

Boze Hancock, Global Marine Team

- Oyster goals project – quantifying benefits to target new investments

Mark Spalding, Global Marine Team

- Mapping Ocean Wealth – making ecosystem services count

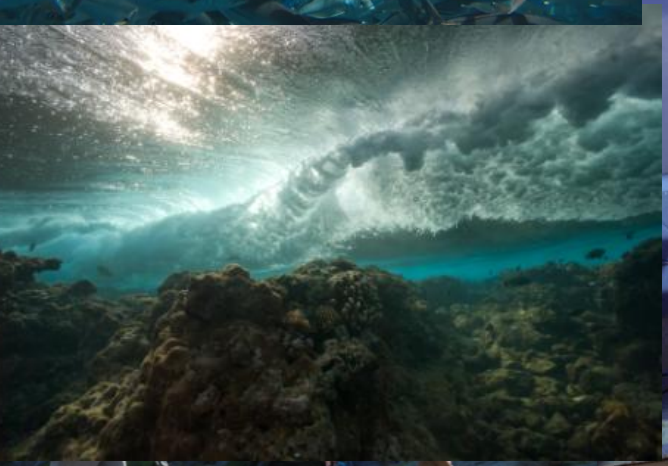
Pawan Patil

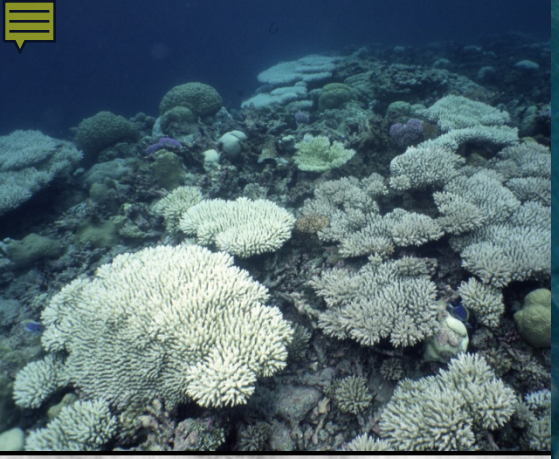
- How to leverage billions!

Mapping Ocean Wealth
making ecosystem services count

Mark D Spalding

- The challenge
- Building solutions, early success!
- Mapping Ocean Wealth



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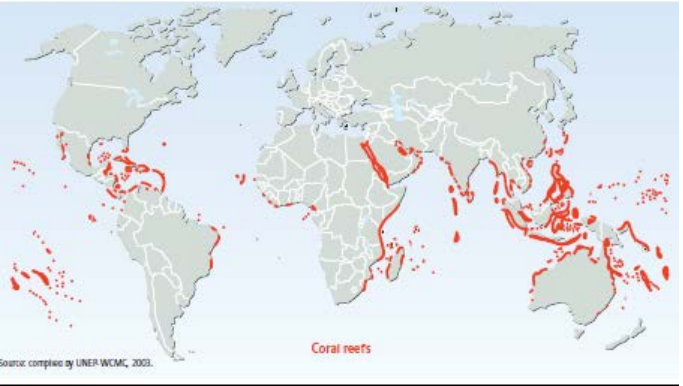
Why aren't the messages getting through?

1. Lack of data
2. Incomplete data
3. Challenging enabling environment

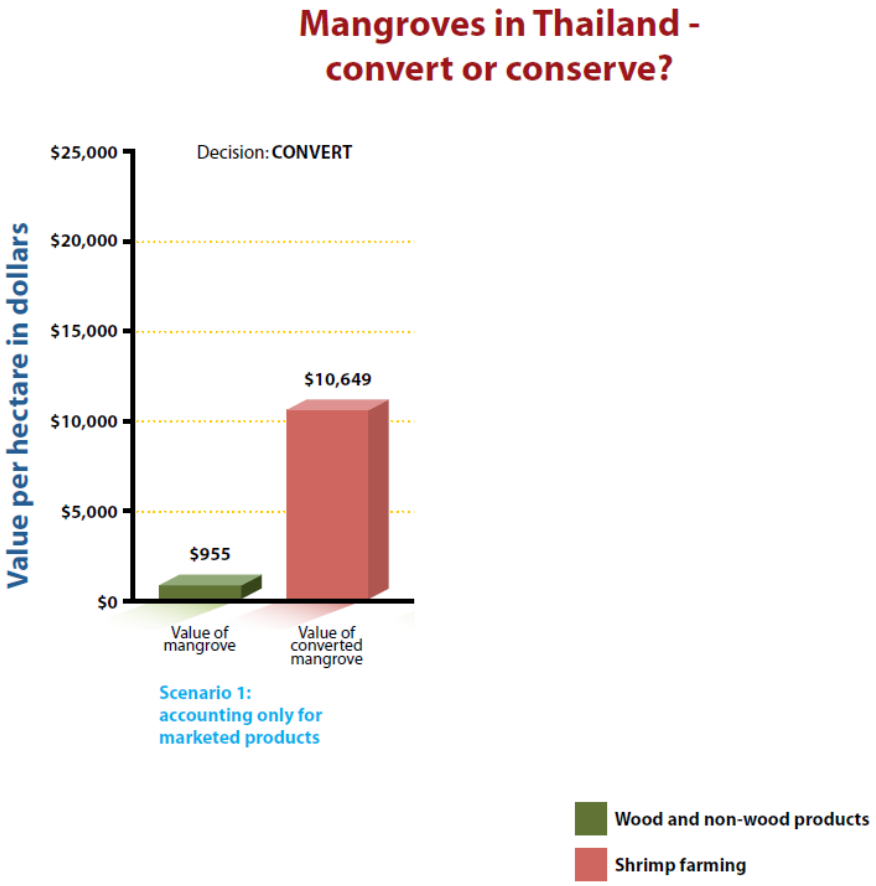
The problem of averages



e.g. coastal wetlands (saltmarsh and mangrove)

- Costanza, 1997 - \$9990 ha^{-1} yr^{-1}
- De Groot et al, 2012 - \$193,845 ha^{-1} yr^{-1}

Incomplete data

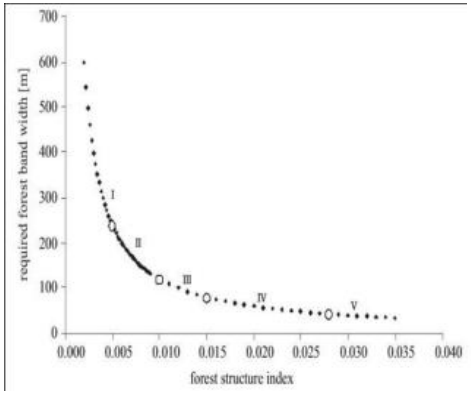


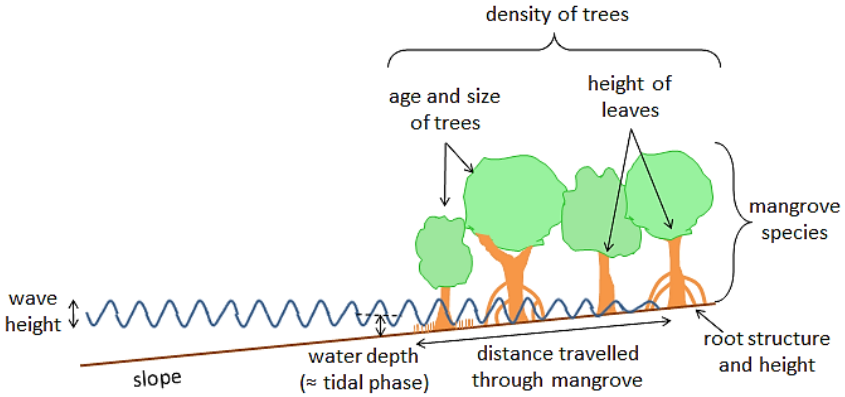
World Bank, 2012, based on Barbier, 2012

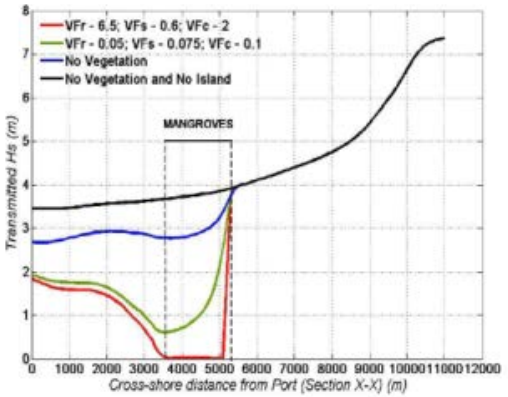
Ecosystem service assessment
4 elements

1. Review
   - understand the full body of science available describing any ecosystem service
2. Modelling
   - develop best possible models to describe ES delivery
3. Mapping
   - utilise models to deliver detailed maps, tools and other resources
4. Integration
   - combine multiple ecosystem services and support trade-off analyses.

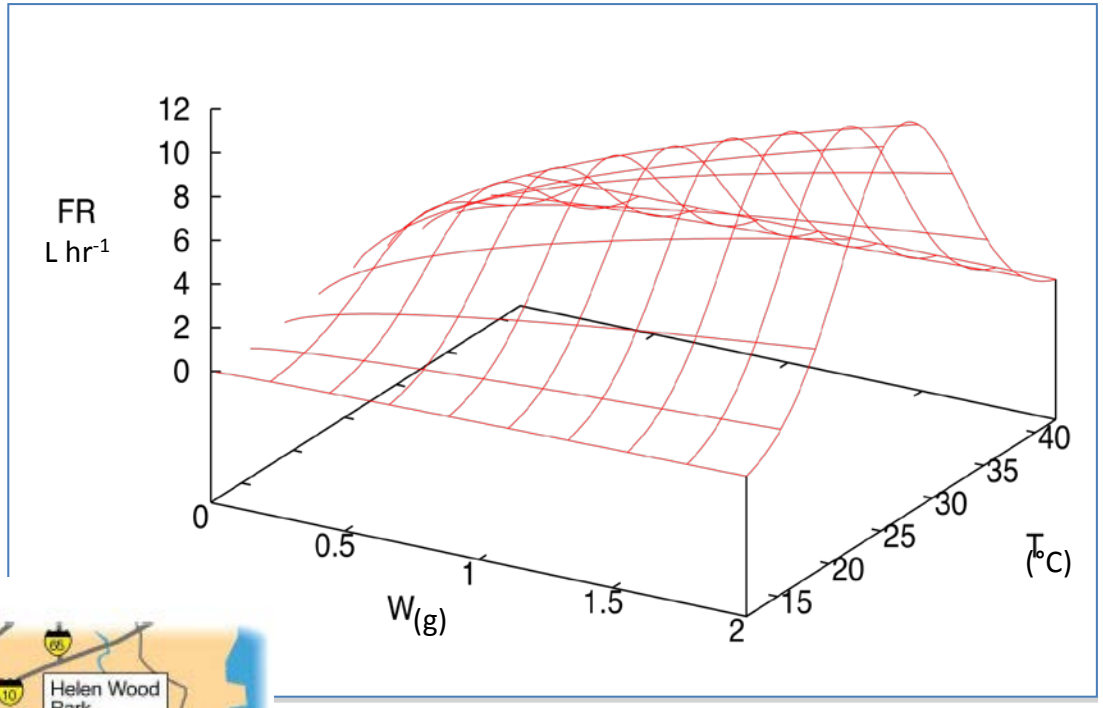
Review: coastal protection by mangrove forests

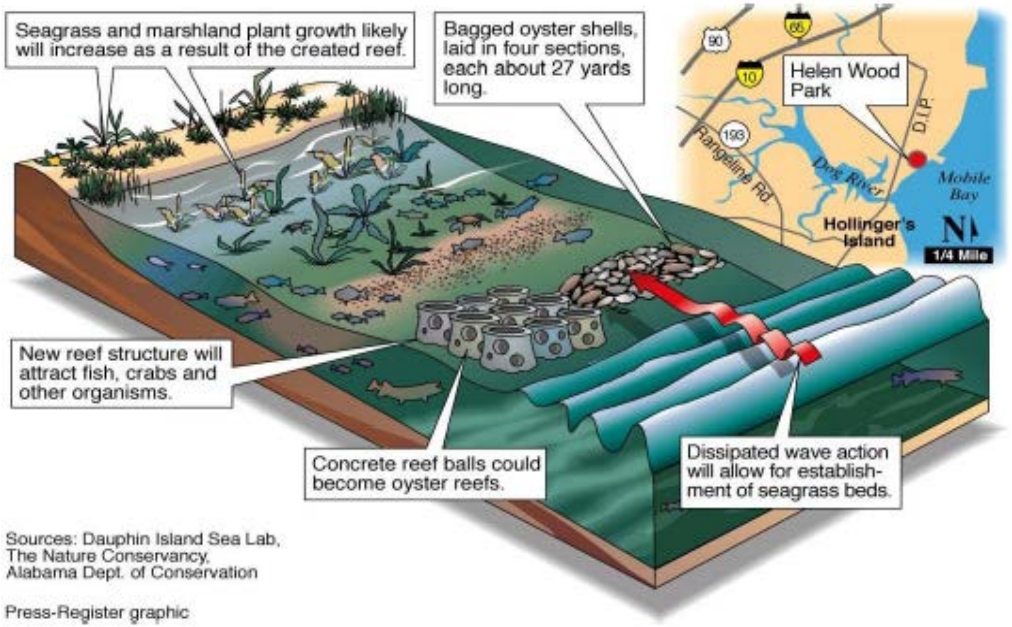


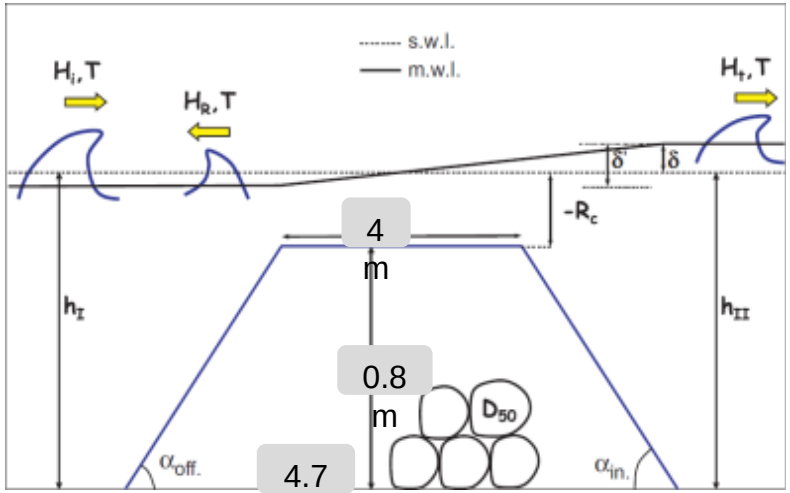




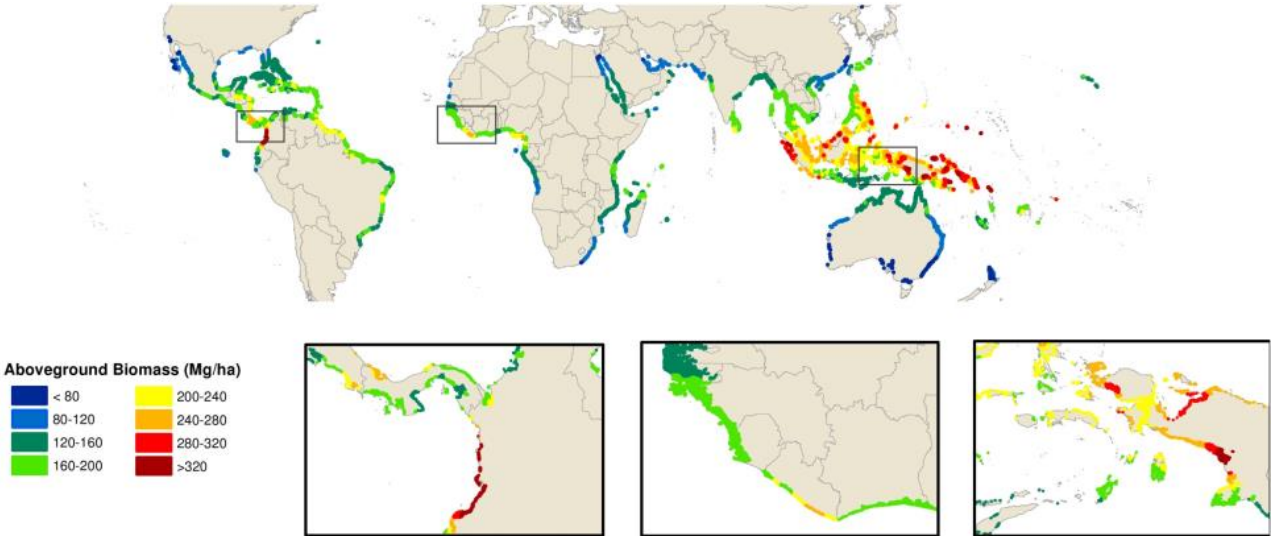
Modelling: filtration and coastal protection by oyster reefs

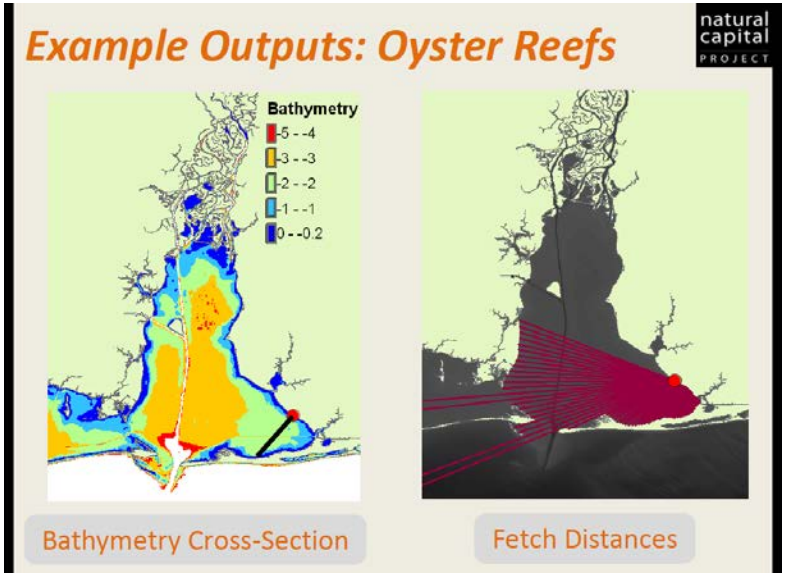


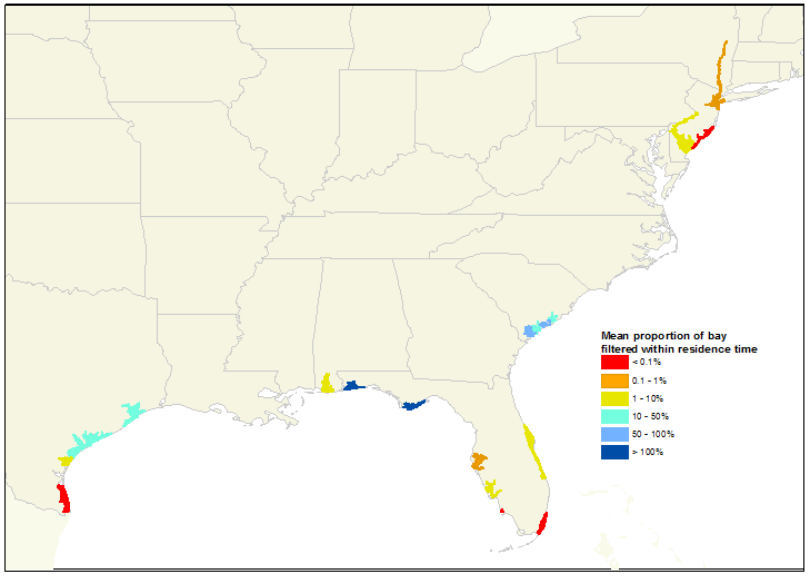




Mapping: biomass, filtration, wave attenuation







Integration: service bundles, trade-off analyses

Ecosystem service tradeoff analysis reveals the value of marine spatial planning for multiple ocean uses

Crow White[a,1], Benjamin S. Halpern[b], and Carrie V. Kappel[b]

[a]Bren School of Environmental Science and Management, University of California, Santa Barbara, [b]National Center for Ecological Analysis and Synthesis, University of California, Santa Barbara, CA 93101

Edited by Peter M. Kareiva, The Nature Conservancy, Seattle, WA, and approved February 2, 201

Marine spatial planning (MSP) is an emerging responsibility of resource managers around the United States and elsewhere. A key proposed advantage of MSP is that it makes tradeoffs in resource use and sector (stakeholder group) values explicit, but doing so requires tools to assess tradeoffs. We extended tradeoff analyses from economics to simultaneously assess multiple ecosystem services and the values they provide to sectors using a robust, quantitative, and transparent framework. We used the framework to assess potential conflicts among offshore wind energy, commercial fishing, and whale-watching sectors in Massachusetts and identify and quantify the value from choosing optimal wind farm designs that minimize conflicts among these sectors. Most notably, we show that using MSP over conventional planning could prevent >$1 million dollars in losses to the incumbent fishery and whale-watching sectors and could generate >$10 billion in extra value to the energy sector. The value of MSP increased with the greater the number of sectors considered and the larger the area under management. Importantly, the framework can be applied even when sectors are not measured in dollars (e.g., conservation). Making tradeoffs explicit improves transparency in decision-making, helps avoid unnecessary conflicts attributable to perceived but weak tradeoffs, and focuses debate on finding the most efficient solutions to mitigate real tradeoffs and maximize sector values. Our analysis demonstrates the utility, feasibility, and value of MSP and provides timely support for the management transitions needed for society to address the challenges of an increasingly crowded ocean environment.

ecosystem-based management | efficiency frontier | multisector planning | bioeconomic model | renewable energy

Coastal waters around the world are experiencing increasing demand for their diverse human benefits, or ecosystem services. Demand comes from existing sectors, such as fishing and transportation, that seek to expand their activities and emerging sectors, such as renewable energy and offshore aquaculture. The need to coordinate these human uses to reduce impacts across sectors is prompting calls for ecosystem-based coastal and marine spatial planning (MSP) (1). In the United States, Executive Order 13547 mandates this approach to marine resource management, and many US states and other countries have recently passed legislation emphasizing MSP (e.g., ref. 2).

Despite mounting interest in MSP, it has been difficult to implement for at least two reasons (3). First, user groups are wary of negative effects of regulatory changes to the status quo, and they legitimately ask for evidence that MSP will generate improvements. Evidence of benefits could include increased management efficiency, greater stakeholder involvement, and outcomes that better achieve management goals. Here, we illustrate how single- and multisector management decisions affect sector values and how MSP (i.e., coordinated multisectoral planning for reducing sector conflicts and increasing their values) can explicitly improve sector values while achieving management goals, thus enhancing potential for stakeholder buy-in.

A second barrier to MSP is that the science for assessing and communicating tradeoffs among human uses of the ocean, and identifying strategies to mediate these tradeoffs, has been slow to catch up with policy opportunities emerging from efforts to implement ecosystem-based management, MSP, and marine pro-

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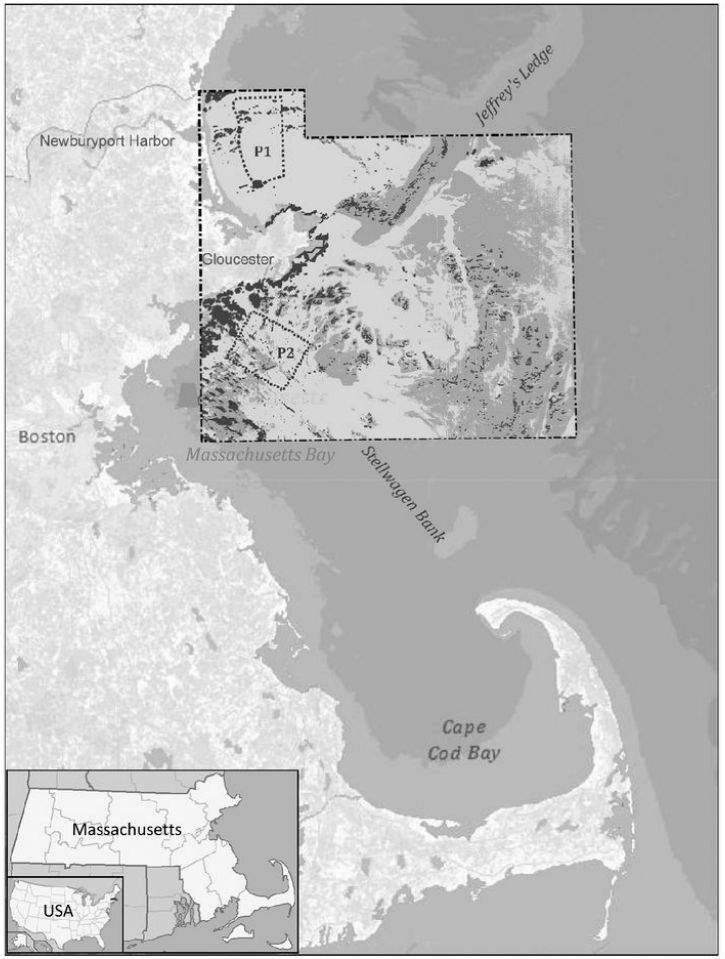
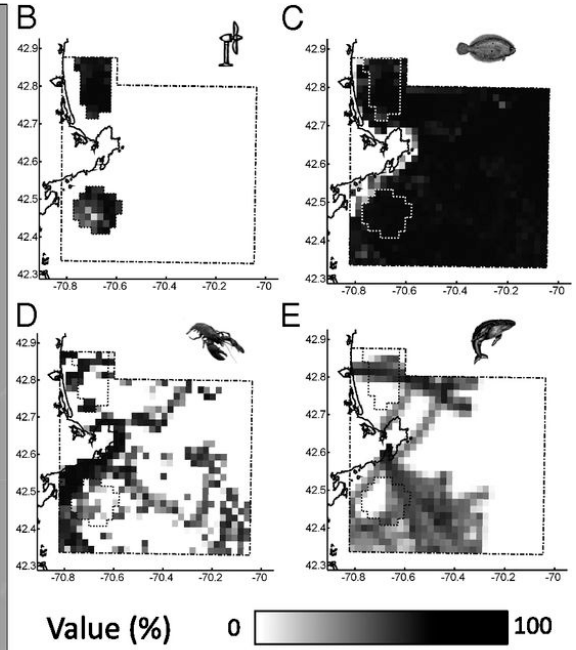




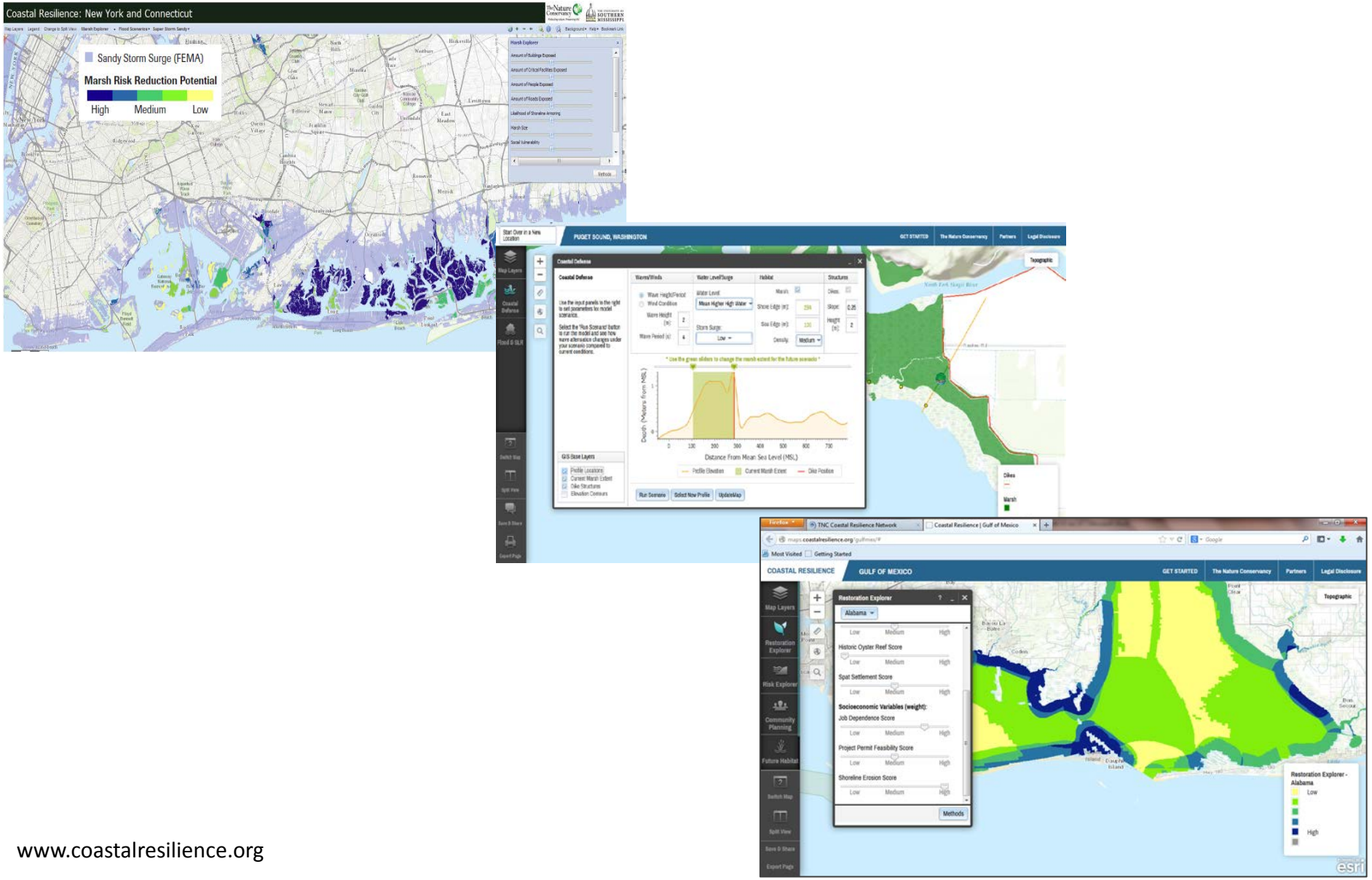
Legend for map A

- Study area
- Provisional wind energy areas
- Sand, silt or mud
- Gravel
- Rock

Massachusetts Bay and spatial distributions of resources and sector values.

White C et al. PNAS 2012;109:4696-4701

Planning tools and decision support



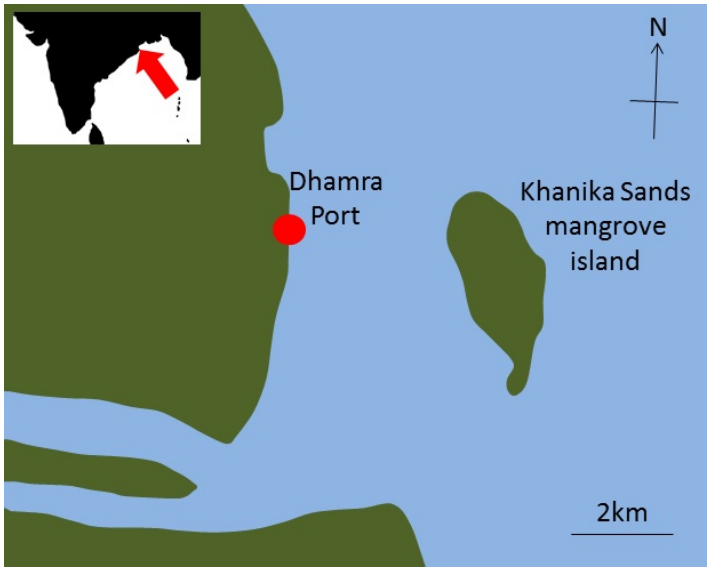
www.coastalresilience.org

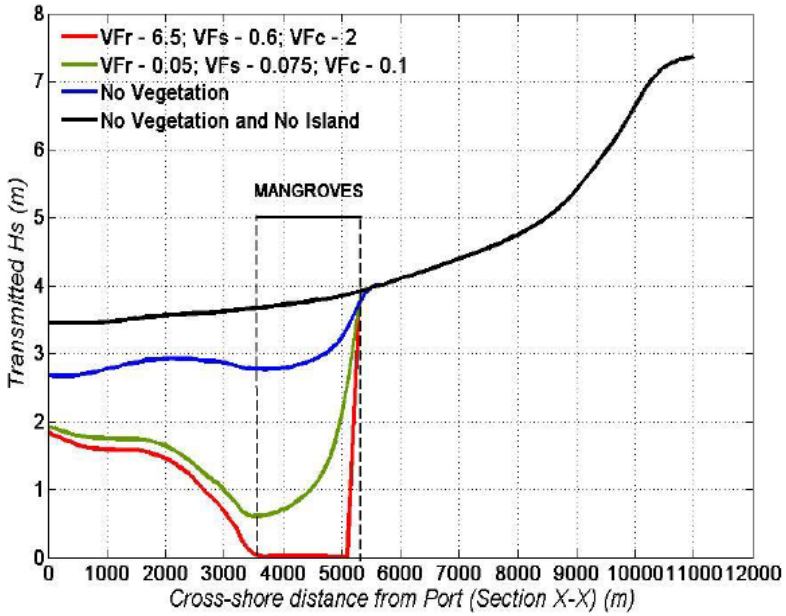
Influencing key sectors

Mangrove island in front of Dhamra Port, Orissa, India:

- increases the return period of a 2.5m wave reaching the port from 20 years to 60 years.
- An extension of the island to the north would further decrease wave height at the port.

(Narayan *et al.* , 2010)





Mangrove Capital partnership

Practical solutions

Scientific Evidence

Enabling policies

- National Mangrove Strategy influenced
- Invited for feedback to Greenbelt Law
- Invited to help draft National Technical guidelines on
  - Hybrid engineering
  - Mangrove restoration in aquaculture
- Invited to provide design for 2 demo sites (each 1000 ha) of aquaculture rehabilitation program
- Building with nature experiment embedded in Resilient Villages program by MMAF
- Facilitated 2 District Management plans (Mangrove & Aquaculture area)
- Best Management Practice by Aquaculture smallholders influenced
- Mangrove deforestation moratorium in NTT
- Provided feedback to ASC restoration appendix and invited to help roadtesting it
- Input to Indonesian Aquaculture Standard (CBIB) => MMAF is now chair of ASEAN so potentially big influence

We are already hard at work

- Wave attenuation science:
  - Mangroves
  - Saltmarshes
  - Coral reefs
  - Oyster reefs
- Oyster reefs
  - Filtration
  - Fish stock enhancement
- Seagrass
  - Fish stock enhancement
- Mangroves:
  - Storm surge attenuation
  - Elevation
  - Carbon
  - Fisheries
- Tools
  - Coastal resilience
  - NatCap Marine InVEST
- Practical interventions
  - Oyster restoration, Atlantic and Gulf
  - Mangrove restoration, Greneda
  - Post Sandy response
  - Reef resilience
  - Economic valuations

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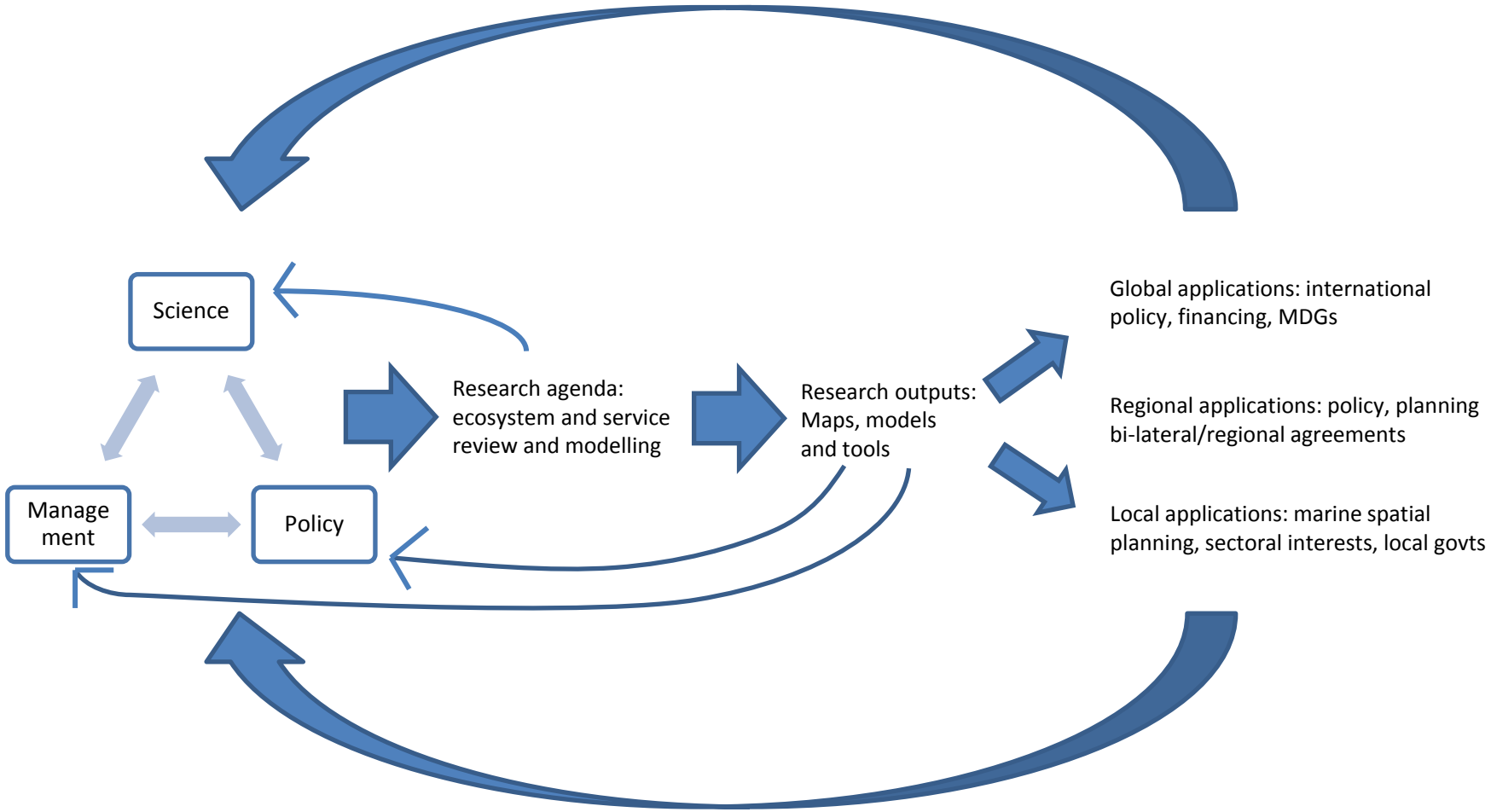
Mapping Ocean Wealth

Science, maps and tools to change the way the world sees nature

Aiming to influence policy and action in multiple sectors – government, development, conservation, business…

- Creating detailed information targeted for decision-makers
- Building partnerships, sharing information
- Strengthening and nurturing scientists and innovative science
- Working across scales
- Focus and improve investment decisions, for people and for nature


Science
Research agenda: ecosystem and service review and modelling
Research outputs: Maps, models and tools
Global applications: international policy, financing, MDGs
Regional applications: policy, planning bi-lateral/regional agreements
Local applications: marine spatial planning, sectoral interests, local govts
Manage ment
Policy

Science

- Ecosystem x Service science - review, model-building, mapping
- Consolidation - ES bundling and trade-off analyses
- Expert reports, publications, shared datasets

Outreach and comms

- Tools, data portals, decision-makers guides
- Communications – press, industry, public
- Policy change

Field led elements

- Field led science
- Building ES quantification into action (MSP, policy influence…)
- Policy change, leverage to other geographies

natural capital PROJECT

UNEP

CORAL TRIANGLE INITIATIVE
ON CORAL REEFS, FISHERIES AND FOOD SECURITY

The Economics of Ecosystems & Biodiversity

GLOBAL PARTNERSHIP FOR OCEANS

Deltares
Enabling Delta Life

WILDLIFE CONSERVATION SOCIETY

Science

- Ecosystem x Service science - review, model-building, mapping
- Consolidation - ES bundling and trade-off analyses
- Expert reports, publications, shared datasets

WAGENINGEN UR
For quality of life

Outreach and comms

- Tools, data portals, decision-makers guides
- Communications – press, industry, public
- Policy change

MESP

IUCN

CONSERVATION INTERNATIONAL

Field led elements

- Field led science
- Building ES quantification into action (MSP, policy influence…)
- Policy change, leverage to other geographies

Duke NICHOLAS INSTITUTE FOR ENVIRONMENTAL POLICY SOLUTIONS

WETLANDS INTERNATIONAL

WAVES

CambridgeConservationInitiative
transforming the landscape of biodiversity conservation

Mapping Ocean Wealth

TNC Team

- Project co-ordinators
- Policy lead
- Decision support tools
- Communications and outreach
- Regional representatives
- Project manager - tbd

Core Advisory Group

- Linwood Pendleton, ESP/ Duke
- Les Kaufman, Boston
- Marea Hatziolos, Consultant
- Rashid Sumaila, UBC
- Lauretta Burke, WRI
- Pawan Patil, World Bank
- Anne Guerry, NatCap/InVEST
- Carter Ingram, WCS
- FAO
- WWF
- Other industry/users?

Breakout discussions

1. Who are the critical NEW audiences for ES valuation?

- not just who needs to know, but why?
- … of these who is ready to listen?

2. How do we make a compelling case to these audiences?

- Global versus local
- Tools versus stories
- Maps versus numbers
- Dollar values versus other measures (jobs, tons of fish)

3. How do we use ES values to influence policy and management?

- Mapping tools
- Technical products
- Communications

Provide examples!

4. `What work do you know of across TNC which might feed into ES valuation and Mapping Ocean Wealth?