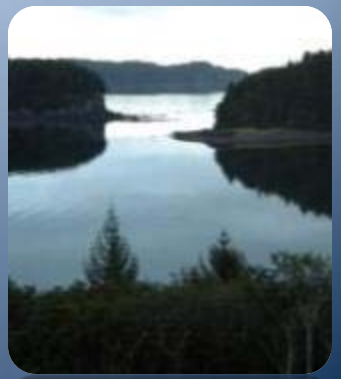
Science * Stewardship * Sustainability



Marine Spatial Planning:
A Tool for Implementing Ecosystem-Based Management

Steven Murawski, Ph.D., Ecosystem Goal Team Lead
National Oceanic and Atmospheric Administration | NOAA
November 16, 2009

The Imperative for Implementing Ecosystem Based Management

"*To succeed in protecting the oceans, coasts, and Great Lakes, the United States needs to act within a unifying framework under a clear national policy, including a comprehensive, ecosystem-based framework for the long term conservation and use of our resources*".

President Barack Obama

June 12, 2009

Creation of the Ocean Policy

Task Force

EBM – NOAA's View

"*EBM is an approach that provides a comprehensive framework for marine and coastal resource decision making. In contrast to individual species or issue management, EBM considers a wider range of relevant ecological, environmental and human factors bearing on societal choices regarding resource use".*

Characteristics: (1) geographically specified, (2) adaptive, (3) accounts for ecosystem knowledge and uncertainties, (4) multiple simultaneous drivers, (5) strives to balance diverse societal objectives, (7) incremental, (8) collaborative

What is Coastal & Marine Spatial Planning?

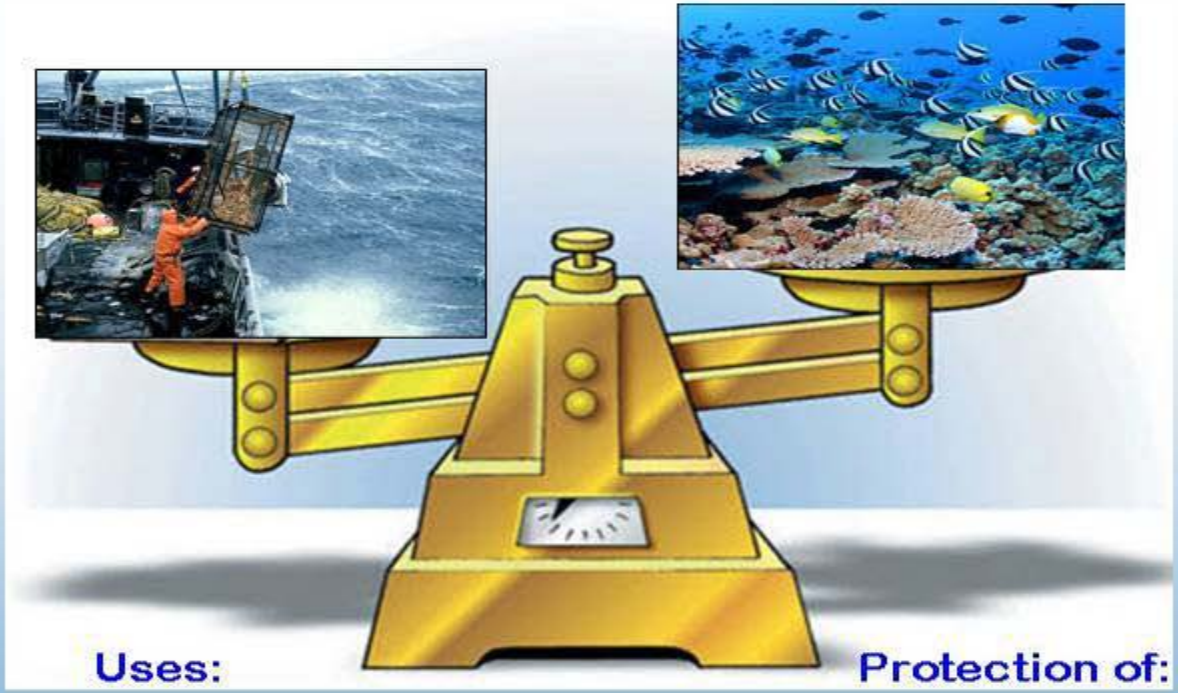
MSP is:

A comprehensive, ecosystem-based process through which compatible human uses are objectively and transparently allocated to appropriate ocean areas to sustain critical ecological, economic and cultural services for future generations.

The goals of MSP are:

To maximize societal benefits of ocean uses, while minimizing impacts on ecologically sensitive areas and species and reducing conflicts between incompatible activities sharing marine locations

Coastal and Marine Spatial Planning: Implement comprehensive, integrated ecosystem-based coastal and marine spatial planning and management in the United States.



- Fisheries & Aquaculture
- Alternative Energy
- Military Readiness
- Bioprospecting
- Coastal Development

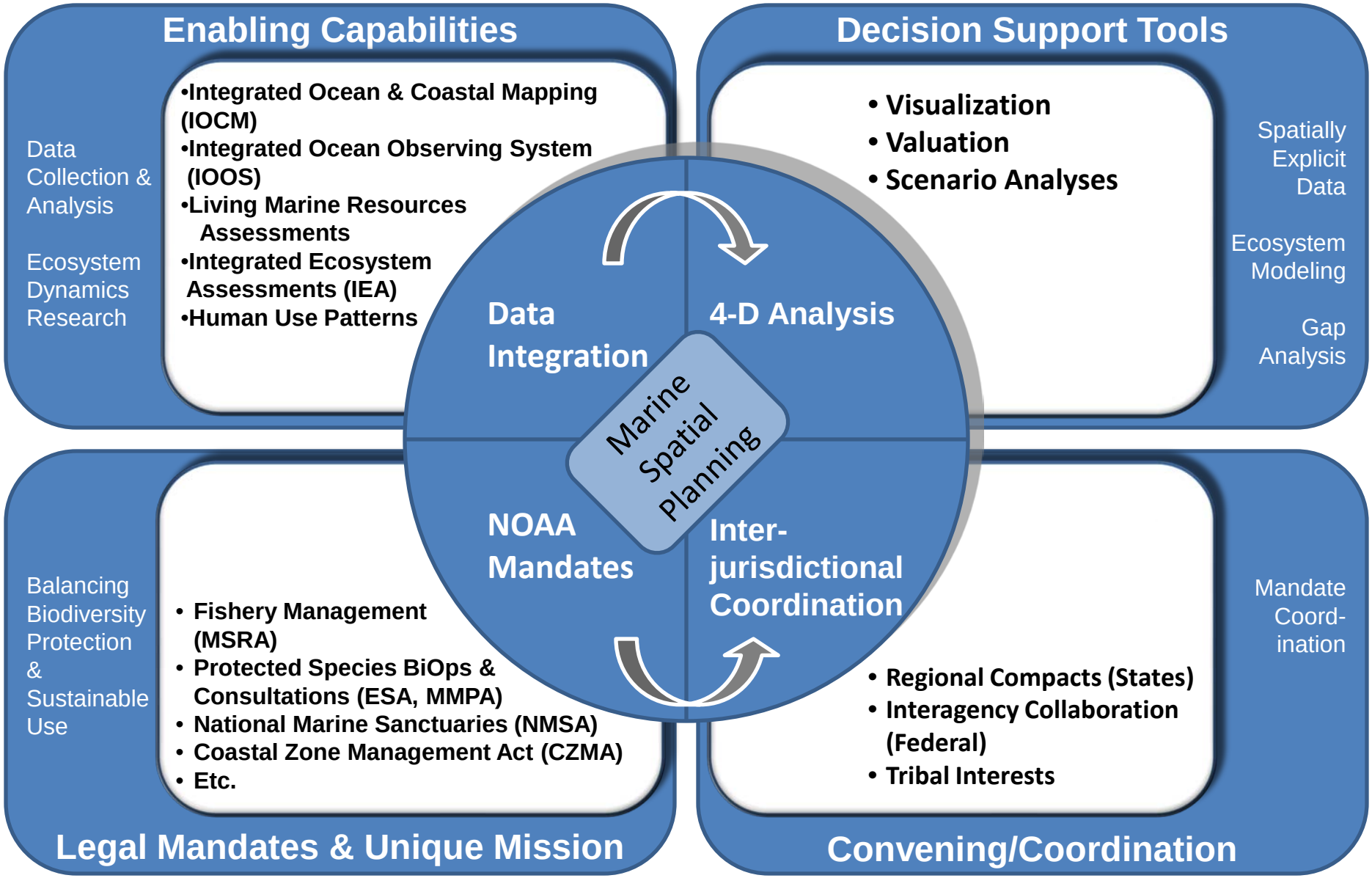
- Ocean Biodiversity
- Protected Species
- Vulnerable Habitats
- Coastal Communities
- Cultural Resources

Balancing the Sustainable Use and Protection of the Oceans and Coasts

Key Elements to a MSP Framework

- A Coherent Definition of MSP
- Geographical Extent
- Regional Planning Structure
- Enforceability
- Stakeholder Participation
- National Goals for Plans
- Capacity Building
- Technical Support & Infrastructure

Critical NOAA Capabilities Supporting Marine Spatial Planning



Coastal & Marine Spatial Planning: Technical Requirements

Enhanced Mapping & Cadastre

Ocean Habitat Characterization Studies

Monitoring

Enforcement

Hydrodynamic Models

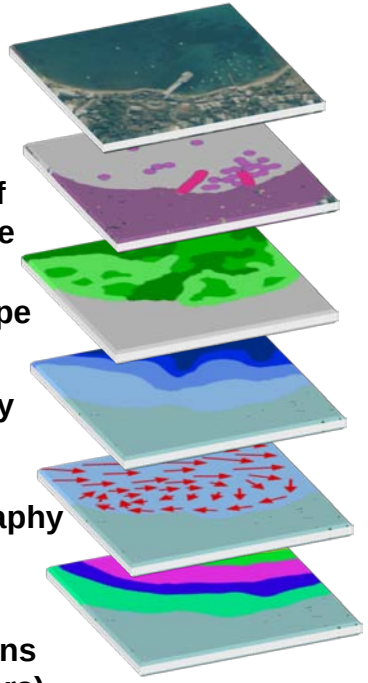
Living Marine Resource Assessments

Characterization of Human Use Patterns

Integrated Ecosystem Assessments (IEAs)

Biogeographic Assessment Approach to Support CMSP

Biogeographic Data Layers

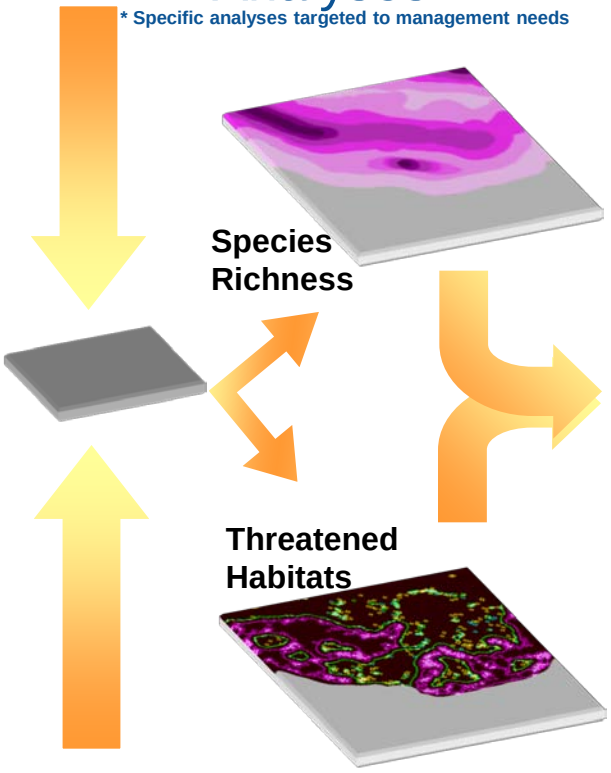


- Imagery
- Patterns of Human Use
- Bottom Type
- Bathymetry
- Oceanography
- Species Distributions (many layers)

Combine Biogeographic Layers for Analysis

Example Integrated Biogeographic Analyses*

* Specific analyses targeted to management needs



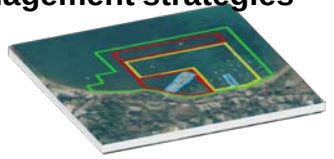
Analytical Products to Meet Management Objectives

Products to Aid Management

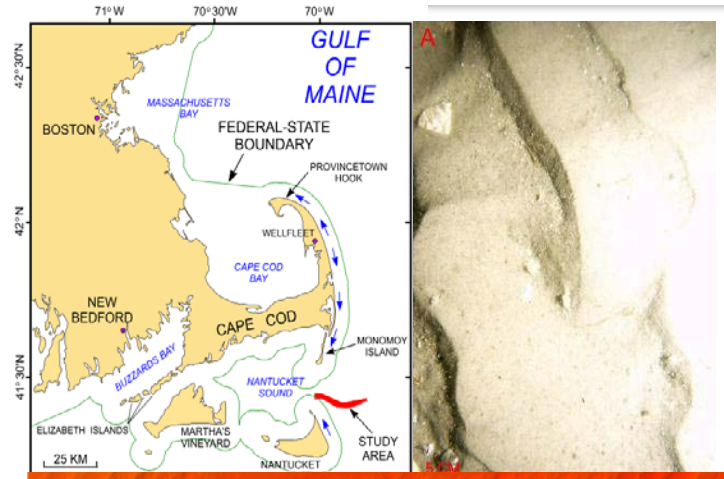
Evaluate internal zone boundaries relative to biological resources

Explore options for reducing ecosystem threats

Evaluate alternative management strategies



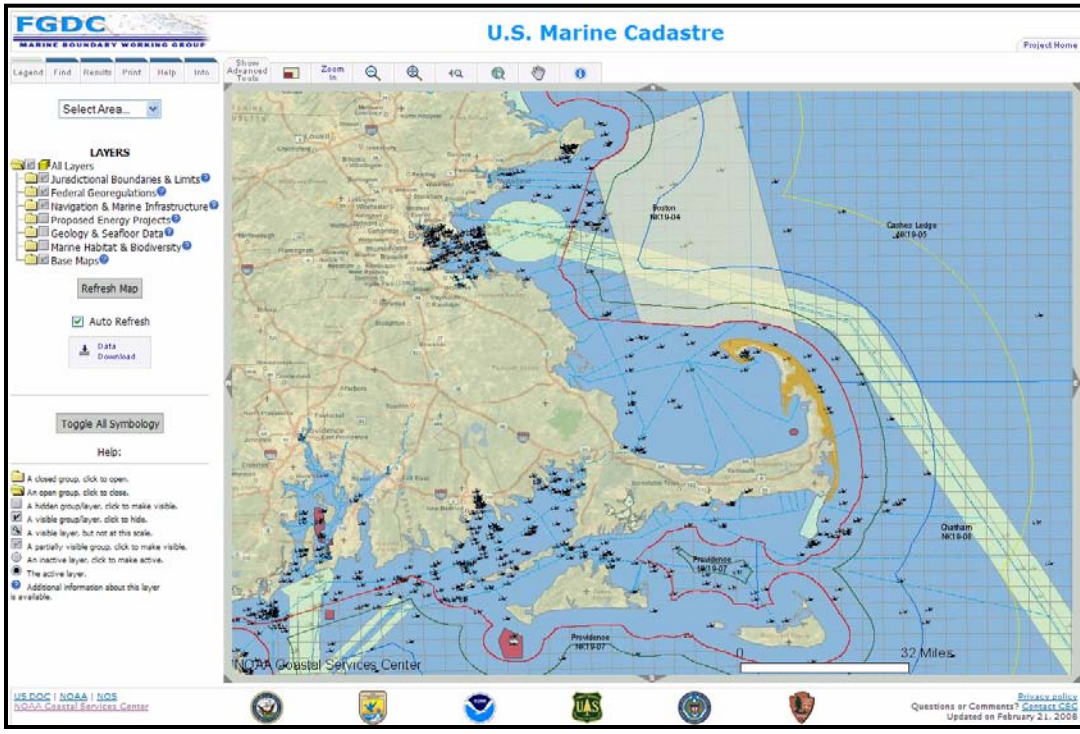
Mapping and Cadastre



Bathymetric Position Index

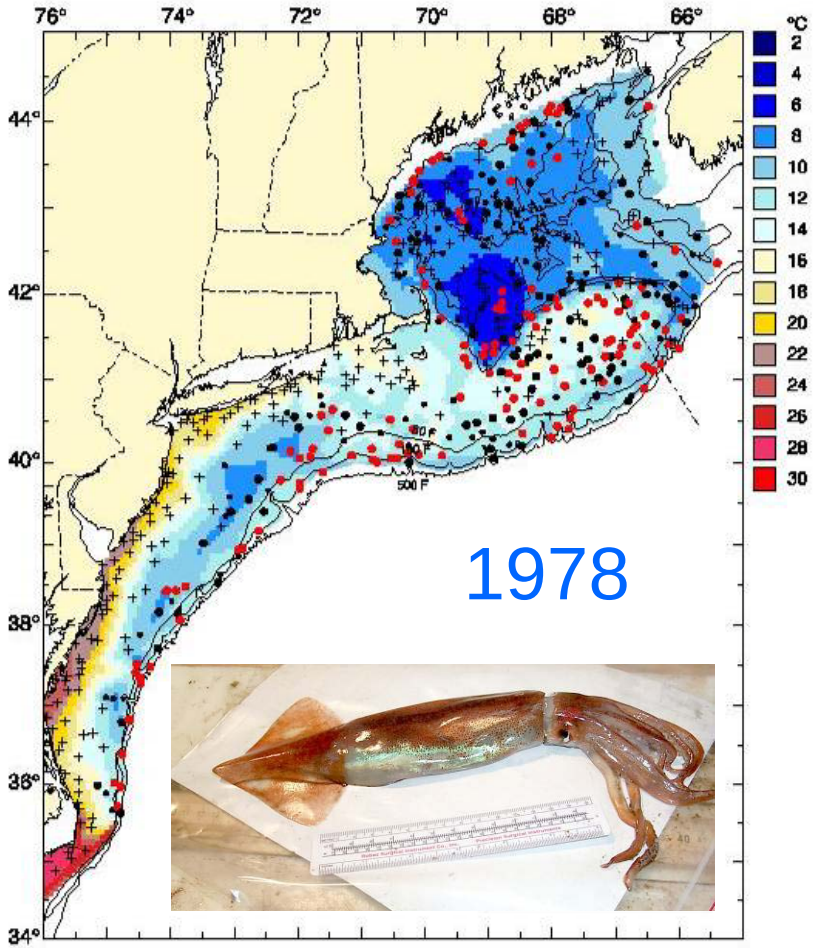
Enhanced Mapping

Multibeam Bathymetry & Estimated Depths



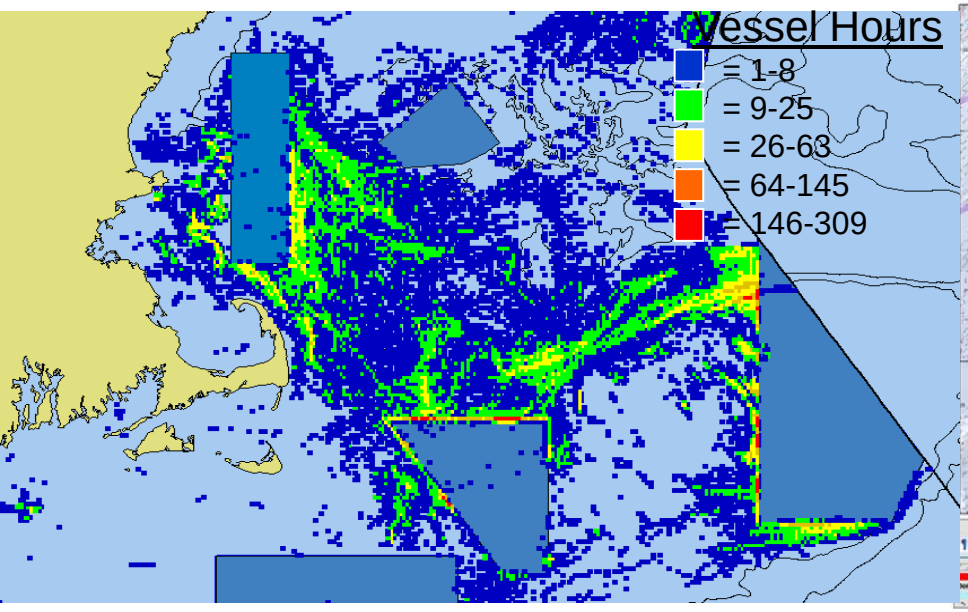
Multiple Use Marine Cadastre

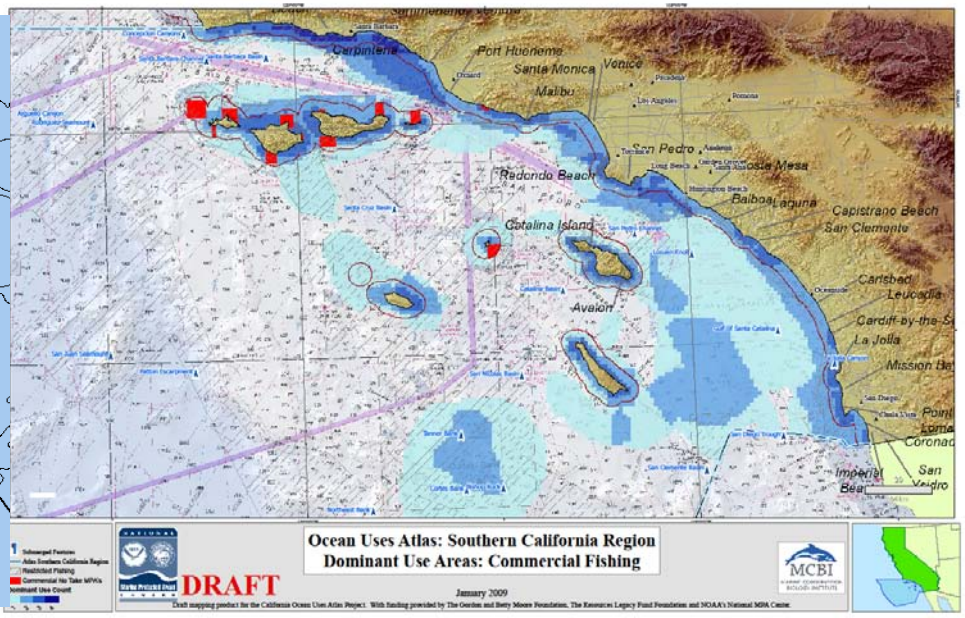
Living Marine Resource Assessment



Distribution of Illex illecebrosus captured during the 1978 NEFSC autumn bottom trawl survey in relation to bottom temperatures.

Human Use Characterization

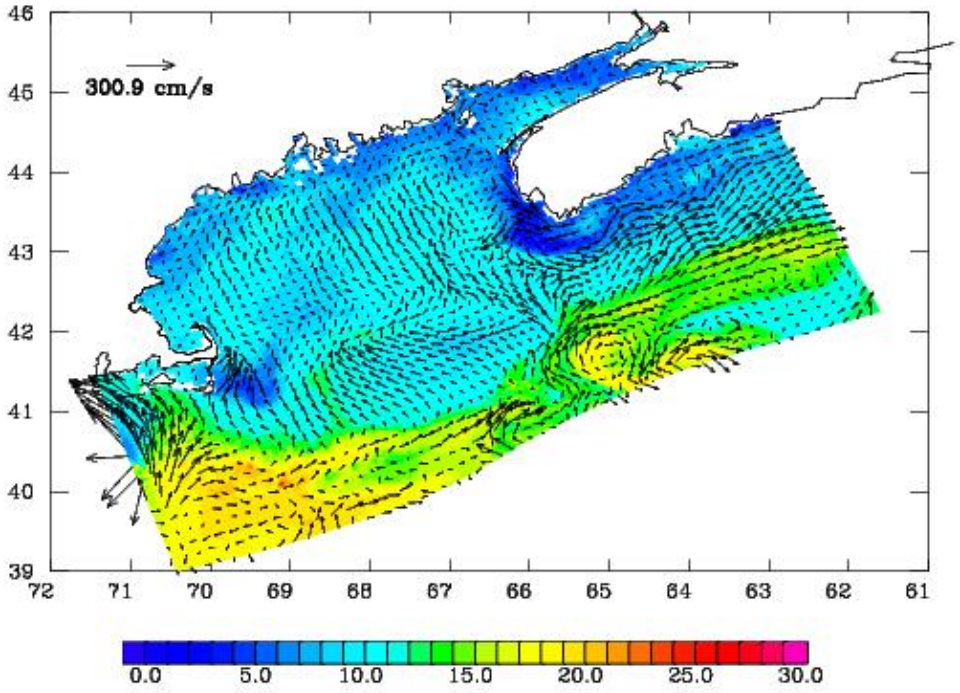




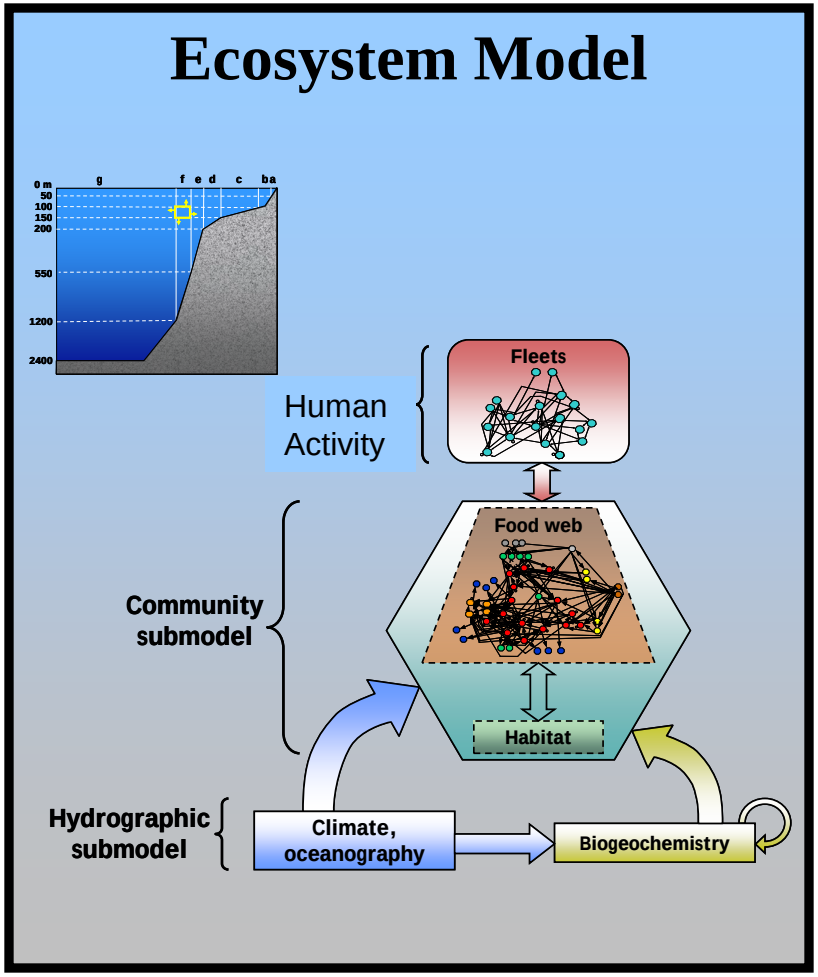
Vessels Hours

Commercial Fishing Use

Hydrodynamic and Ecosystem Modeling



Temperature, Velocity



Hydrodynamic Model

Ecosystem Model

Coastal & Marine Spatial Planning Integrated Ecosystem Assessments

CMSP

Needs enabling capabilities

- Ecosystem dynamics research
- Data integration and analysis

Needs decision support tools

- Spatially explicit ecosystem data
- Ecosystem modeling
- Scenario analysis
- Gap analysis

Needs coordination through

- Regional compacts between governments
- Interagency collaboration at multiple levels
- Tribal interests

IEA

Provides for capability needs

- Understand ecosystem with models
- Integrate ecological and social data

Provides for decision support tools

- Integration of spatial data
- 3-D ecosystem models
- Evaluation of tradeoffs
- Gap analysis through scoping process

Provides coordination (e.g.)

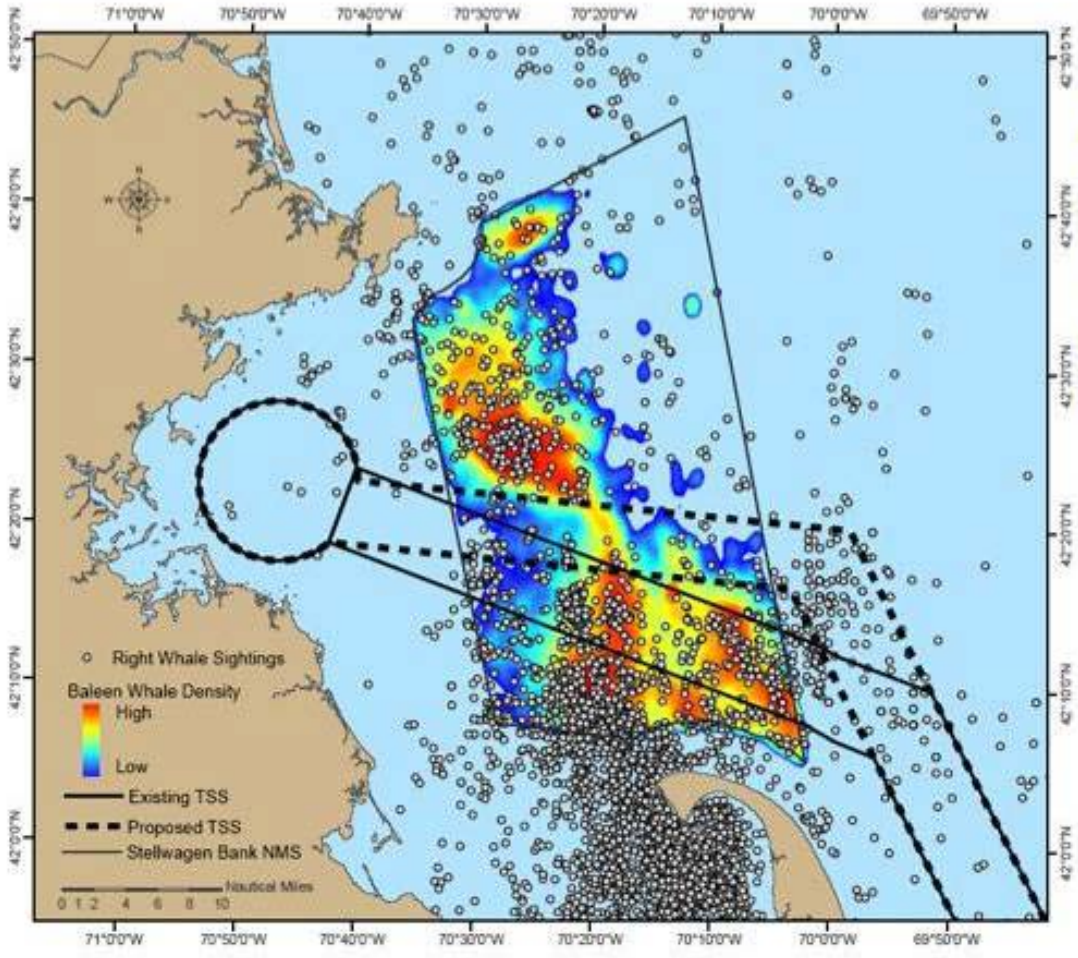
- West Coast Governors Agreement supports California Current IEA
- Puget Sound IEA brings together local, state, federal, and tribal agencies represented in Puget Sound IEA

Coastal & Marine Spatial Management

Current examples of activities within NOAA that support Coastal and Marine Spatial Planning

- Most have fairly specific goals
  - Protected species management
  - Sanctuaries and monuments
  - Fisheries
  - Offshore energy
  - IOOS
- May be comprehensive
  - Pilot project for San Pablo Bay, CA

Examples of CMSP: Protected Species



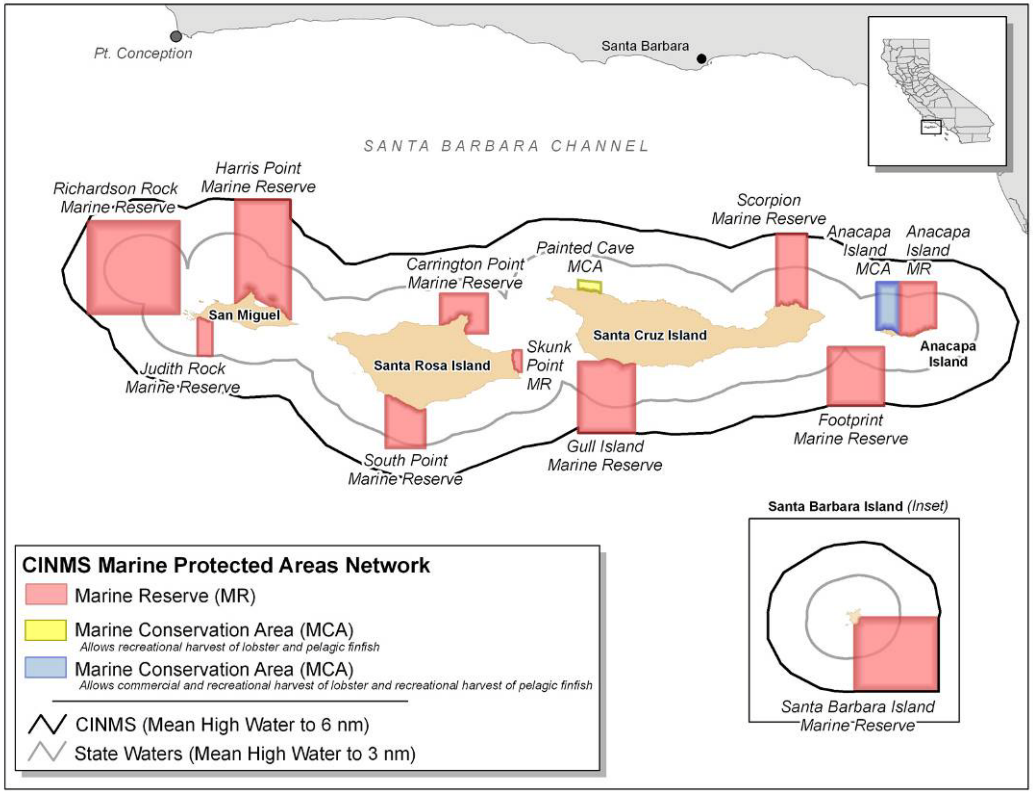
Rotate shipping lanes 12º to an area where right whale density is historically lower.

Up to 58% reduction in risk of ship strikes

Whale density
Red = highest density
Blue = lowest density

Examples of CMSP: Sanctuaries

Channel Islands National Marine Sanctuary

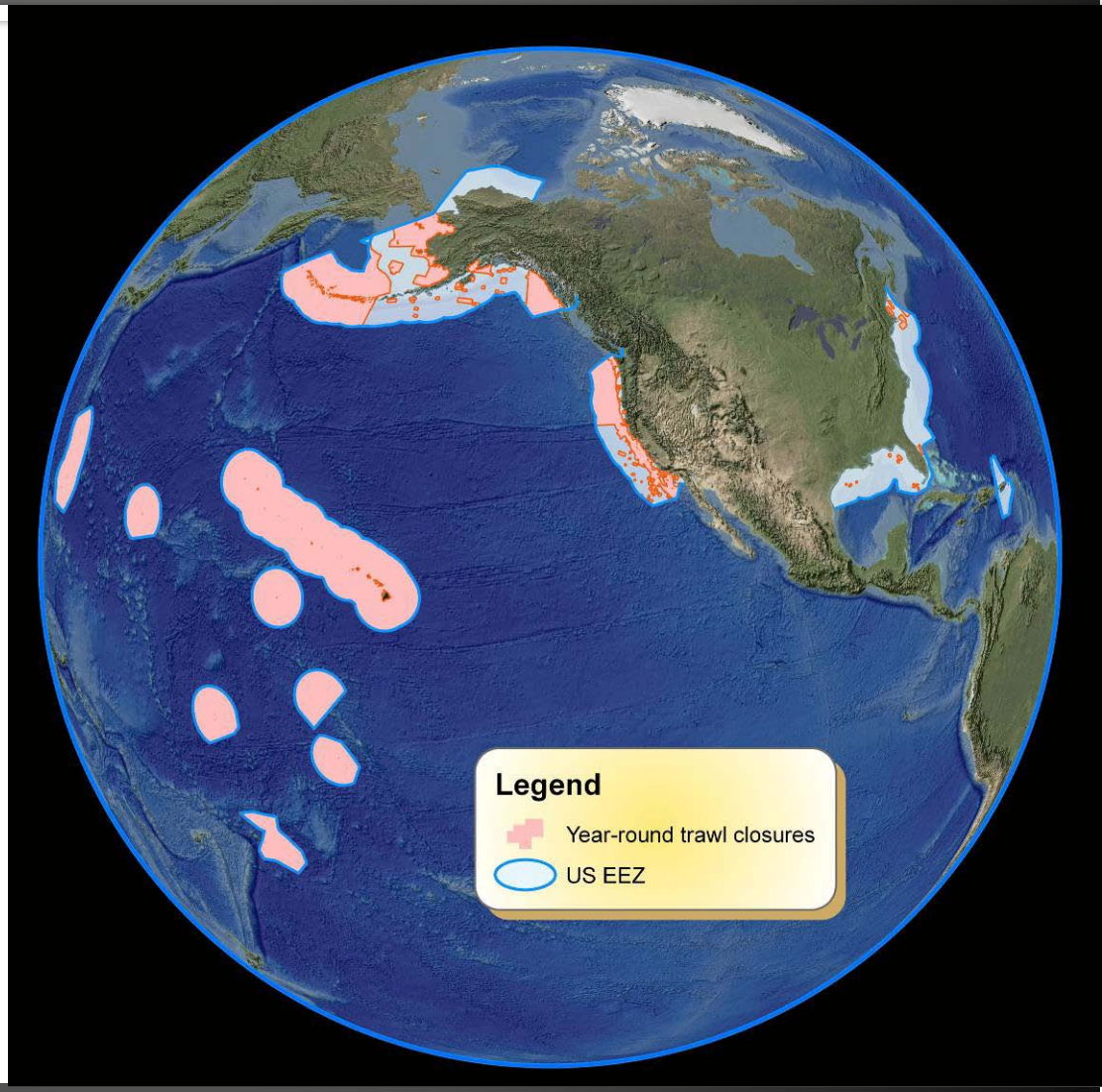


Complex Marine Spatial Planning Regime and Designation

Examples of MSP: Fisheries Regulations

67% of the U.S. EEZ is closed to trawling

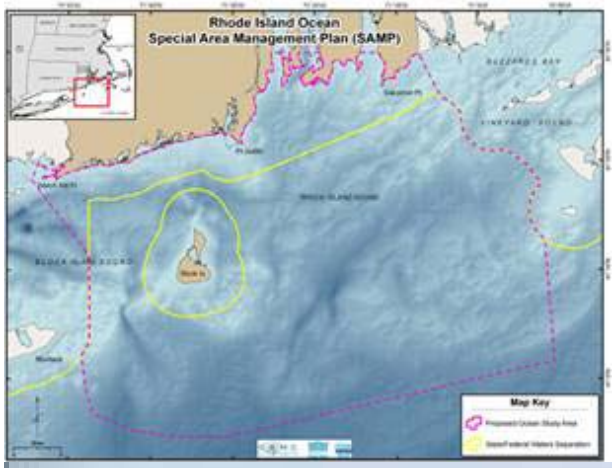
Through the Magnuson Stevens Fishery Conservation and Management Act (MSRA), NOAA can restrict all or some fishing methods from areas in order to achieve sustainable management of fished natural resources, e.g. prohibiting bottom trawling in many deep coral habitats



Examples of Non-Comprehensive CMSP: Rhode Island

Ocean Special Area Management Plan

- reducing its carbon footprint
- renewable energy resources
  - primarily offshore wind
  - meet 15% of state's energy needs
  - sea-level rise policy for coasts



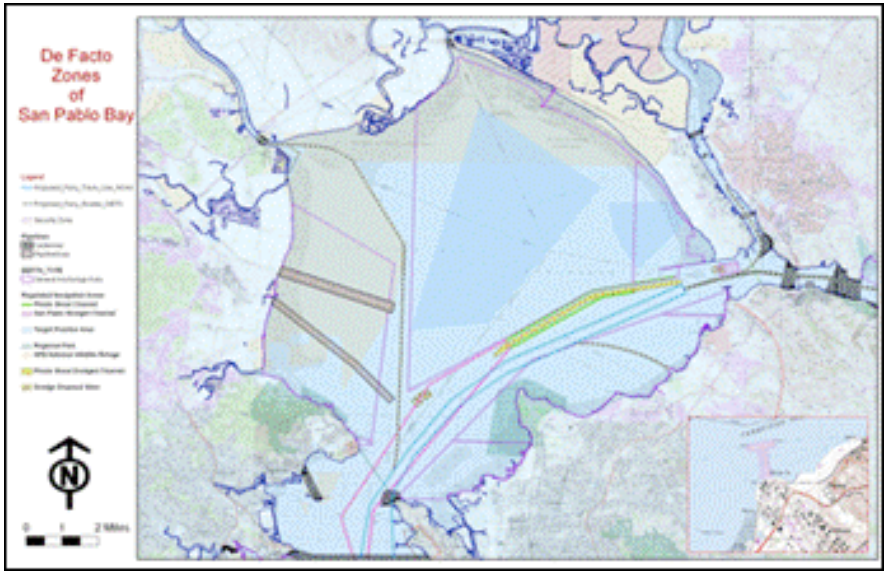
Coastal & Marine Spatial Planning Oregon

Planning for Wave Energy Usage in Oregon

- Two ocean issues
  - designation of marine reserves
  - siting wave energy facilities
- An executive order
  - prepare plan for ocean energy development
  - adopt as part of the Oregon Territorial Sea Plan

Pilot Project for San Pablo Bay, California

- investigate the feasibility of comprehensive zoning
- Prepare a management framework
  - to minimize conflicts
  - to maximize efficient use
  - to address and manage current and potential cumulative impacts



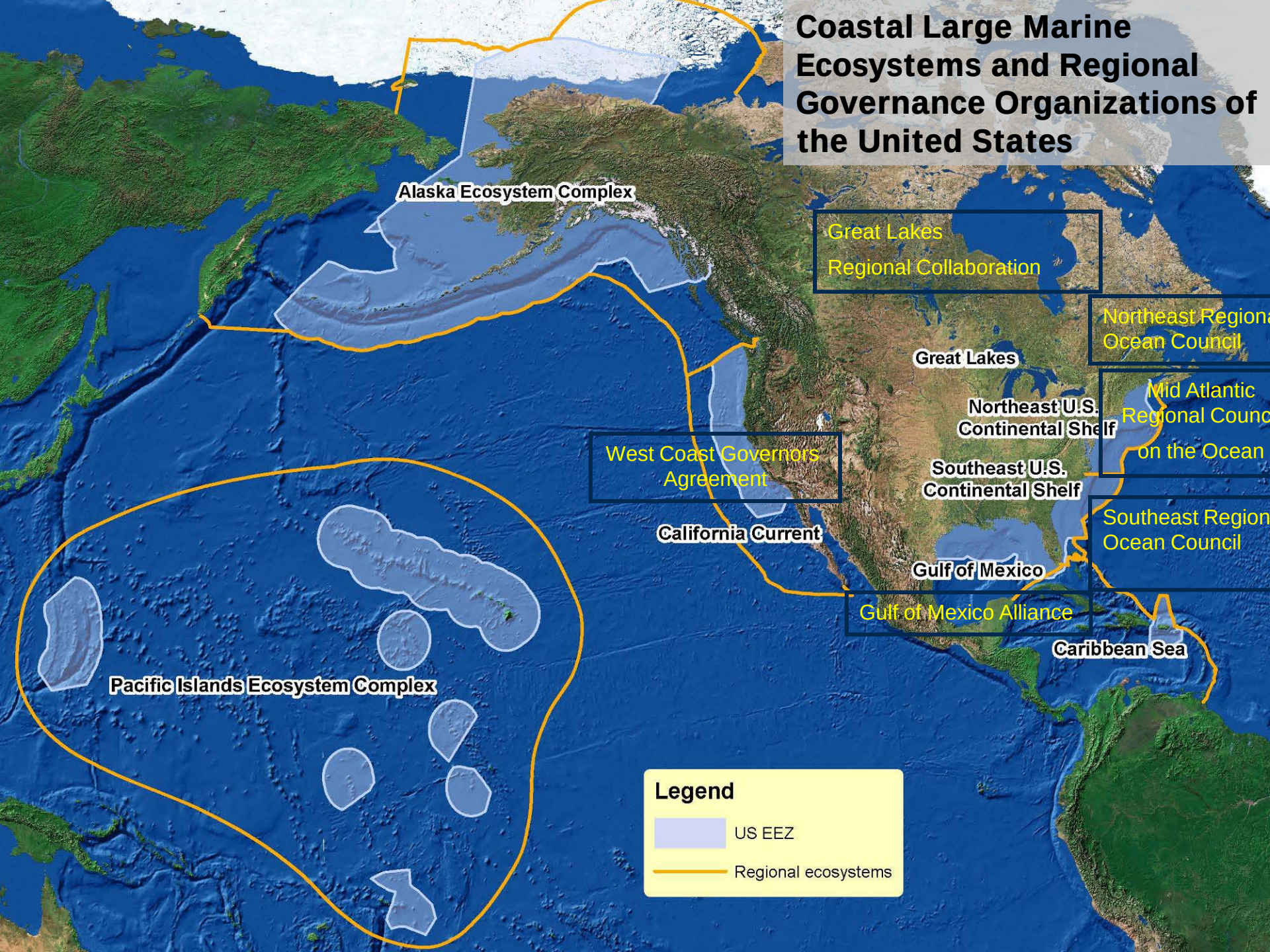
Coastal & Marine Spatial Planning
National or Regional Scale?

National

- Top-down mandate
- Set the framework for integration of regional CMSP work
- Determine standards for data
- Ensure interoperability across regional efforts

Regional

- Bottom-up driven
- Demonstrate ability to work across NOAA as a model to work across agencies
- Regions will have to organize and co-ordinate efforts
- Regions will have different compelling issues


Coastal Large Marine Ecosystems and Regional Governance Organizations of the United States
Alaska Ecosystem Complex
Great Lakes
Regional Collaboration
Northeast Regional Ocean Council
Great Lakes
Mid Atlantic Regional Council on the Ocean
Northeast U.S. Continental Shelf
West Coast Governors Agreement
Southeast U.S. Continental Shelf
Southeast Regional Ocean Council
California Current
Gulf of Mexico
Gulf of Mexico Alliance
Caribbean Sea
Pacific Islands Ecosystem Complex
Legend
US EEZ
Regional ecosystems

CMSP Evolving Perspectives

- **Objectives of CMSP not yet well articulated**
- **3rd and 4th dimensions important (not just static maps)**
- **Critical Science**
  - Ecosystem-relevant spatial planning tools
  - Market & non-market valuation of ecosystem services
- **Asymmetric benefits & costs**
  - Make governance using multiple sectoral statutes difficult
  - Multi-agency problem (interagency challenge)
  - Resource Rent Problem
- **Integrated governance system does not exist**
  - Need to explore “soft” vs. “hard” governance & planning
  - Conflict Resolution Mechanisms
- **Important opportunities for “Sector Stacking”** (e.g., aquaculture & energy). How can we promote this as a national priority?

spatial management

an historical perspective:

"…indications at the present time are that neither knowledge of the mechanisms of dispersion nor accuracy of data and commercial statistics is sufficient to justify the labour involved in rigorous treatment…[but] the method enables working solutions to be obtained."

R.J. H. Beverton and S. J. Holt, 1957