

MOP Science Program

Planning Framework —

- Stakeholder informed
- Science based

Integrated Data Network—

- Improve accessibility of ecological and socioeconomic information
- Dynamic reflection of ocean systems
- Responds to user needs

Ecosystem & Economic Modeling—

- Ecosystem modeling
- Economic valuation
- Scenario/Trade off analysis
- Cumulative impacts

Indicators—

- Measure and communicate conditions to general public

Data; Public/Stakeholder Input; Planning /tools Options

Develop Draft Plans

Mod. Draft

Formal Review of Final Plan

Plan Launch

← Implementation & v2.0 →

Step 1

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Implementation & v2.0

7/08-1/09

2-4/09

5-6/09

7-12/09

12/31/09

12/31/10

Planning Framework

Plan 1.0 Options

Long-term Planning Framework Options

Program Summaries:

An inventory and review of ocean management and integrated resource management programs from around the world

DRAFT

Prepared for the Massachusetts Ocean Partnership
March 2009

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Prepared by:
Members of the University of Massachusetts Boston Planning Team: Urban Harbors Institute, Good Harbor Consulting, Provincetown Center for Coastal Studies, Ocean Visions

3. Organizational/Institutional Structure				
Option 1: Networked Utilization of existing land use and regulatory mechanisms based on the jurisdictional authority of the Ocean Plan and, taken together, used to implement the management program	Option 2: Centralized Single authority to plan and regulate coastal activities in the management program	Option 3: Decentralized All jurisdictions working together in an agreement with the OCM plan (subject to EBM Secretary review)		
4. Inter-jurisdictional Coordination within and outside Ocean Planning boundaries				
Option 1: Analyze existing OCMZ program activities, including federal constraints	Option 2: SMP (Sec 302, FCMZ): Comp plan with policies, standards, criteria and implementation mechanisms to guide public and private decisions in specific geographic areas. Fed controls pre-emptive of OCMZ program unless a waiver is granted within inter-governmental planning	Option 3: PSP A programmatic General Permit that is used to avoid unnecessary duplication of regulatory review/analysis by another federal, state, or local agency	Option 4: Comprehensive Inter-governmental agreement	Option 5: New interagency Management Review to improve coordination outside ocean planning boundary
5. Continued Public/Community Involvement				
Option 1: Continue OCMZ as is or reaping membership	Option 2: Station Advisory Council: a core multi-stakeholder working group for periodic regular input, advice and support to the planning process	Option 3: Massachusetts Ocean Partnership continues periodic stakeholder organization	Option 4: Freely public participation opportunities within existing program and regulatory processes	Option 5: Or regional advisory committees
6. Management Approaches				
a) Marine Spatial Planning (either comprehensive or area specific)				
Option 1: designate comprehensive management areas with priority, allowed uses, criteria, and prohibited uses	Option 2: designate limited coastal general sensitive and unique areas for protection and designate opportunities wherever specific uses	Option 3: IMC/OZ regulate the minimum, designate appropriate location and quality standards for uses allowed under OCMZ, apply OCMZ to additional regulatory change needed for sensitive areas in OCMZ jurisdiction	Option 4: Opportunity maps showing where human activities are permitted for identification current applications and regulatory framework and where uses best fit to meet policy	Option 5: regional approach, prioritize areas of highest sensitivity

Definition of the Management Area (Section 3)

- Based on ecologic properties and jurisdictional boundaries
- Identify potential connections to smaller and larger scales
 - MA/Oversight Planning Area, MA Coastal Zone, Gulf of Maine, SNE, etc.

Identify and Prioritize Policy Issues (Section 4)

- As specified by Ocean Act and working groups
- Understand a description of the impacted ecosystem
 - i.e. Ecological Risk Assessment
- Identify priority ecosystem components for consideration
 - i.e. Ecosystem with Ocean, EBM, MILES, Non-point Source Analysis, Ecological Assessments
- Choose priority activities to be included in management plan
 - i.e. Multi-Criteria Decision Making
- Engage stakeholders to scope issues of concern to the ocean community within management area

Elaborate Conceptual Objectives (Section 5)

- For key ecosystem components and those associated with its use, define desired future state and time frame
- Link to each objective to national, state and local policy
 - Use of ecosystem models (i.e. InVEST, MUSE), Ecological Assessments, Moran

Setting of Goals and Objectives (Section 2)

- Massachusetts Ocean Act Principles
- Setting long-term Objectives
- Identify components, or and interactions among ecosystem, and human activities, ecosystem services and conservation goals

Monitor and Assess Progress & Report Status of Ecosystem Health (Section 7)

- Develop performance metrics to review and evaluate management actions
- Review metrics against goals adaptively
- Monitor indicators

Management Strategies (Section 6)

- Identify operational objectives associated with each conceptual objective
 - At management level and activity level
 - Develop list of indicators
- Identify management actions associated with operational objectives to address high priority impacts
- Use of scenario analysis models, i.e. Management Strategy Evaluation
- Steps to implement operational objectives

Figure adapted from: NCEAS Working Group on Science Frameworks for EBM, F. Michel and A.A. Rosenberg, co-chairs 2007.

Policy Area	OCEAN RESOURCES											
	Coastal Zone	Marine Mammals	Seabirds	Sharks	Deep Sea	Continental Shelf	Offshore	Open Ocean	Coastal Zone	Marine Mammals	Seabirds	Sharks
Coastal Zone	+	+	+	+	+	+	+	+	+	+	+	+
Marine Mammals	+	+	+	+	+	+	+	+	+	+	+	+
Seabirds	+	+	+	+	+	+	+	+	+	+	+	+
Sharks	+	+	+	+	+	+	+	+	+	+	+	+
Deep Sea	+	+	+	+	+	+	+	+	+	+	+	+
Continental Shelf	+	+	+	+	+	+	+	+	+	+	+	+
Offshore	+	+	+	+	+	+	+	+	+	+	+	+
Open Ocean	+	+	+	+	+	+	+	+	+	+	+	+



Data; Public/Stakeholder Input; Planning /tools Options

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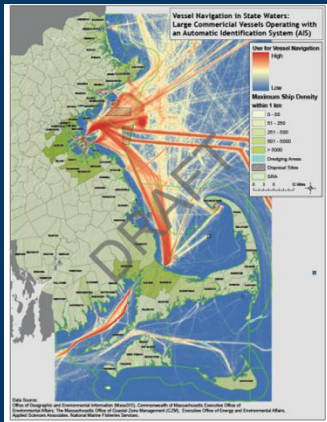
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Integrated Data Network

Data Integration & Analysis for Plan 1.0

Data Inventory & Discoverability



Massachusetts Ocean Data Inventory

Welcome to the Massachusetts Ocean Data Inventory Metadata Portal

The Massachusetts Ocean Partnership (MOP) is a public-private partnership created to advance integrated multi-use ocean management in support of sustainable marine industries and ecosystem stewardship leading to resilient and productive ocean ecosystems in Massachusetts' state waters. The purpose of this portal is the development of an integrated statewide ocean data network in collaboration with existing Massachusetts and regional data management efforts, including the Massachusetts Office of Coastal Zone Management (CZM) and the Massachusetts Office of Geographic and Environmental Information (MassGIS).

- All CZM Data Sets
- All MassGIS Data Sets
- Massachusetts Ocean Partnership
- Massachusetts Office of Coastal Zone Management
- MassGIS
- Contact Us

Categories: ATMOSPHERE, BIOLOGICAL CLASSIFICATION, BIOSPHERE, HUMAN DIMENSIONS, LAND SURFACE, OCEANS, SOLID EARTH

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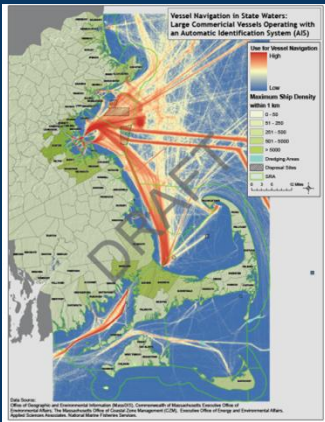
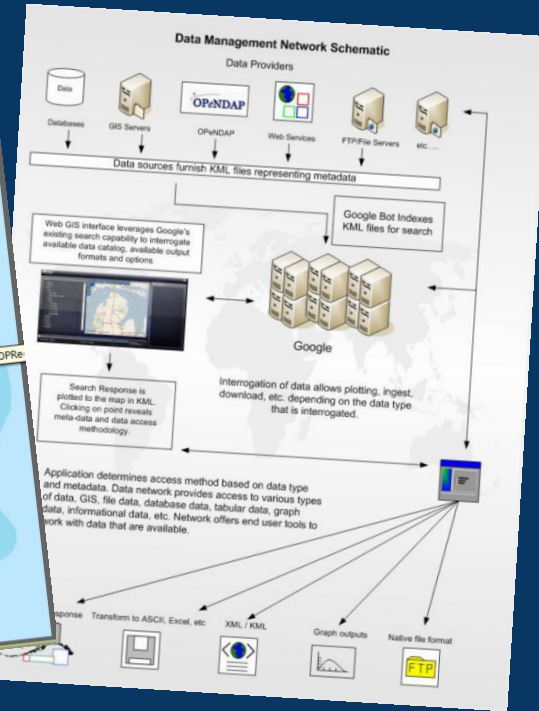
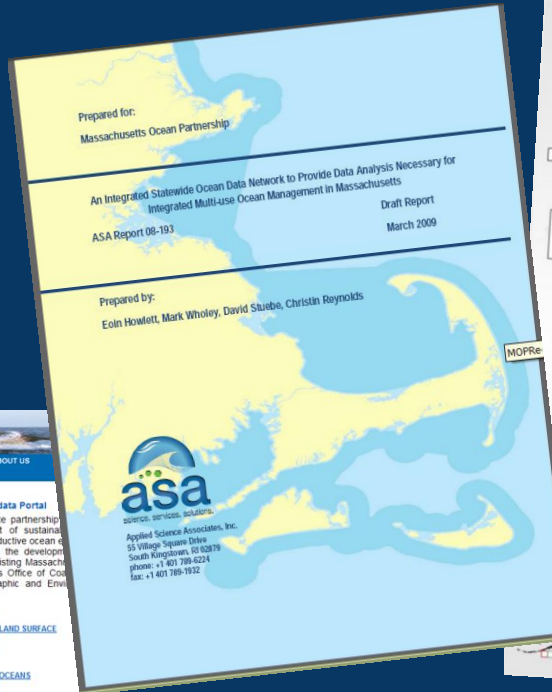
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Integrated Data Network

Data Integration & Analysis for Plan 1.0

Data Inventory & Discoverability

Data Network Concept Design



Intro > Context & Drivers > Melding Pot > MOP Science Initiatives > MOP Communications



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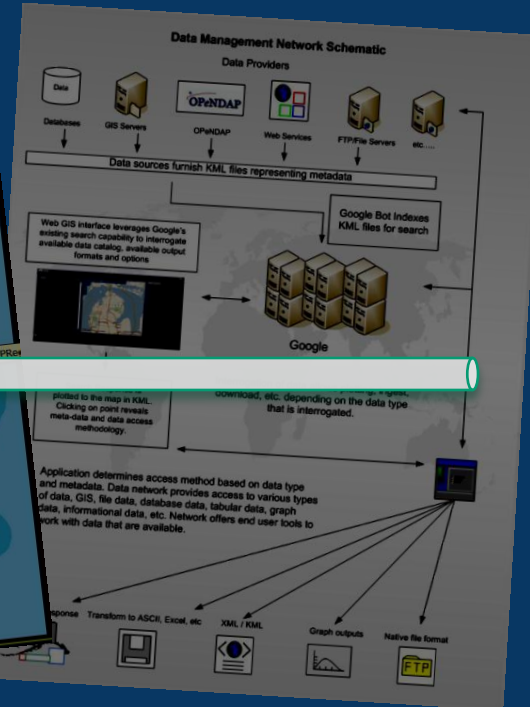
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Integrated Data Network

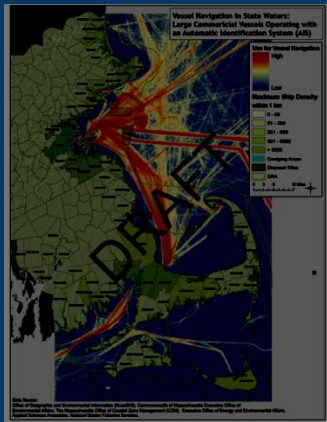
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Data Network Development



Global Change - Metadata Portal for the Massachusetts Ocean Data Inventory

HOME DATA SERVICES DATA SETS MOP WEBSITE PARTNERS ABOUT US

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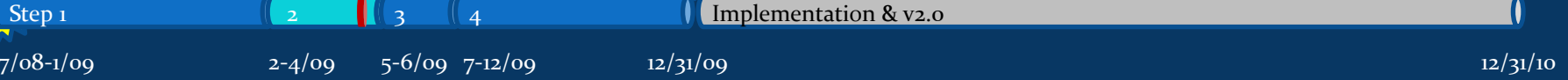
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Modeling, Scenario Analysis & Decision Support

Model Inventory

Table 4. Relationship between Massachusetts Oceans Act issues and Ecosystem Models considered in this report.

Class of Issues	Minimally Realistic Models							
	Non Spatial				Spatial			
	E-SAM	MRM	MSVPA	MSVPA-X	MS-PROD	MSM	GADGET	CCAMLR
Community biodiversity								
Species biodiversity								
Population biodiversity								
Base of Food Chain								
Population Productivity								
Food Chain Processes								
Water Column								
Bottom Habitat								
Water Quality								
Biota Quality								
Economic								
Social & Cultural								

Class of Issues	Whole Ecosystem Models										
	Aggregate System Models					Dynamic System Models					
	EUC	ESEM	MS-PROD	EMAX	ATLANTIS	ERSEM	SEAPODYM	COSMOE	INWITRO	MIMES	SymMOOP
Community biodiversity											
Species biodiversity											
Population biodiversity											
Base of Food Chain											
Population Productivity											
Food Chain Processes											
Water Column											
Bottom Habitat											
Water Quality											
Biota Quality											
Economic											
Social & Cultural											

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Modeling, Scenario Analysis & Decision Support

Model Inventory

Whole Ecosystem Model

Habitat Classification

Circulation Model

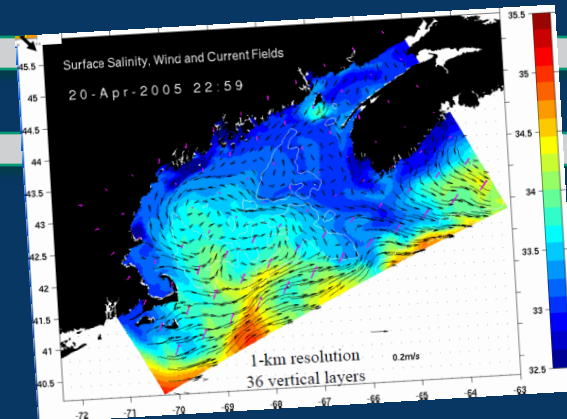
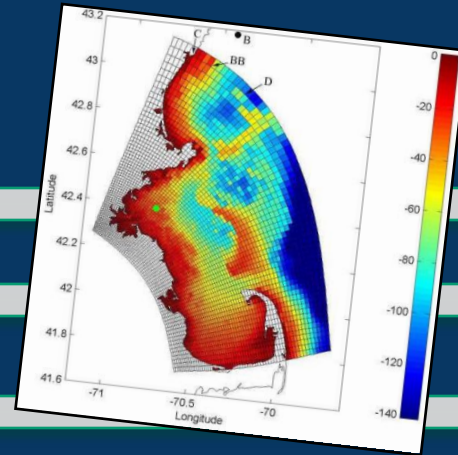
Coastal Inundation Model

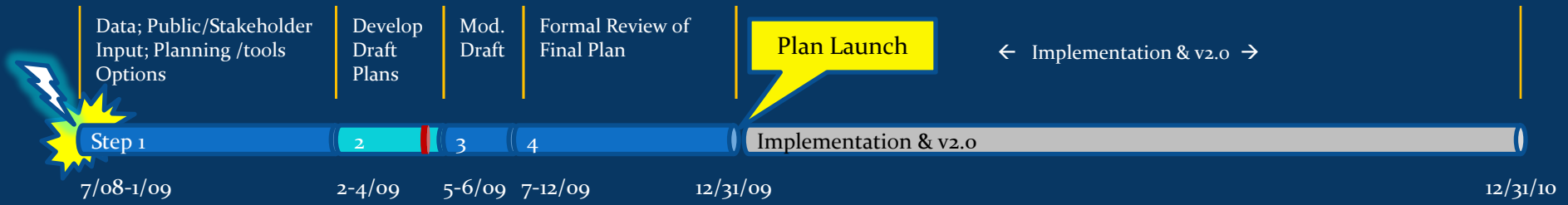
Land/Sea Interaction (Water Quality Model)

Table 4. Relationship between Massachusetts Oceans Act issues and Ecosystem Models considered in this report.

Class of Issues	Minimally Realistic Models			
	Non Spatial			
	E SAM	MRM	MSVPA	MSVPA-X
Community biodiversity				
Species biodiversity				
Population biodiversity				
Base of Food Chain				
Population Productivity				
Food Chain Processes				
Water Column				
Bottom Habitat				
Water Quality				
Biota Quality				
Economic				
Social & Cultural				

Class of Issues	Whole Ecosystem Models					
	Aggregate System Models			Whole Ecosystem Models		
	ESM	SEM	Key-PICO	OMX	ATLANTIS	ERSM
Community biodiversity						
Species biodiversity						
Population biodiversity						
Base of Food Chain						
Population Productivity						
Food Chain Processes						
Water Column						
Bottom Habitat						
Water Quality						
Biota Quality						
Economic						
Social & Cultural						





Economic Valuation

Coastal Valuation Inv.

EBM Economics Booklet

Mitigation Methodology

Socioeconomic Connections

Econ. Implications of OMP

Socioeconomics Wkshp



Data; Public/Stakeholder Input; Planning /tools Options

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Economic Valuation

Coastal Valuation Inv.

EBM Economics Booklet



Mitigation Methodology

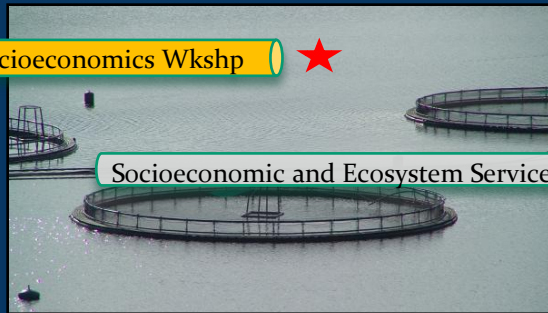
Socioeconomic Connections

Econ. Implications of OMP

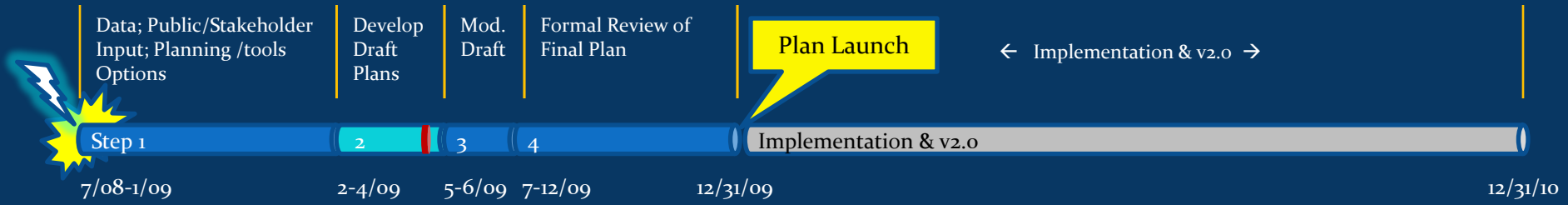
Socioeconomics Wkshp



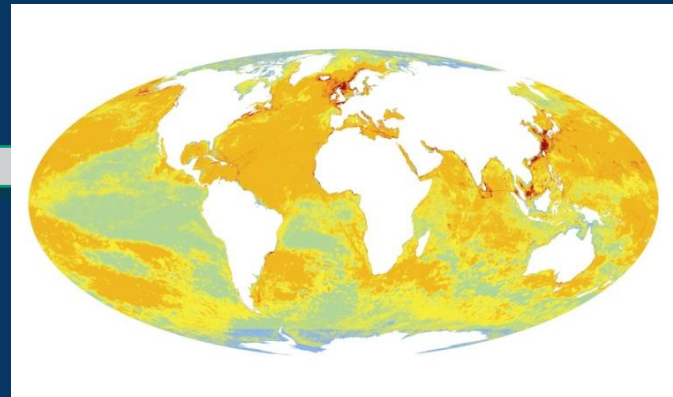
Socioeconomic and Ecosystem Service Valuation



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Cumulative Impacts



Indicators

Data; Public/Stakeholder Input; Planning /tools Options

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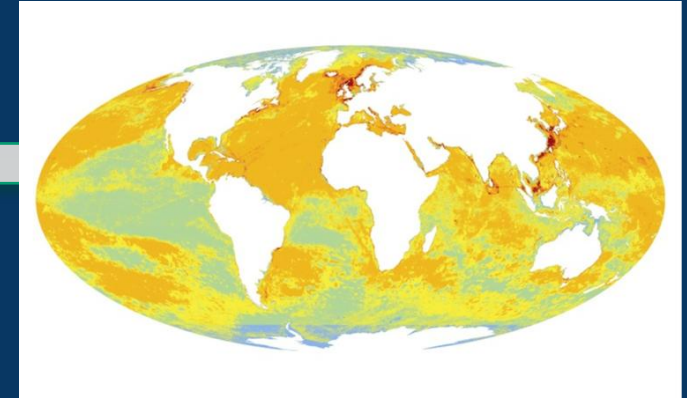
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Cumulative Impacts

Human Impacts

Cumulative Human Impacts and Tradeoffs



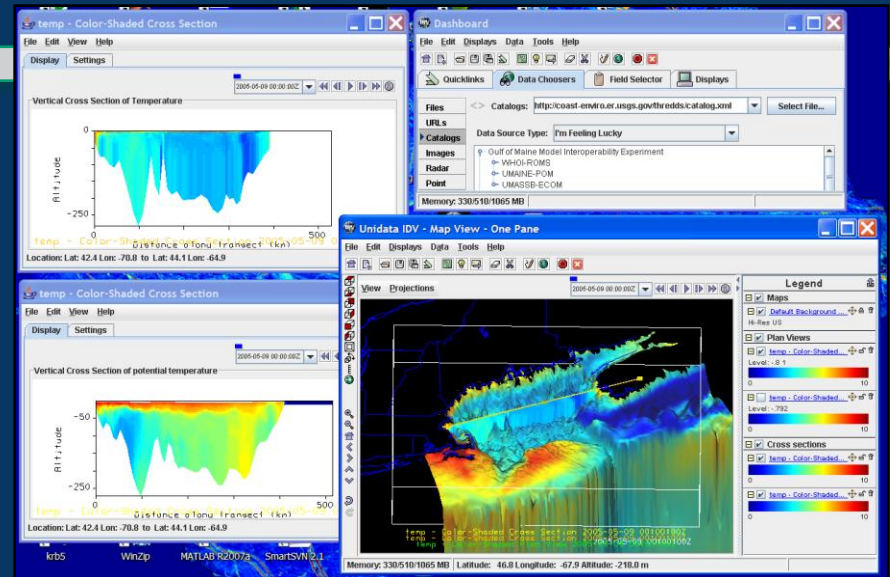
Indicators

Indicators for Plan 1.0

Long Term State and MOP Indicators

Appendix C: Suggested MOP Indicators within the DPSIR Framework

Indicator Class	Organizing Theme	Indicator	Type/Focus				
			D	P	S	I	R
Environmental Indicators	Diversity	<ul style="list-style-type: none"> Diversity of communities Diversity of populations Diversity of species Genetic diversity Invasive species/pests 				■	■
	Distribution	<ul style="list-style-type: none"> Horizontal distribution (patchiness, aggregation) Vertical distribution (food web/epiphytic structure) 			■	■	
	Abundance	<ul style="list-style-type: none"> Biomass (key populations) Number of individuals (marine mammals) Density (plants, benthic organisms) 			■	■	
Production and reproduction	Ecologic interactions	<ul style="list-style-type: none"> Complexity of food web Key predator/prey interactions Keystone species Size spectra 			■	■	
		<ul style="list-style-type: none"> Fishing mortality Incidental mortalities (by-catch) Natural mortality (predation) 			■	■	
Species health		<ul style="list-style-type: none"> Species at-risk of extinction (Bio)accumulation of toxic compounds Diseases and abnormalities 		■		■	■
Water quality		<ul style="list-style-type: none"> Water column properties Oceanographic processes & variability (& regime shifts) Sedimentation (e.g. transport of suspended sediments) Eutrophication parameters 	■				
Contaminant Introduction		<ul style="list-style-type: none"> Industrial inputs of Persistent Organic Pollutants (POPs)/Metals Fertilizer Use in Coastal Watershed Pesticide Use in Coastal Watershed 		■			■



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