ECOSYSTEM GOAL

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Presentation Outline

• Ecosystem Goal Team (EGT) Mission and Outcomes
• Ecosystem Approach to Management (EAM)
• EGT Programs
• EAM in FY11-15 PPBES
An informed society that uses a comprehensive understanding of the role of the oceans, coasts and atmosphere in the global ecosystem to make the best social and economic decisions.

To understand and predict changes in the Earth’s environment and conserve and manage coastal and marine resources to meet our nation’s economic, social and environmental needs.
EGT MISSION

Protect, restore, and manage the use of coastal and ocean resources through an ecosystem approach to management.

EGT OUTCOMES

Healthy and productive coastal and marine ecosystems that benefit society
A well-informed public that acts as a steward of coastal and marine ecosystems
How Big Is the U.S. EEZ?

The U.S. Exclusive Economic Zone, totaling 4,453,068 square miles, is nearly one and one-half times larger than the landmass of the lower 48 states.

+ additional responsibilities in international waters
What is an *Ecosystem*?

**NOAA’s Ecosystem Definition**

An **ecosystem** is:

A geographically specified system of organisms (including humans), and the environment and the processes that control its dynamics.

The environment is the biological, chemical, physical and social conditions that surround organisms.
Why an *Ecosystem Approach*?

Federal EAM Stimulus

**U.S. Commission on Ocean Policy**
Better coordination and integration in managing our nations coasts and oceans
Ecosystem based management to improve coastal and marine resource management

**President’s Ocean Action Plan**
Ecosystem approach to management
Committed to Gulf of Mexico and Great Lakes partnership
Cooperative Conservation
Established a new governance structure
What is an *Ecosystem Approach to Management*?

**Seven Characteristics of EAM**

**EAM is:**  
1. Geographically specified  
2. Adaptive  
3. Takes account of ecosystem knowledge and uncertainty  
4. Considers multiple external influences  
5. Strives to balance diverse societal objectives  

**EAM Implementation will need to be:**  
6. Incremental  
7. Collaborative
Geographically Specified

- 8 regional ecosystems and ecosystem complexes were delineated
- Defined by the scope of the problem and potential management area to achieve solutions
National and Regional Ecosystem Challenges

**NATIONAL CHALLENGES**

- **Habitat loss, degradation, and fragmentation**
- **Coastal development for public health, welfare, and safety**
- **Sustainable fisheries and dependent communities**
- **Conserve and recover protected species**
- **Pollution**
- **Harmful algal bloom impacts on marine resources and human health**
- **Invasive species**
- **Climate change**

**California Current**
- Fishing gear impacts and bycatch
- Pacific salmon recovery
- Impaired water quality in watersheds and salmon habitat loss
- Public access
- Increased pinniped and human interactions

**Alaska**
- Impacts of sea ice reduction dependent living marine resources
- Tribal access for subsistence uses
- Management of marine mammals cooperatively with Alaskan native
- Stellar Sea Lion recovery

**Great Lakes**
- Toxic pollution
- Restoration of Great Lakes Areas of Concern

**Northeast**
- Overfished groundfish stocks, fishing gear impacts, and bycatch
- Right Whale ship strikes and entanglements
- Urban runoff

**Southeast**
- Addressed sea turtle bycatch by recovery actions and take reduction plans for Kemp’s ridley turtles and Humpback Whales. Both populations now stabilizing or increasing
- Protected large tracts of habitat for fish and wildlife through CELC Program, including a 10,700-acre parcel in South Carolina
- Engaged stakeholder community and other agencies to delineate regional ecosystem boundaries and enhance strategy to implement ecosystem approaches

**Pacific Islands**
- Marine Debris
- Bycatch and entanglement of sea turtles and seabirds
- Conservation of Monk Seals and humpback Whales
- Coral Bleaching

**Gulf of Mexico**
- Hurricane Recovery
- Sea turtle by catch in trawl and long line fisheries
- Bycatch in the red snapper and shrimp fisheries
- Inadequate sewage capacity
- Pollution related marine mammal strandings
- Offshore oil and gas production

**Caribbean**
- Coral bleaching and disease
- Recovery of coral species
- Urban Runoff
- Sea turtle recovery
- Growth of tourism industry placing demands on limited resources
EAM Characteristics

Adaptive

- Routinely and systematically evaluate information; monitor results and alter scientific investigation and management strategies to achieve the desired condition.

Takes account of ecosystem knowledge and uncertainty

Collect and integrate relevant ecological and socio-economic information; identify uncertainties and gaps regarding ecosystem processes and incorporate that knowledge into management decisions and communication.
EAM Characteristics

Strives to balance diverse societal objectives
- Develop a fair and transparent process working with stakeholders to identify and evaluate options and tradeoffs to arrive at solutions

Considers multiple external influences
Take into account relevant ecological and anthropogenic factors affecting marine and coastal ecosystems
EAM Implementation

**Incremental**
- A stepwise approach that includes a systematic process of monitoring, evaluation, and adaptation to achieve the desired outcome.

**Collaborative**
- Work with a broad range of partners and stakeholders to pool resources and knowledge and share efforts to achieve mutual goals.
Ecosystem Management
A Paradigm Shift or Evolution?

Focus on Managing Ecosystem parts

- Individual Species
- Narrow Perspective & Scale
- Human Activities Evaluated for Individual Activities
- Resource Management by Sectors
- Scientific Monitoring Programs Focused Narrowly
- Single Use and Purpose Observations

Current Mandates

Focus on Ecosystem Relationships, Processes, and Tradeoffs

- Multiple Species
- Broad Perspective & Scale
- Humans Integral to Ecosystem
- Integrated Resource Management
- Adaptive Management Based on Scientific Monitoring
- Shared and Standardized Observations

Future Mandates
NOAA’s Role: Balancing the Sustainable Use and Protection of the Oceans and Coasts

Strategies for Sustainable Use
- Eliminate Overfishing
- Rebuild fished stocks to B-MSY
- Develop sustainable aquaculture practices
- Minimize adverse impacts of energy & military readiness
- Guide coastal development through “best practices”

Strategies for Ocean Protection
- Identify & map vulnerable species & ecosystems
- Use MPAs of many types to protect
- Acquire critical land at the coast to be protected
- Research new methods to relate biodiversity change to use patterns
What is the Ecosystem Goal?

The largest of NOAA’s Mission Goals

The most diverse of NOAA’s 4 Mission Goals

Support 4 Line Offices – NMFS (68% of Ecosystem Goal budget), NOS (22%), OAR (9%), NESDIS (1%)
Work through 9 Programs
Responsible for >90 different laws affecting commerce, conservation, land use, and research
Outcomes often affected by many factors
Balance sustainability and resource use

Serve a wide range of stakeholders, often with conflicting visions for NOAA
Significant economic impacts…e.g.,
Commercial and recreational fisheries contribute >$61 billion to US economy
85% of US tourism revenues are generated by people vacationing and recreating along the coasts

NOAA Budget by Goal (FY09)

- EGT: 24%
- Support: 47%
- CLI: 6%
- W&W: 20%
- C&T: 3%

EGT FY10 current program = $1.18 billion
# Ecosystem Goal Programs
- many individual mandates

<table>
<thead>
<tr>
<th>Program</th>
<th>Description</th>
<th>FY-10 Funding levels</th>
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<tbody>
<tr>
<td><strong>AQUACULTURE</strong></td>
<td>Production and technology development to increase seafood production, replenish depleted species. Handle trade issues and promote adoption of environmentally sound aquaculture practices and technologies.</td>
<td>$11.0 m</td>
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<tr>
<td><strong>COASTAL &amp; MARINE RESOURCES</strong></td>
<td>Assist coastal managers to protect, restore, and use coastal ecosystem services. Collaborate with other stewardship programs, to build upon research, modeling, and assessment.</td>
<td>$164.2 m</td>
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<tr>
<td><strong>CORAL REEF CONSERVATION</strong></td>
<td>Reduce the impacts of key threats to coral reef ecosystems. Help implement coral reef conservation actions in response to threats.</td>
<td>$33.9 m</td>
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<td><strong>ENFORCEMENT</strong></td>
<td>Provide law enforcement services directed to obtain compliance with management regimes instituted by NOAA in support of its stewardship responsibilities for living marine resources.</td>
<td>$66.3 m</td>
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<tr>
<td><strong>ECOSYSTEM OBSERVATIONS</strong></td>
<td>Capabilities encompass routine observations, assessments and forecasts, and product development, as well as data management and quality assurance activities.</td>
<td>$379.4 m</td>
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<tr>
<td><strong>ECOSYSTEM RESEARCH</strong></td>
<td>Provide scientific information and tools necessary for EAM to coastal stakeholders. Development and enhancement of coastal resources, as well as development and transfer of technology and tools to resource managers.</td>
<td>$179.6 m</td>
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<td><strong>FISHERIES MANAGEMENT</strong></td>
<td>Ensure fisheries are maintained at productive levels for supporting sustainability and the ecosystems to which they contribute. Apply ecosystem-based principles in conserving and managing fisheries.</td>
<td>$164.7 m</td>
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<td><strong>HABITAT</strong></td>
<td>Protect coastal, marine, and Great Lakes habitats, and improve and increase trust resources. Advance applied habitat science and develop techniques to succeed in protection and restoration.</td>
<td>$61.9 m</td>
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<td><strong>PROTECTED SPECIES</strong></td>
<td>Stop the decline of protected species populations to reduce the risk of extinction. This is achieved through planning, regulation, partnerships, direct action, and outreach and education.</td>
<td>$120.4 m</td>
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Oceans and Marine Life Programs include:

- Protected Species (PSP)
- Habitat (HAB, part, related to EFH)
- Fisheries Management (FMP)
- Ecosystem Research (ERP, part)
- Ecosystem Observations (EOP)
- Enforcement (ENF)
- Corals (COR, part, including deep)
- Coastal and Marine Resources (CMRP, part, Sanctuaries)
- Aquaculture (AQU)

Overall, NOAA is providing for 38% of the full EGT Requirement in 2011, slightly higher for OML.
Erosion to Base Capacity is Problematic Across EGT: Protected Species Management Example

Protected Species Work Load

- Permit Applications
- Number of Consultations

Year


PSP Investments and Through-Put

- Mean Time to Process Permits (days)
- Budget ($millions)

Year


PSP Investments and Through-Put

- Permit Process Time
- PSP Budget

100 120 140 160 180 200 220 240

Budget ($millions)
Key Gaps FY11-15

• Gap 1: Improving Science, Regulatory, and Enforcement Capacity to End Over-Exploitation and Rebuild Living Marine Resources

• Gap 2: Strategies to Comprehensively Protect Vulnerable Species and Places

• Gap 3: Understanding and Predicting Ecosystem and Human Health Issues Related to the Oceans & Coasts

• Gap 4: Enabling Environmentally Safe Exploitation of New Resources for Energy, Aquaculture and Medical Advance Applications

• Gap 5: Adapting to Sea-Level Rise, Freshwater Availability, Loss of Sea Ice and Acidification Impacts on Ocean Ecosystems
EGT FY11-15 Strategic Portfolio

EGT Objectives

1. Implement Regional EAM

2. Protect Vulnerable Places and Species

3. Achieve Safe and Sustainable Seafood

4. Understand and manage climate impacts on oceans and coasts

Ocean and Marine Life Portfolio

- Improve science, assessments and implementation of Ecosystem Approaches
- Protect and restore ocean habitats and protected species
- Achieve Safe and Sustainable Seafood
- Understand and predict impacts of climate change on trust resources

Costal Portfolio

- Protect and restore coastal water quality and prevent impacts on human health
- Protect and restore coastal habitats and guide sustainable uses
- Minimize impacts of hazards and climate change on coastal communities

Interdependent, complementary components

PROTECT  ◆  RESTORE  ◆  MANAGE
FY11-15 Solutions & Priorities

Solution 1: Implement Regional Ecosystem-Based Management

- Reinvest in “small wet infrastructure” to collect relevant ecological information
- Conduct research to develop decision support models for marine ecosystems – ORPP commitments
- Develop integrated ecosystem assessments to evaluate the current status of regional ecosystems and the likely responses to management interventions
- Build NOAA capacity to support emerging state and regional governance institutions such as WGA, Puget Sound Partnership
- Increase support for Sustainable Coastal Communities
- Invest in alternative information and sensors to mitigate the loss of ocean color (SeaWifs)
- Invest in sophisticated electronic methods to better track animal movements (NOAA Census of Marine Life contribution)
- Increase investments in social sciences to assist in balancing use and protection objectives
Solution 2: Protecting Vulnerable Species and Places

- Rebuild core capacity of marine mammal and endangered species management and science programs.
- Increase core capacity to protect and restore essential fish habitats.
- Expand capacity for permits/consultations on energy exploration.
- Expand deep sea corals research and characterization studies (MSRA)
- Map extended continental shelf: an important national priority as it potentially opens another 400,000 square nautical miles of submerged lands for exclusive USA use
- Prevent/remove marine debris and derelict fishing gear
- Improve enforcement of NMsanctuaries
- Expand NOAA’s Caribbean Coral reef Initiative
- Equip and support Okeanos Explorer
FY11-15 Solutions & Priorities

Solution 3: Achieving a Safe and Sustainable Seafood Supply

- Build additional capacity to assess and manage fishery stocks through increased stock assessment capability, especially for data-poor stocks; augment the by-catch reduction program
- Fund regional fishery management councils to meet the mandates of the new MSRA requirements
- Expand enforcement capabilities to implement regulations
- Expand aquaculture science to develop cost effective raising techniques and alternative feeds.
- Invest in new and improved methods to assess and verify the safety of the USA seafood supply - critically needed to address new threats, especially from imports.
FY11-15 Solutions & Priorities

Solution 4: Understanding and Predicting Climate Impacts on Ecosystems

- Build coastal community capacity to assess vulnerability and implement adaptation plans for climate & weather hazards
- Mitigate impacts of climate change on NOAA trust resources
- Assess impacts of the loss of sea ice, at both poles on protected species, fisheries and ecosystems
- Increase understanding of impacts and adaptation options for increasing ocean acidification,
- Increase understanding impacts and adaptation options of fresh water supply issues in drought plagued areas on natural resources,
- Increase monitoring and evaluation of impacts of sea level rise on essential habitats and key species
- Assess risks and adaptation options for impacts of ocean warming on the distribution of plant and animal species (including invasives)

PROTECT  ◆  RESTORE  ◆
Loss of Arctic Sea Ice – Ecological Implications for NOAA

September, 2007

September Arctic Sea Ice Measurements

Petition To List
NOAA Trust Resources
MMPA + ESA

Ringed, Ribbon, Spotted Seals

+Arctic FMP
A Nascent Marine Phenology Network

Phenology (def): The study of the timing of biological activity over the course of a year, particularly in relation to climate.

The objective of this program is to combine NOAA’s biological observing of place-based Phenomena into a network that allows interpreting of the impacts of climate change on them, and for forecasting impacts on NOAA’s trust resources.

- Our responsibilities become our observatory
- Opportunity to engage other federal Agencies & the States

Fisheries, NOS and OAR sponsored ecological observation systems – will help to understand effects of SLR, ocean warming, etc.
Ocean Acidification: A Consequence of Human Production of Greenhouse Gasses – Ocean Impacts & NOAA Responsibilities

- Potential impacts on shelled plankton, coral reefs (shallow and deep), bivalves and crustaceans, and food chains
- Managed resources under Coral Reef Conservation Act, MSRA, ESA
- NOAA, NSF funding OA study through NRC Oceans Study Board (2008)

**Value:**
- Bivalves: $732M ex-vessel commercial value
- Crustaceans: $1,265M ex-vessel commercial value
- Combined: $1,997M ex-vessel commercial value (51% of commercial catch by $)
Known Locations of Deep-sea Corals

The data represent known locations of both soft and hard deep corals. Data do not represent density of coral cover but rather known locations and may reflect fishing or research effort. The origin of data varies: in Alaska - survey (RACE) and observer (NORPAC) databases; West Coast – NMFS bottom trawl surveys and observer programs; Gulf and Southeastern US - literature citations and fishery management council database; Northeast - historical records, NMFS bottom trawl surveys and observer logbooks.
The Ultimate Ecosystem
Background Slides
Aquaculture
Program Manager: Michael Rubino

- Supports production and enhancement technology development to increase seafood production and replenish depleted species.
- Addresses aquaculture-related trade issues and promotes world-wide adoption of environmentally sound aquaculture practices and technologies.
Coastal and Marine Resources
Program Manager: Tim Goodspeed

- Promotes the health and productivity of coastal and marine ecosystems by taking a comprehensive approach to balancing protection and use of the ecosystems.
- Management and conservation efforts are implemented at a range of geographic scales in collaboration with state and local partners, and though coordination with a range of domestic and international partners.
Corals
Program Manager: David Kennedy

• Supports effective management and sound science to preserve, sustain and restore valuable coral reef ecosystems.

• Provides a wide variety of tools, products and services to help reduce the loss and degradation of coral reef ecosystems, working extensively with government, private, academic and other non-governmental partners.
Ecosystem Observations

Program Manager: John Boreman

• Designed to be a coastal and oceanic observing system that supports management programs within the Ecosystem Goal and NOAA.

• Capabilities encompass routine observations, assessments and forecasts, product development, data management, technology transfer, and information dissemination.
Ecosystem Research
Program Manager: Leon Cammen

• Provides scientific information and tools necessary for ecosystem management to the Ecosystem Goal and coastal stakeholders.

• Responsible for characterizations of ecosystems, ocean exploration, the development and transfer of technology and forecast tools to resource managers, the development and enhancement of ocean and coastal resources, and coastal outreach and education.
Enforcement
Program Manager: Dale Jones

• Provides law enforcement services directed to obtain compliance with management regimes instituted by NOAA in support of its stewardship responsibilities for living marine resources.
Fisheries Management
Program Manager: Galen Tromble

- Manages sustainable commercial and recreational fisheries by maintaining fish stocks at productive levels.

- Apply ecosystem approaches to conserve and manage fisheries within the broad ecosystem structure defined by the Fishery Management Councils, Atlantic Highly Migratory Species Program, Interstate Marine Fisheries Commissions, and state and international fisheries.
Habitat
Program Manager: Pat Montanio

• Restores and protects coastal, marine, and Great Lakes habitat for the benefit of NOAA trust resources.

• Uses science-based characterization and assessment tools to understand habitat changes and evaluate project success.

• Engages local communities in on-the-ground restoration projects to build environmental awareness and stewardship values.
Priority activities are toward stopping the decline of protected species populations to reduce the risk of extinction. Efforts are made to stabilize populations, and to recover populations to levels that make them functional members of marine and coastal ecosystems.

Goals are achieved through planning, regulation, partnerships, direct action, and outreach and education both domestically and internationally.