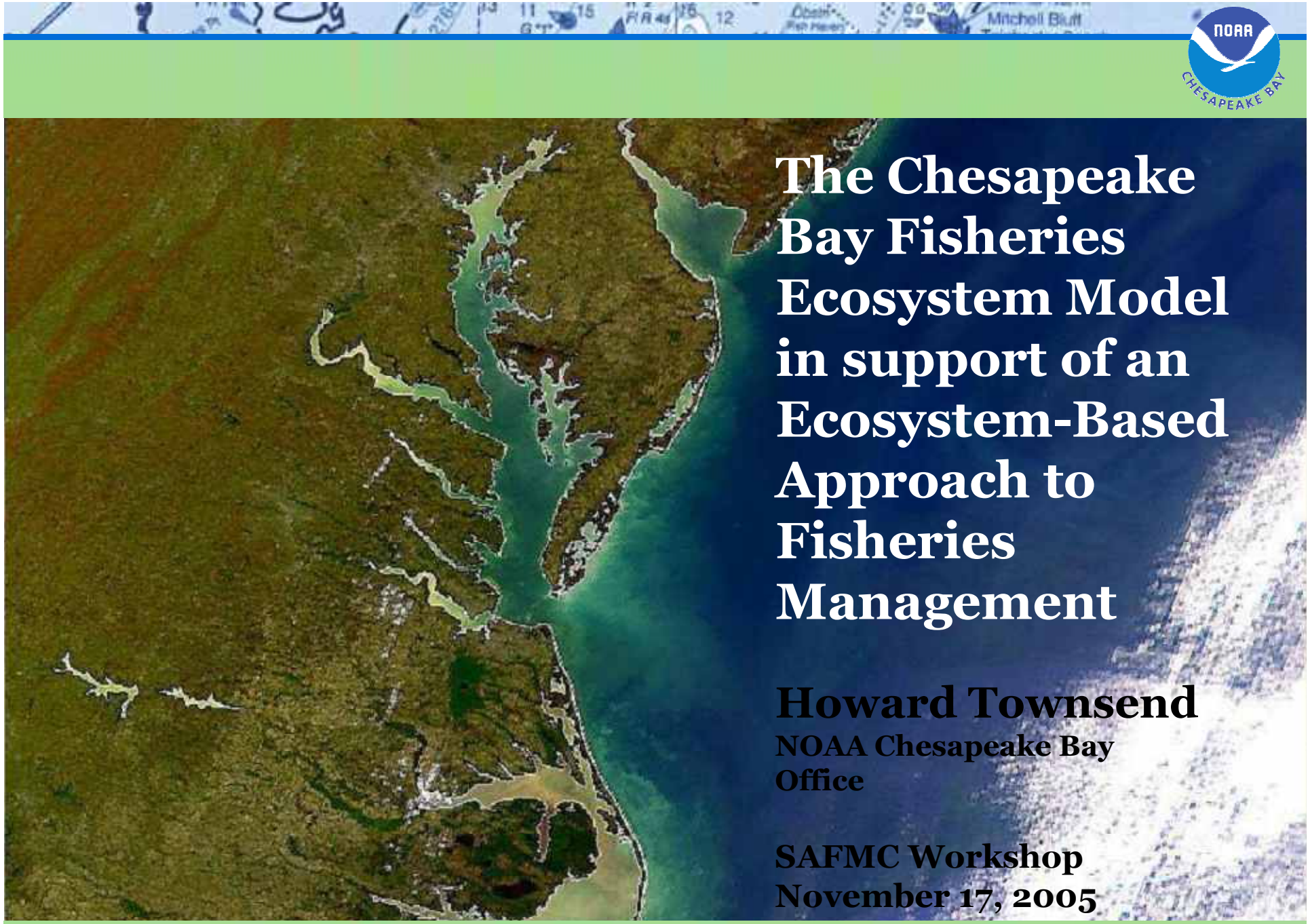


The Chesapeake Bay Fisheries Ecosystem Model in support of an Ecosystem-Based Approach to Fisheries Management

Howard Townsend
NOAA Chesapeake Bay Office

SAFMC Workshop
November 17, 2005

Overview

- Background
  - Chesapeake Bay and Problems
  - NOAA's view of EAM/EBFM
  - Fisheries Ecosystem Plan

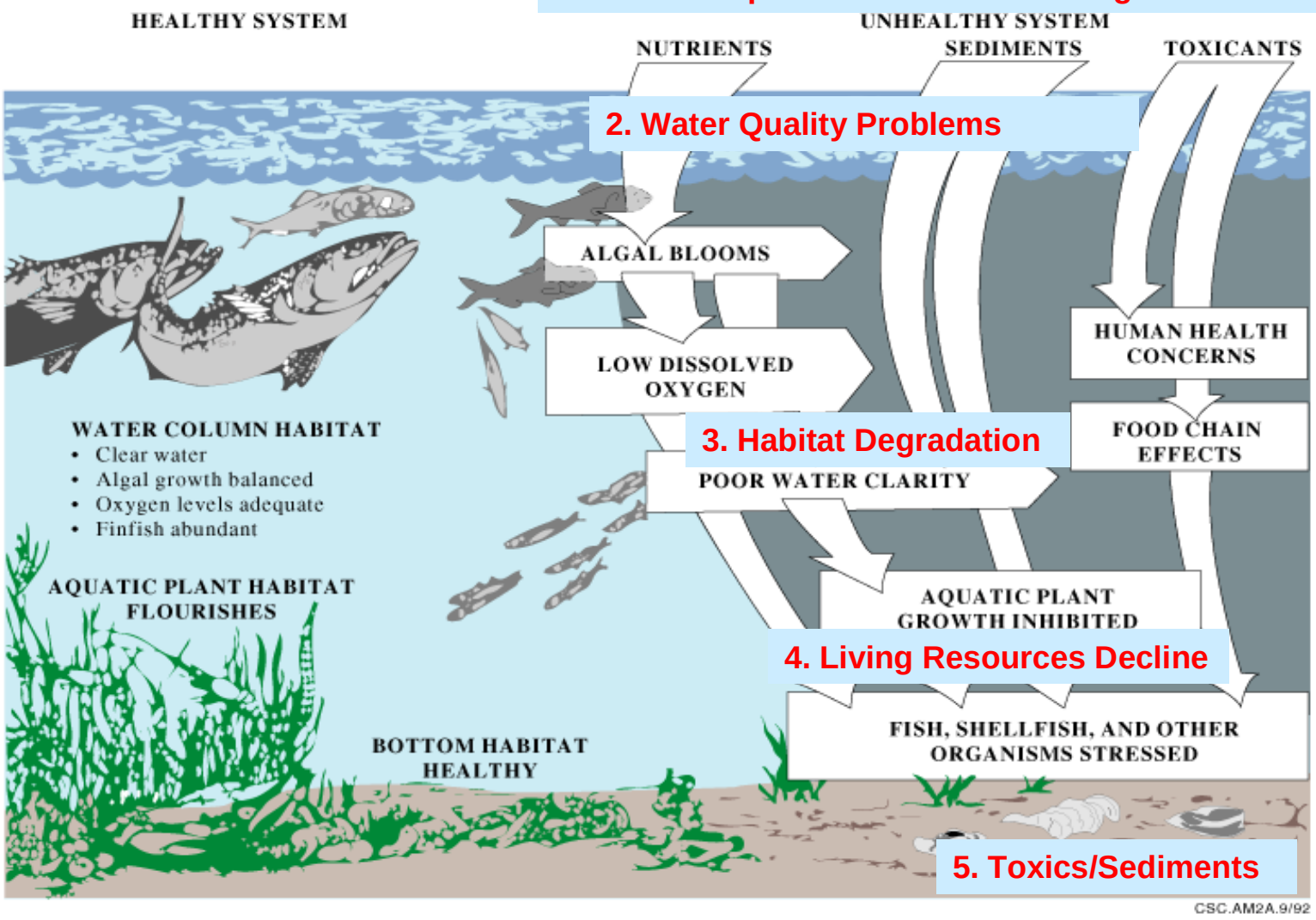
- Ecosystem Approaches to Management
  - Moving towards integrated adaptive management

- How Fisheries Ecosystem Model is Being Used
  - CBFEM Overview
  - CBFEM Applications

Chesapeake Bay

- Largest Estuary in the U.S.
- Watershed encompasses 64,000 mi^2.
- Captain John Smith – first English settlement at Jamestown, VA 1607
- DC's backyard so it receives lots of political attention

The Key Problems



NOAA's Ecosystem-based Approach

MISSION

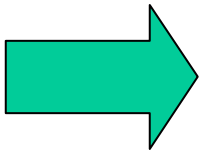
Protect, restore, and manage the use of coastal and ocean resources through an ecosystem approach to management.

EXPECTED LONG-TERM OUTCOMES

1. Healthy and productive coastal and marine ecosystems that benefit society
2. A well-informed public that acts as a steward of coastal and marine ecosystems

PAST APPROACH

- Individual species
- Small spatial scale
- Short-term perspective
- Humans: independent of ecosystem
- Independent coastal & ocean resource management
- Management not integrated with science



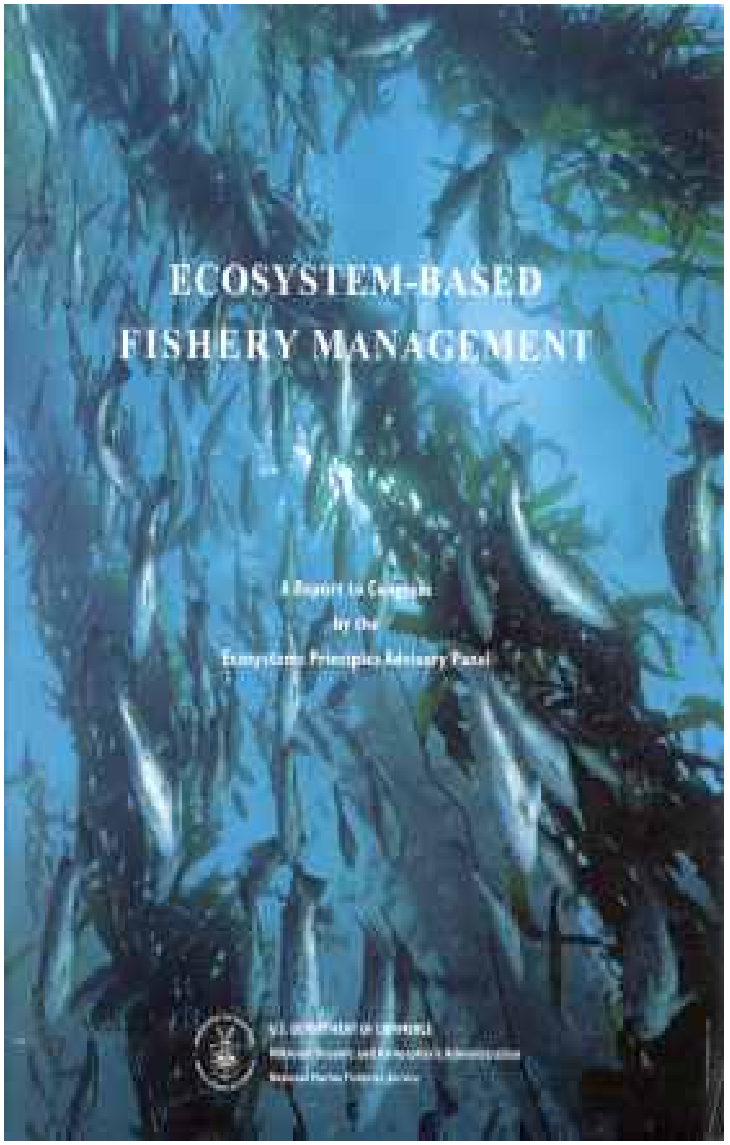
FUTURE APPROACH

- Ecosystems
- Multiple scales
- Long-term perspective
- Humans: integral part of ecosystem
- Integrated coastal & ocean resource management
- Management integrated with science – adaptive management

A Fisheries Ecosystem Plan

- An FEP is an umbrella document containing information on the structure and function of the ecosystem in which fishing activities occur, so that managers can be aware of the effects their decisions have on the ecosystem, and the effects other components of the ecosystem have on its fisheries.

-NMFS (1999) Report to Congress



Key Chesapeake Bay FEP Objectives

- Provide living resource managers with a clear description and understanding of the fundamental physical, biological, and human/institutional structures of the Chesapeake Bay ecosystem

- Provide guidance on how information on the Bay ecosystem should be considered in FMPs for resident species, and coastal species that are seasonal Bay inhabitants

FEP Components

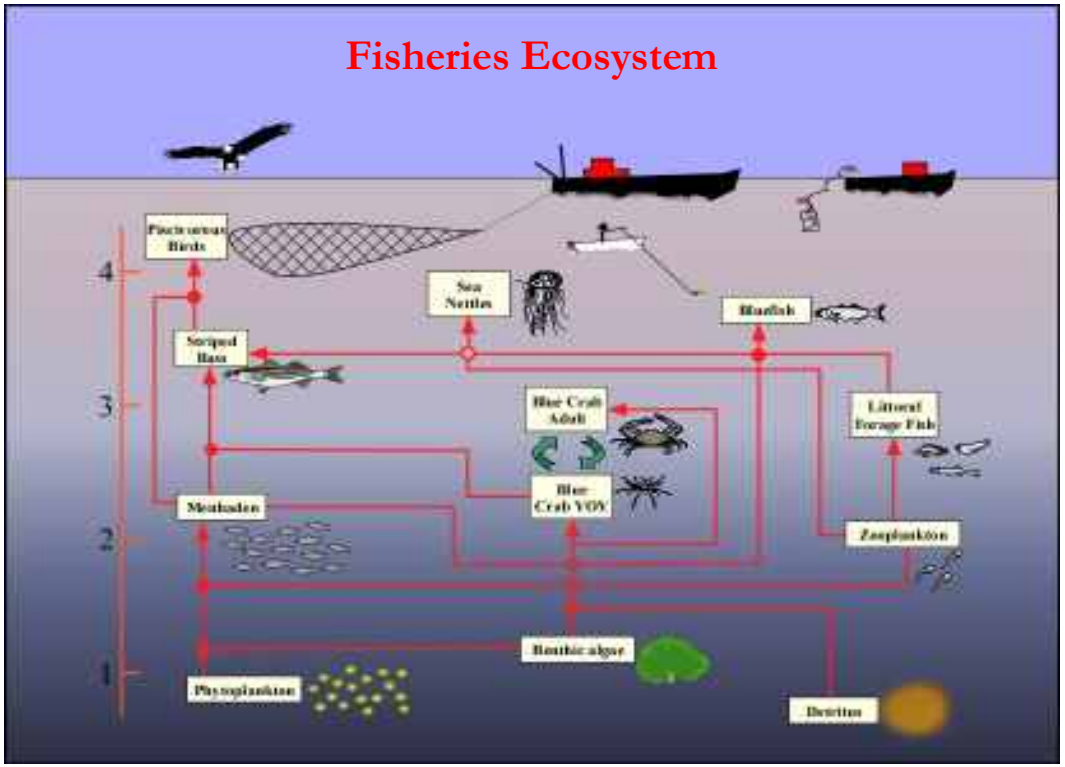
- Ecosystem Boundaries: Defining the Management Unit
- Food Web interactions and Modeling
- Habitat, Habitat Requirements, and Management
- Patterns of Total Removals
- Characterization and Incorporation of Uncertainty
- Indicators of Ecosystem Health & Biological Ref. Points
- Monitoring in Support of Ecosystem-based Fisheries Management
- Externalities (Climate, etc.)
- Economic and Social Dimensions of the Fisheries Ecosystem

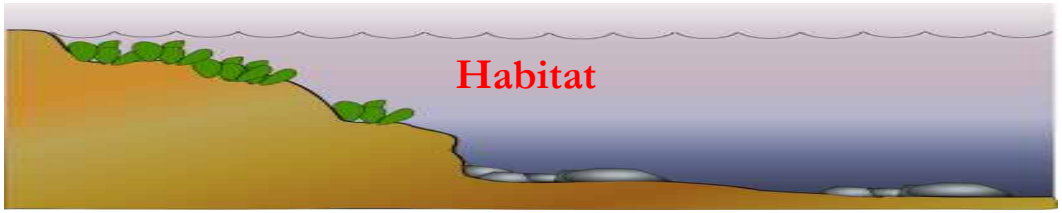
Integrated Adaptive Management

Model

Manage

Monitor & Assess





From Concept to Practice

- Formally adopt an ecosystem-based approach to fisheries management in CB by member of CBP Partnership

- Gain endorsement of FEP for Chesapeake Bay as the guiding framework for ecosystem-based fisheries management

- Develop first generation, pilot Multispecies/Ecosystem-based FMPs for ecosystem-based fisheries management (oyster, blue crab, striped bass, menhaden, and *Alosa)*

- Transition from traditional single species approach to multi-species approach, and finally to ecosystem-based approach, but still will be using some of the basic tools and knowledge necessary for single species

From Concept to Practice

- Use fisheries management as a Living Resource Driver for Bay-wide multi-media restoration efforts

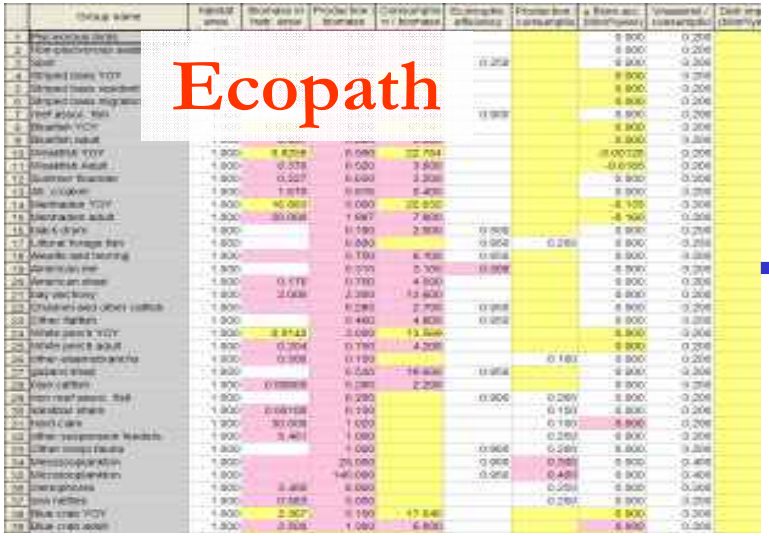
- Providing fisheries managers with sound science from which to develop stock assessments *and* habitat requirements for managed resources

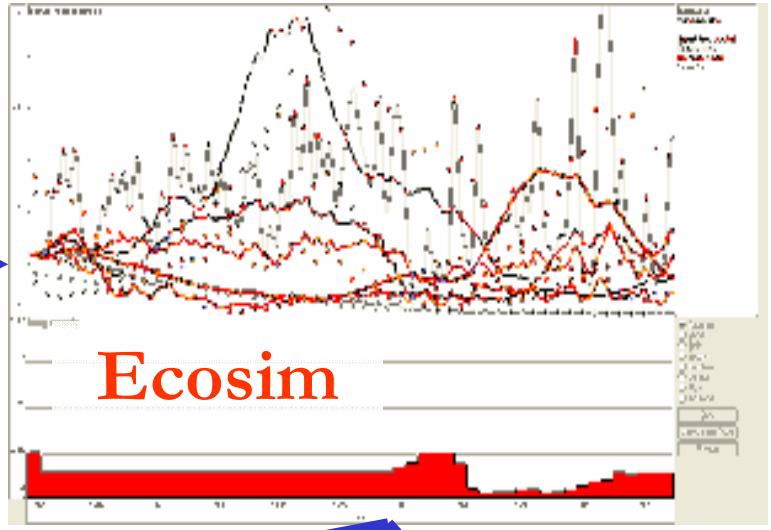
- Provide watershed resource managers (air, water, land) with quantifiable living resources indicators with which to make resource management decisions

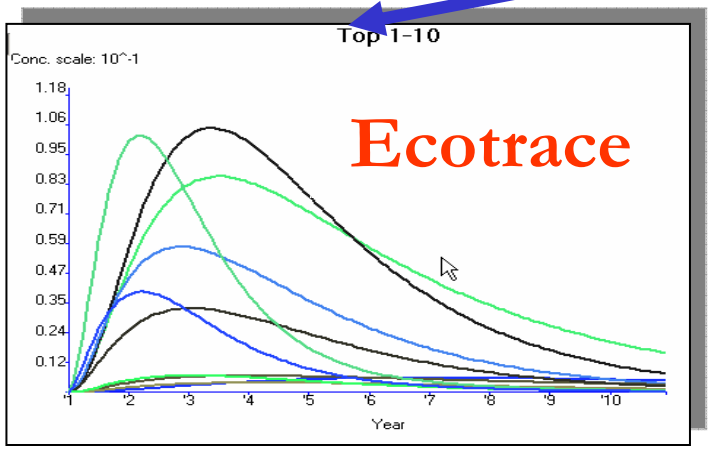
How Management Will Differ

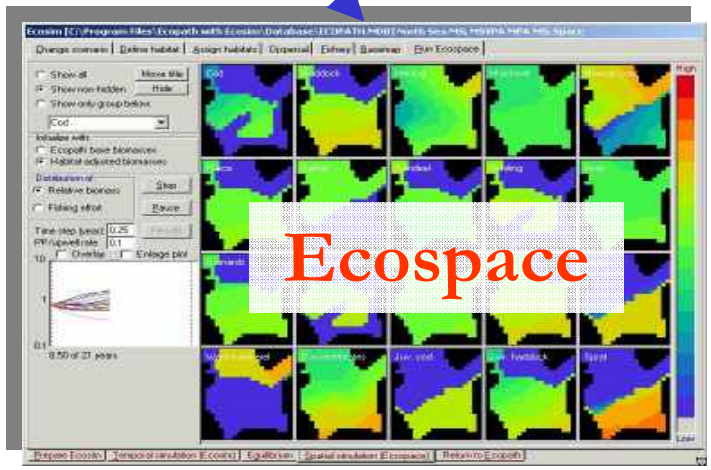
- A New Ethic: Conserve and Protect the Essential Properties of the Ecosystem.
- Precautionary Approach
- Ecosystem-Based Multispecies Fisheries Management Plans with Development Guided by the FEP
- Coordinated Regional Actions (states, commissions, and councils)
- Coordinated Management Actions of agencies with jurisdiction and authority over other parts of the ecosystem (e.g., water and air quality, habitat, land use)
- Harness the Energy and Resources of the Chesapeake Bay Program and other stakeholder-partners
  - Fisheries Managers Can't Do It Alone
  - Participation by Non-Fisheries Resource Managers is Required

Chesapeake Bay Fisheries Ecosystem Model: EwE

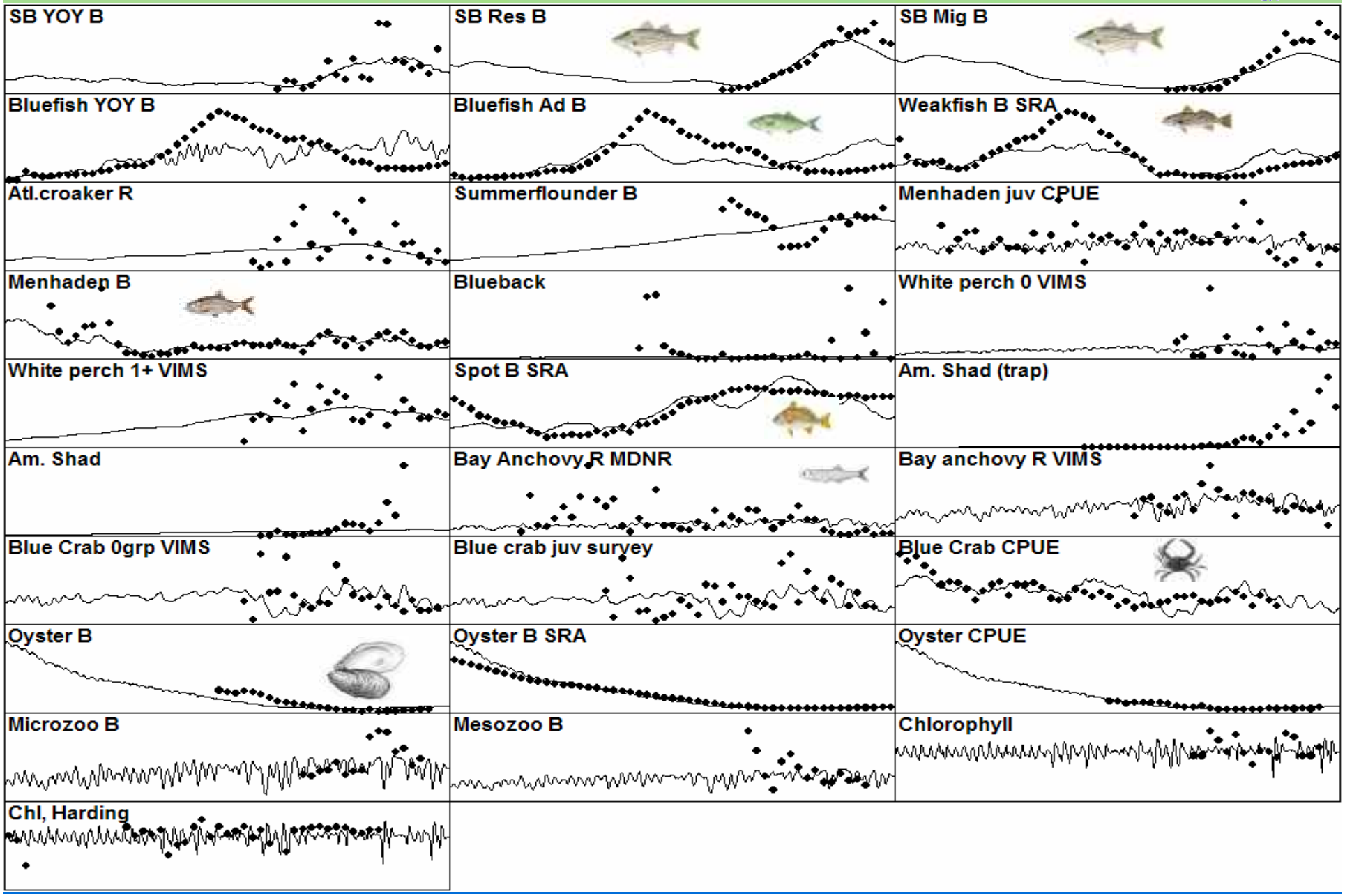




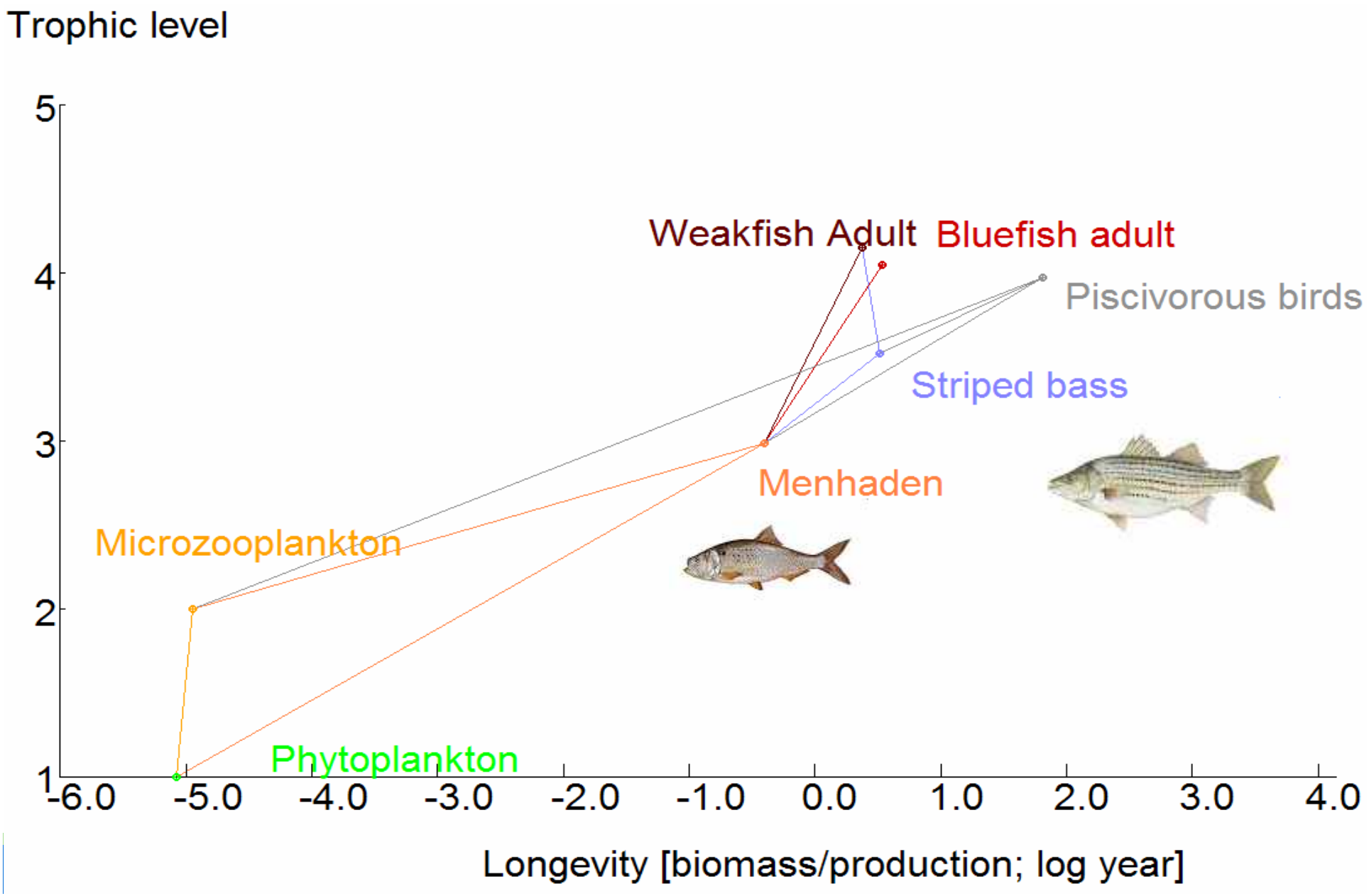




Chesapeake Bay Fisheries Ecosystem Model



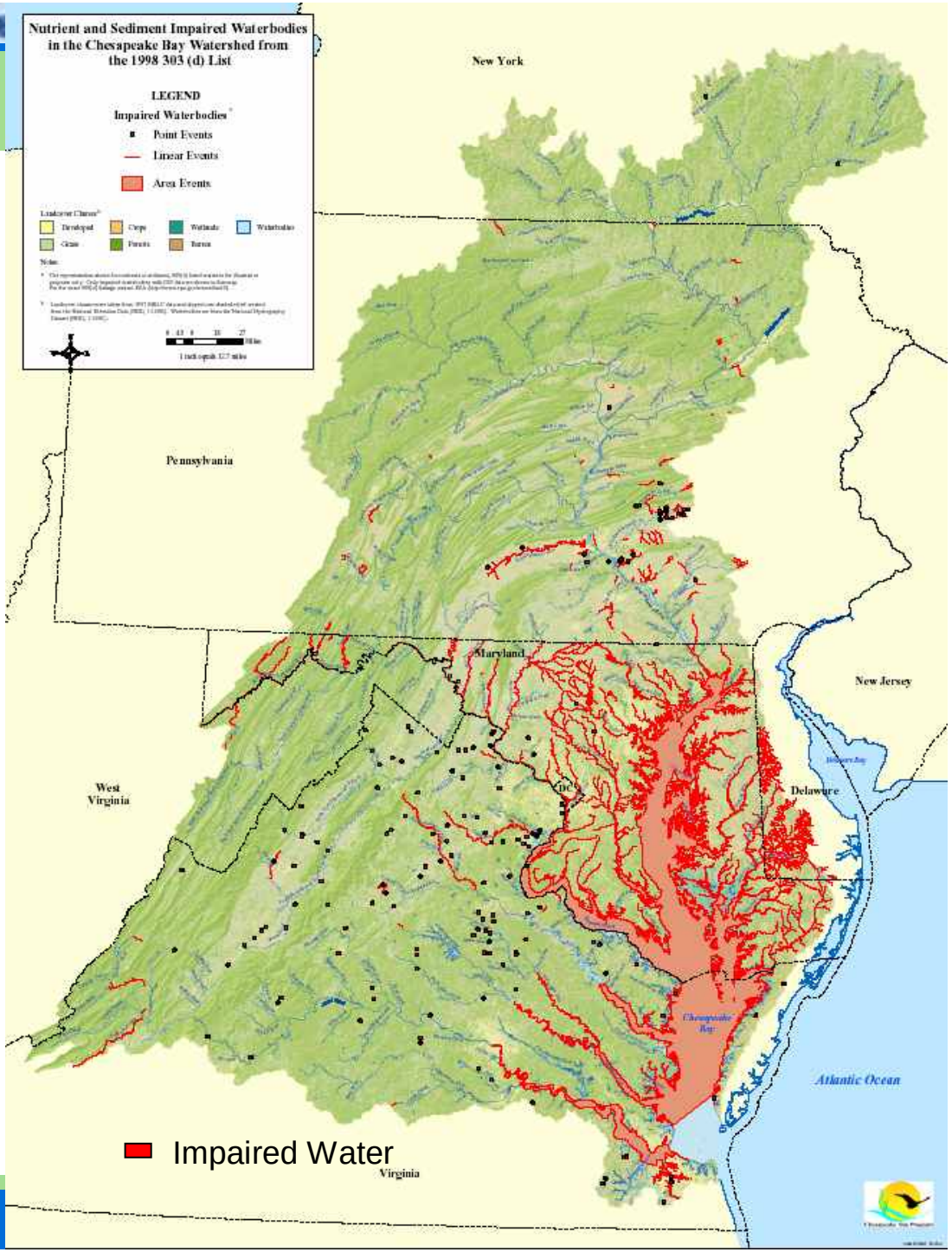
Model Scenarios For Menhaden EBFMP



H_2O Quality & Fisheries

- Over 90% of the Bay and its tidal rivers are impaired due to episodic low dissolved oxygen levels and poor water clarity, all related to nutrient and sediment pollution.

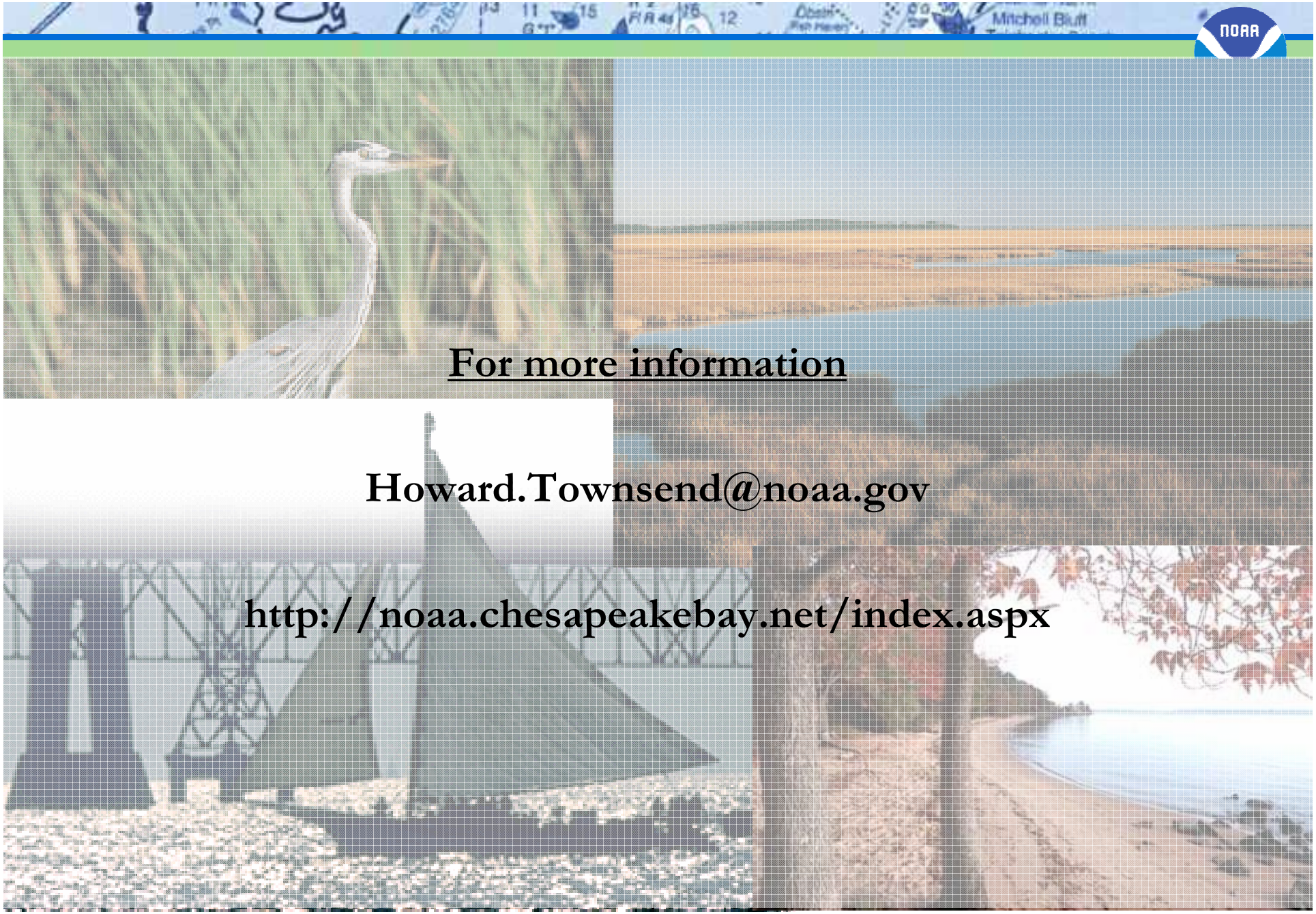
- Linking EPA Watershed and Water Quality (Eutrophication) Model to the Fisheries Ecosystem Model to explore how effects of H_2O quality on fisheries



Other Ecosystem Modeling Activities

- Developing a NOAA Ecosystem Modeling Team
  - Developing ecosystem models for all the regions over which NOAA has interest or jurisdiction;
  - Having dedicated ecosystem modelers in each region who are familiar with local ecosystems and researchers; thereby enabling facilitation of collaborative work to parameterize and validate the models
  - Fostering acceptance and use of ecosystem-based approaches to management and ecosystem modeling by regional management councils/commissions, and other management agencies.
  - Facilitating information and technology transfer among ecosystem modelers;

- Hosting a course on Ecopath with Ecosim programming code in Annapolis, MD in June 2006



For more information

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http://noaa.chesapeakebay.net/index.aspx

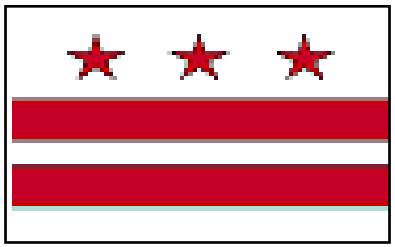
The Chesapeake Bay Program Partnership

Governor of MD

Governor of VA

Governor of PA

Mayor of DC



EPA Administrator

Executive Council

Chesapeake Bay Program
A Watershed Partnership

Chair of Chesapeake Bay Commission

Flow Diagram for the current Fisheries Management Process in Chesapeake Bay