



NOAA Chesapeake Bay Office

Sustaining Fisheries through Ecosystem-Based Study

The Chesapeake Bay and its watershed are an ecosystem—a complex community with diverse inhabitants and habitats that work together as an ecological unit. Thinking of the marine environment and the life that lives there as an ecosystem provides a more realistic view of the underlying causes and effects of changes on living marine resources. In addition to fishing, other activities that can contribute to habitat degradation include coastal development, pollution, and shipping.

Many of the species that call the Chesapeake Bay ecosystem home are highly enjoyed seafood products. Harvest of blue crabs, oysters, fish, and other species is a major economic enterprise. Other species play important roles in the ecosystem that supports the production of seafood.

Despite current fisheries management efforts, the abundance of some economically valuable species is declining. The NOAA Chesapeake Bay Office is working to better ensure the viability of these fish, crabs, and other species by supporting the incorporation of ecosystem principles into fisheries management and by using computer modeling to learn more about how the components of the Chesapeake Bay ecosystem interact.

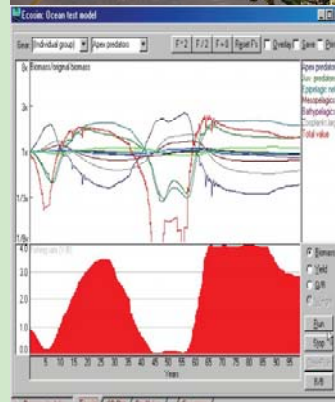
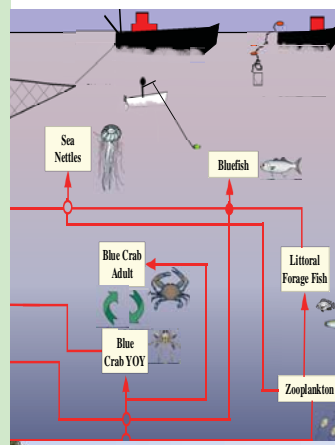
What Is an Ecosystem Approach to Management?

Until recently, when determining policies, fisheries managers have looked at one species of fish and shellfish at a time. For example, if the population of one kind of fish were declining, authorities might decide to lower the cap on how many of that fish could be caught in a given year. But the amount of fishing of a single species is only one variable that affects the future of that kind of animal. Species are affected by interactions with other species, as well as the effects of pollution and other stresses on the Bay on habitat and water quality. To more effectively assess the health of any given fishery and to determine the best way to support it, the entire ecosystem must be taken into account.

To clarify how ecosystem-based planning for fisheries should work in the Chesapeake Bay, scientists from the NOAA Chesapeake Bay Office (NCBO) led fisheries scientists from institutions around the Bay as well as federal and state agencies in developing *Fisheries Ecosystem Planning for Chesapeake Bay*. This publication describes the structure and function of the Chesapeake Bay ecosystem, including key habitats and species interactions. Further, it serves as a guide to ecosystem-based approaches to individual fishery management plans, and

Our Core values...

- Science
- Service
- Stewardship
- Teamwork
- Focus
- Communication



includes recommendations for implementing these plans. The Executive Council of the Chesapeake Bay Program endorsed the principles of ecosystem-based management, adopting *Fisheries Ecosystem Planning for Chesapeake Bay* as its guiding document, in November 2005.

How Does NOAA Learn about the Ecosystem?

The Chesapeake Bay watershed covers more than 64,000 square miles; the number and diversity of variables affecting the health of the ecosystem are tremendous. To study how these variables affect the species that live in the ecosystem, the NOAA Chesapeake Bay Office supports research, monitoring, and computer modeling to analyze these interactions.

NOAA's National Weather Service uses a variety of computer models to predict tomorrow's weather. Similarly, analyzing an ecosystem is complex, so models are needed to understand how an ecosystem works. NCBO supports the development of multiple ecosystem models. For example, NCBO and its partners currently run the "Ecopath with Ecosim" software, which is being used to develop the Chesapeake Bay Fisheries Ecosystem Model. Scientists are compiling vast amounts of information on the Bay's living resources and the inputs that affect these species and their ecosystem. This information is included in a massive database, which feeds into complex equations that can provide answers about interactions in the ecosystem.

For example, the model predicts what might happen to the blue crab population if there were an increase or decrease in the striped bass population. By answering such questions, the model can create more understanding about the links between land use, water quality, and living resource management.

Why Is NCBO Involved?

NCBO is putting NOAA's mission—to understand and predict changes in the Earth's environment and conserve and manage the coastal and marine resources to meet our nation's economic, social, and environmental needs—into action at a regional level. Working closely with other federal, state, and local partners, NCBO is working to strengthen Chesapeake Bay fisheries for the future. Ecosystem approaches to management consider many variables and influences that affect the future of all the fisheries in the Bay.

For more information on ecosystem approaches to management, modeling efforts, and to read *Fisheries Ecosystem Planning for Chesapeake Bay*, visit NCBO's web site at <http://chesapeakebay.noaa.gov>.

NCBO Mission

To understand, predict, and explain changes in the Chesapeake Bay's environment, and conserve and manage coastal and estuarine resources to meet the Region's economic, social, educational and environmental needs.

