



NOAA Ecological Forecasting Roadmap

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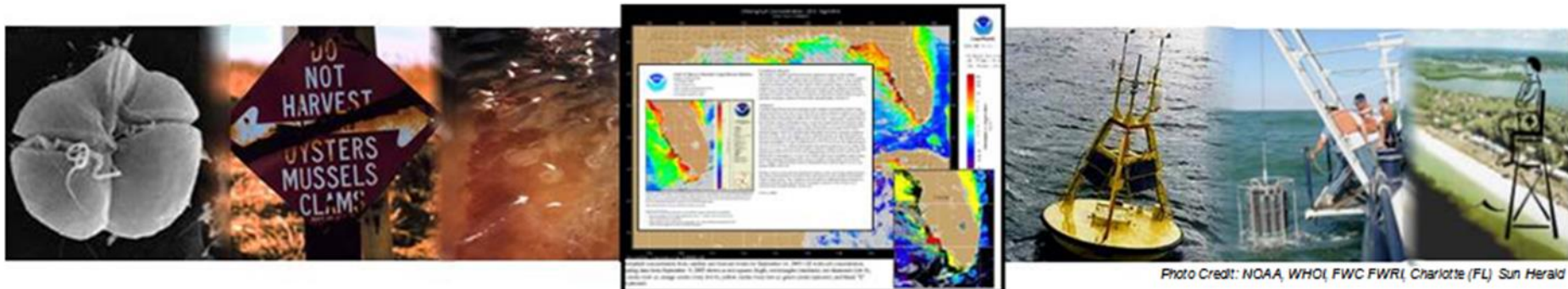
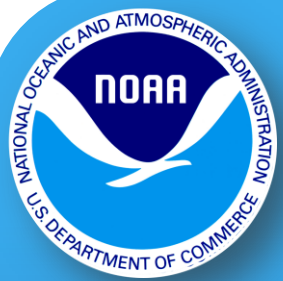


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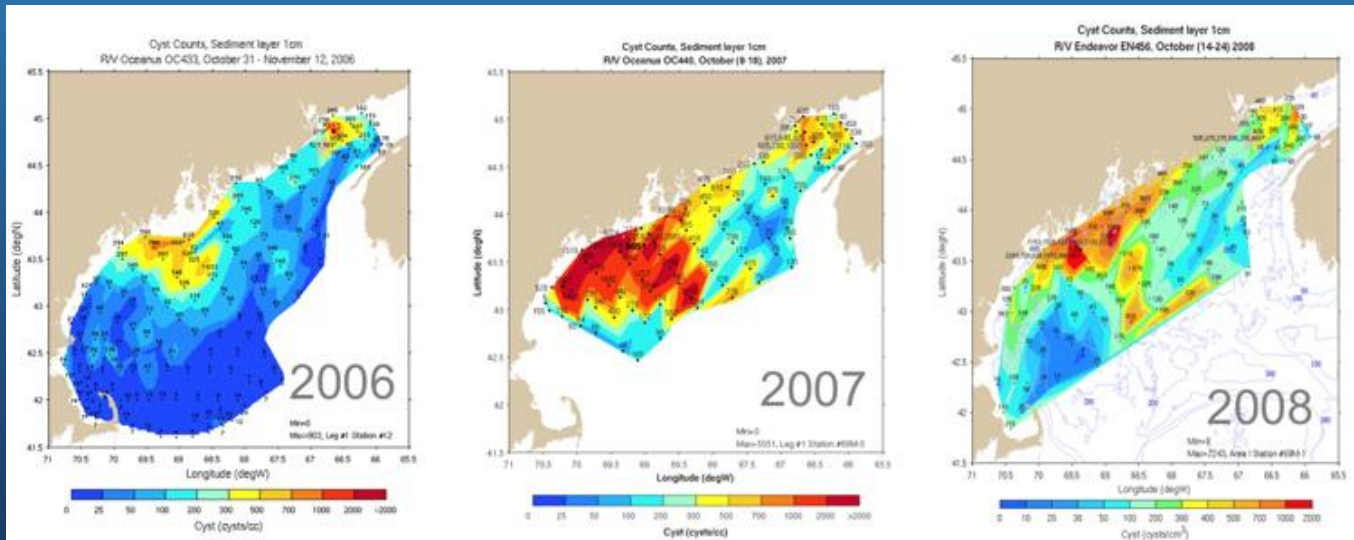
What Are Ecological Forecasts?

- Ecological forecasts predict likely changes in ecosystems in response to environmental drivers and resulting impacts to people, economies and communities.
- Ecological forecasts provide early warnings of the possible effects of ecosystem changes (e.g., harmful algal blooms, hypoxia, etc.) on coastal systems and human well-being with sufficient lead time to allow for corrective or mitigative actions.

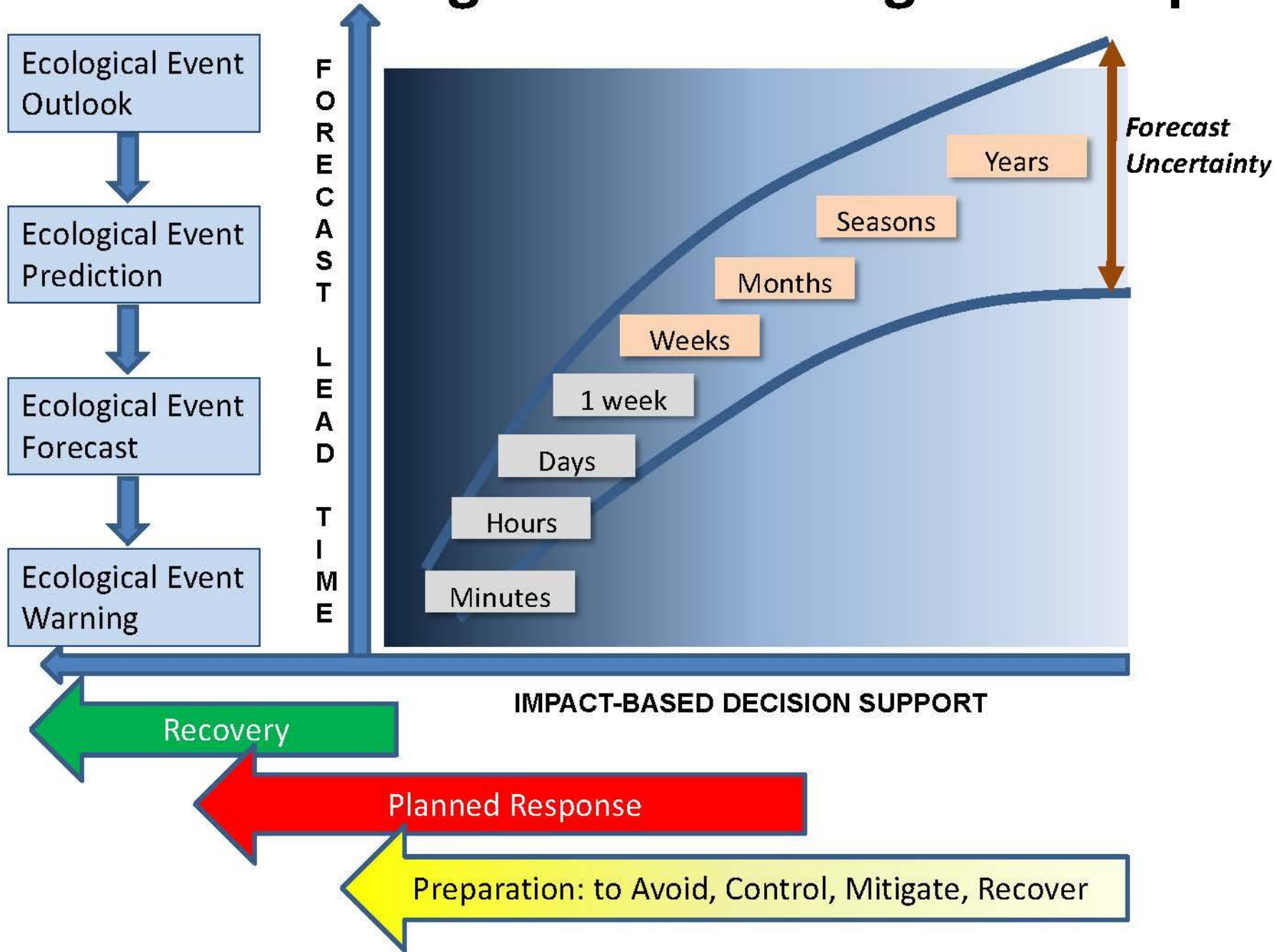


NOAA's Ecological Forecasting Roadmap: What we will achieve

- Strong science to enable delivery of forecasts
- Delivery of more products and services building on existing NOAA and partner capacity
- Delivery of more consistent, efficient, reliable, and national forecasts (tailored to region-specific needs)



NOAA's Ecological Forecasting Roadmap



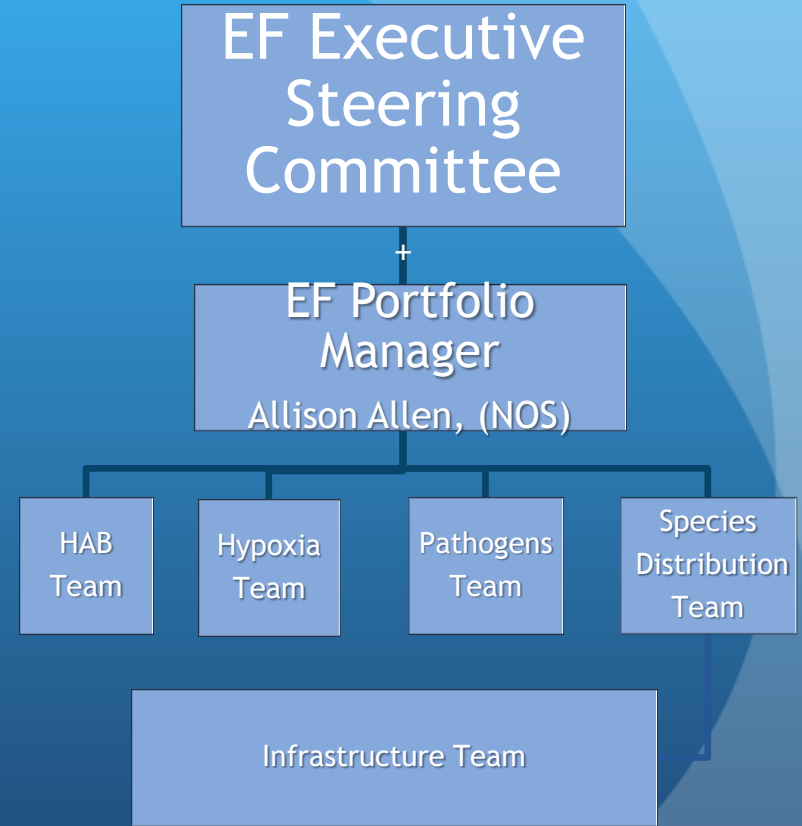


NOAA Ecological Forecasting Roadmap Structure and Priorities

Focus Areas:

HABs, Hypoxia, Pathogens, Habitat/Species Distribution

- Selected based on
 - relative maturity and potential readiness to transition to operations
 - Nation-wide applicability to NOAA's core missions
 - well-identified needs with strong, interested constituencies





Key Principles

- Partnerships are essential
- Priorities are driven by customer/stakeholder needs, values, and uses
- Using a One-NOAA approach integrates efforts across disciplinary and jurisdictional boundaries
- Supporting a full continuum of ecological forecasts
- National in scope but regional in delivery and specificity



Forecasts Under Development

HAB:

- West Florida Shelf (operational)
- Texas (operational)
- Lake Erie (demo/experimental)
- Gulf of Maine (demo/experimental)
- Puget Sound (demo/experimental)
- Washington Coast (demo/experimental)
- California (future)
- Chesapeake Bay (future)

Hypoxia:

- Gulf of Mexico (demo/experimental)
- Chesapeake Bay (demo/experimental)
- Puget Sound (demo/experimental)

Pathogens:

- Chesapeake Bay (demo/experimental)
- Delaware Bay (demo/experimental)
- Tampa Bay (demo/experimental)
- Gulf of Mexico (future, location may change)



Defining “Operational”

- NOAA’s draft administrative order on R2O defines operational activities as “sustained, systematic, reliable, and robust mission activities with an institutional commitment to deliver specified products and services.”



Research to Operations (R2O) Importance

R2O provides services to users
Allows researchers to continue improving operational forecasts
Gives broad visibility to the research



Operational analysis continually identifies areas of needed research
Provides reliable up-to-date information for continual research



Sample Research Questions

Harmful Algal Blooms:

- How well do weather models predict respiratory irritation for the Florida coast?
- Can we detect and quantify cyanobacteria with VIIRS satellite imagery?

Hypoxia:

- What may be useful bio-indicators of hypoxia effects on marine organisms?
- What are some sub-lethal physiological effects of hypoxia (e.g. croaker reproductive impairment)?

Pathogens:

- Can we develop regionally specific algorithms to predict *Vibrio* abundance for regional US coastal ecosystems?
- How can we integrate climate data and models into forecast products to quantify seasonal and longer term risks?



EFR HAB Goals

- Develop a standardized and modular data integration for analysis, production and dissemination of HAB forecasts on a national scale
- Ensure maintenance of existing operational HAB Forecasts, and improve through validation and refinement;
- Transition existing HAB forecasts from R&D and demo phases to operations;
 - operational forecasts in Gulf of Maine, Gulf of Mexico (FL, TX), Chesapeake Bay, Lake Erie, PNW, California;
 - Progress towards establishing operational systems in NY (Long Island Sound), Alaska, Caribbean, other regions
 - Capacity for National Forecast and Early Warning for Event Response to HABs
- Build national infrastructure to support HAB forecast system, including advancing HAB detection capabilities

Hypoxia Ecological Forecasting Roadmap Elements



- Evaluation of monitoring/observation needs and new technologies (Gulf Hypoxia Monitoring Plan, glider workshop, Spring 2013)
- Evaluation of data management, synthesis and visualization needs
- Linking NWS river forecasting with seasonal hypoxia prediction to extend forecasting window (qualitative implemented in 2012 & 2013)
- Long-term action: Integrate nutrient-based models (water quality management) with living resource models (fisheries management)
- Build from Gulf of Mexico to national capabilities
- Further evaluation of user needs for ecosystem mgmt. and short-term forecasts





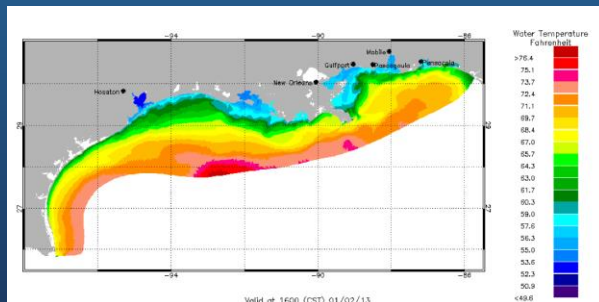
A National scale pathogen ecoforecasting system

Approach:

- Predictive Vibrio algorithms
- NOAA's regional hydrodynamic operational forecasting system (OFS)

Priorities:

- Validate and maintain hydrodynamic model accuracy
 - Temperature and salinity observations
 - Vibrio samples
- Improve predictive algorithms for Vibrio



Northern GOM OFS



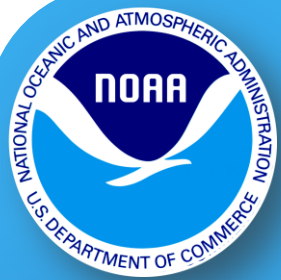
Example Areas of Collaboration (from the SECOORA Webinar)

- HAB forecasting in North Carolina
- Pathogen forecasting in North Carolina
- Research on virulence of Vibrios
- Enhanced collaboration on existing observations:
 - Hypoxia
 - New innovative observation platforms, e.g. Ferrymon
- West Florida Shelf HAB tools (tracking)
- Innovative satellite imagery techniques, modeling advancements, new products, etc, from NC State University

The NOAA logo is circular with a blue border. Inside the border, the text "NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION" is written at the top and "U.S. DEPARTMENT OF COMMERCE" at the bottom. In the center, there is a white stylized wave graphic with the letters "NOAA" in blue above it.

Next Steps

- Continue Regional Webinars
 - Discussion of priorities and key activities (inventory)
 - Identify specific areas of collaboration
 - Integrate partnership opportunities into the revised EFR Action Plan
- IOOS RA participation in annual meetings, review of Action Plan, and engagement with technical teams
- Periodic updates by the Roadmap to RAs



Questions & Discussion

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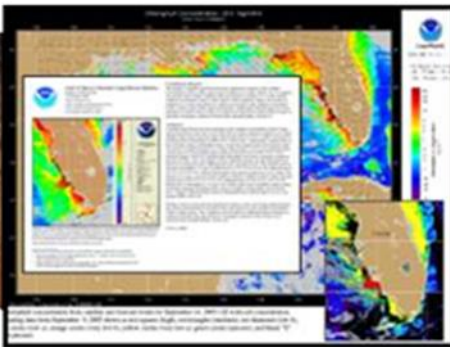
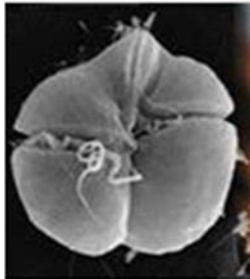


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