

NOAA PERSPECTIVE: THE FUTURE OF ENVIRONMENTAL MONITORING AND MODELING



NEMC 6 AUGUST 2014



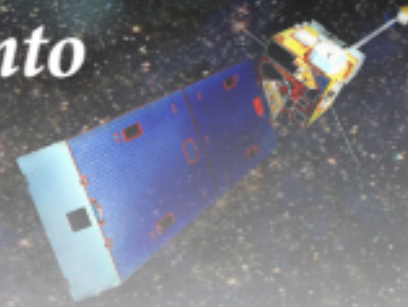
Richard Spinrad, Ph.D.
Chief Scientist

National Oceanic and Atmospheric Administration | NOAA

NOAA

America's Environmental Intelligence Agency

*Putting environmental information into
the hands of people who need it.*



ENVIRONMENTAL INTELLIGENCE



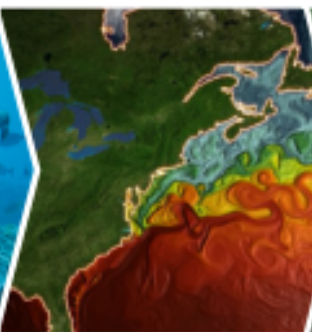
Observations



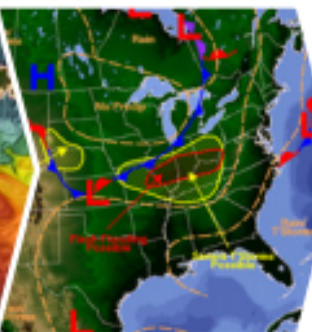
Monitoring



Assessment



Modeling



Forecasts and
Products

TOP PRIORITIES FOR 2014–2016

1

**Make
communities
more resilient**

2

**Evolve the
Weather
Service**

3

**Invest in
observational
Infrastructure**

Actions



Decisions



Information

Knowledge



Data

Assessments



1 Make communities more resilient

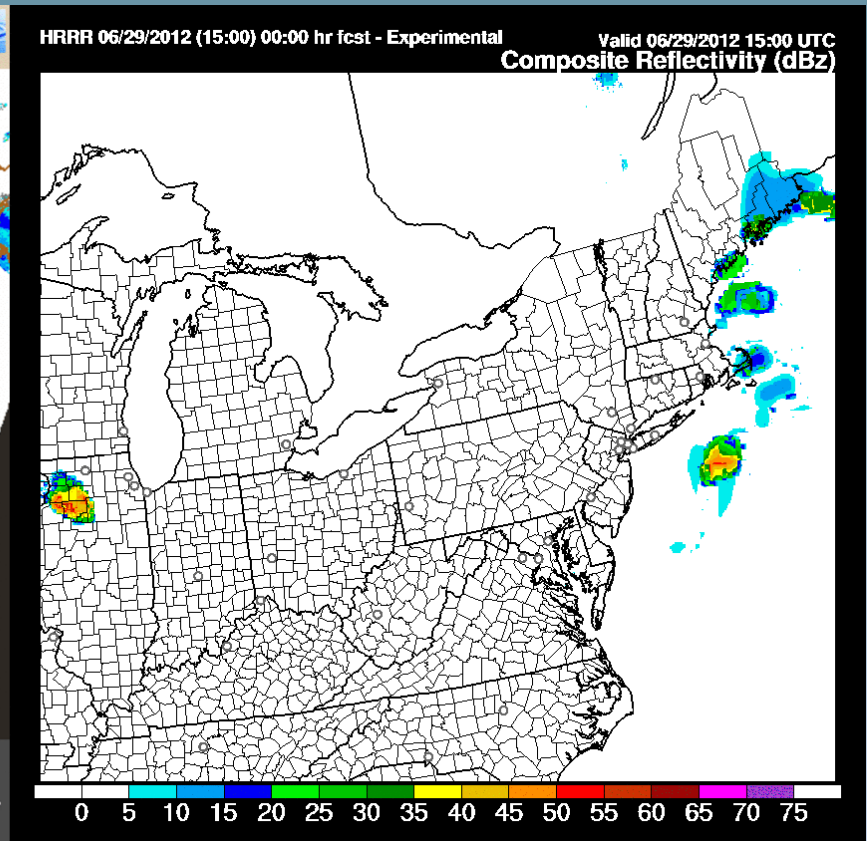
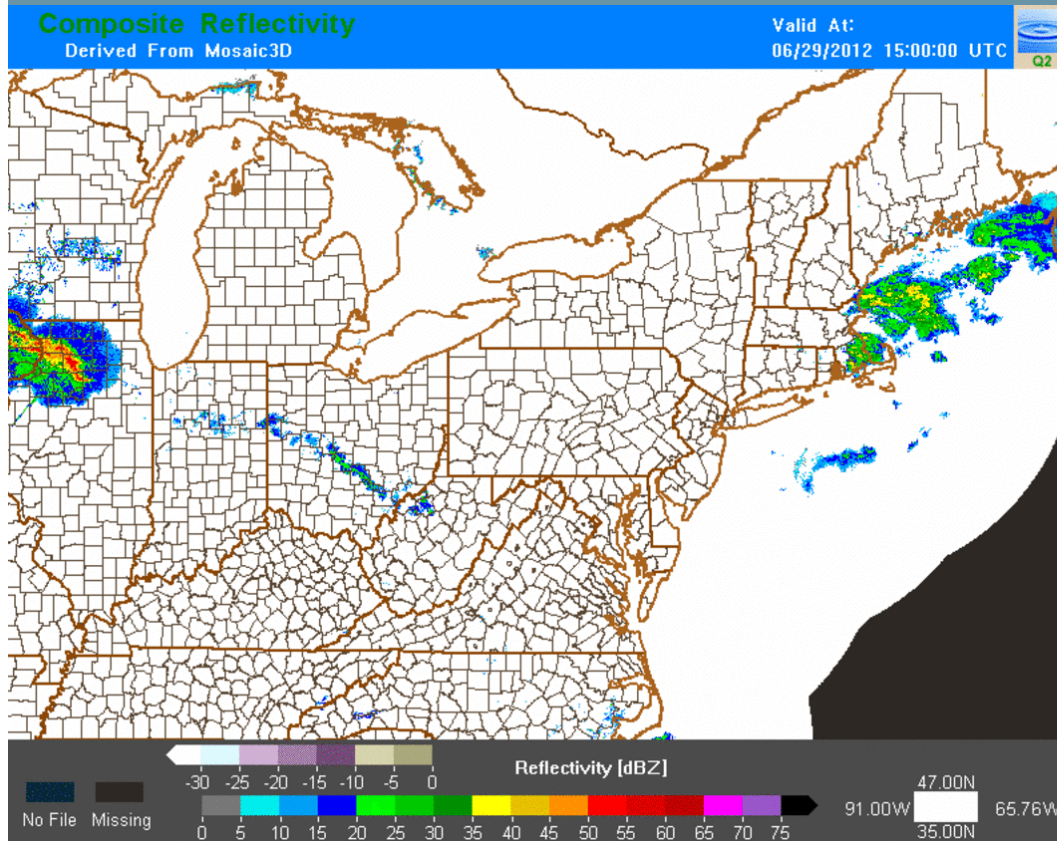
EXTREME WEATHER

Derecho – June 2012



OBSERVED

NEW HRRR MODEL
3km resolution



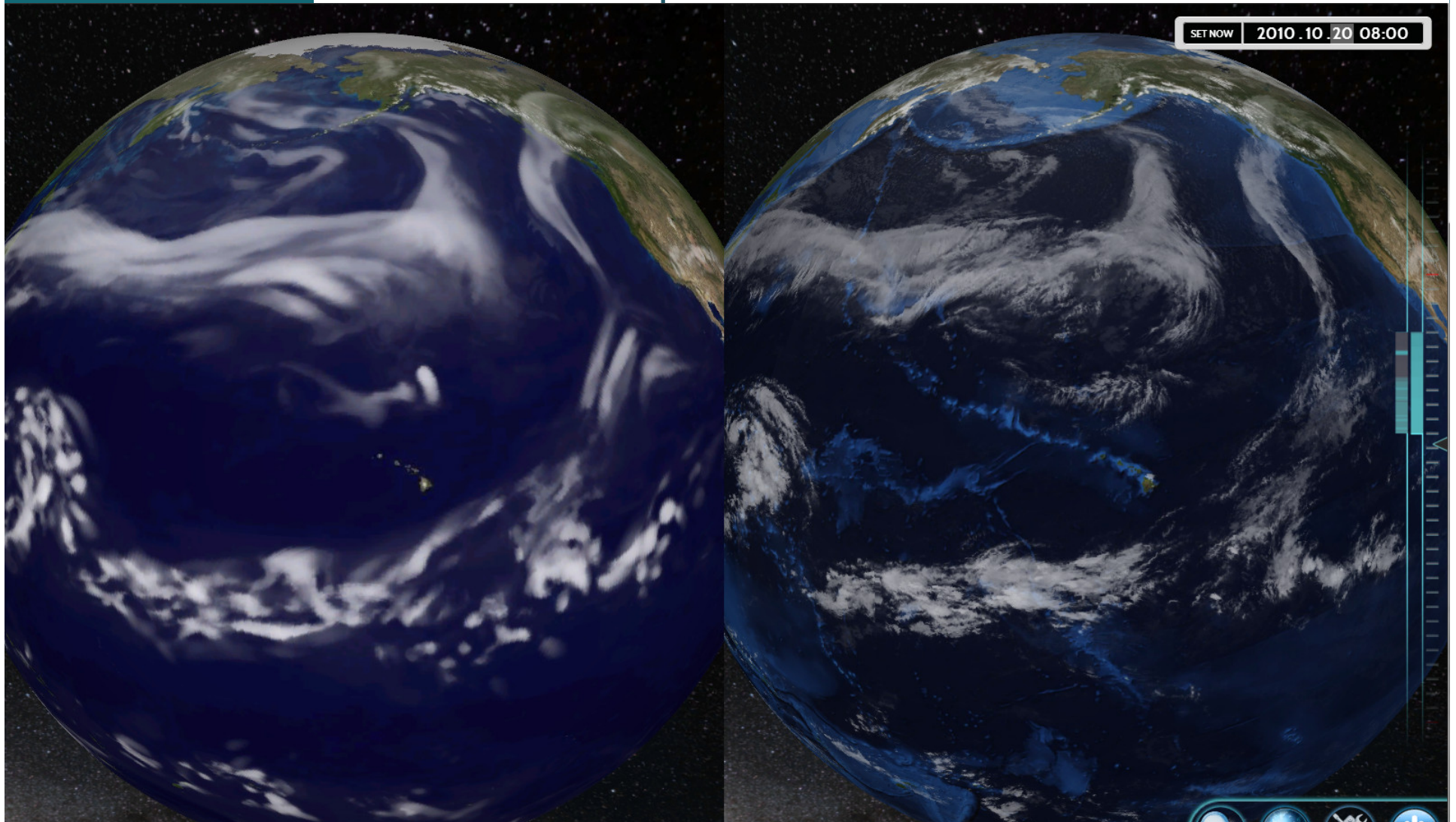
Reflectivity Observations

HRRR 15 UTC 29 June 2012

1 Make
communities
more resilient

HIGH IMPACT WEATHER PREDICTION PROJECT (HIWPP)

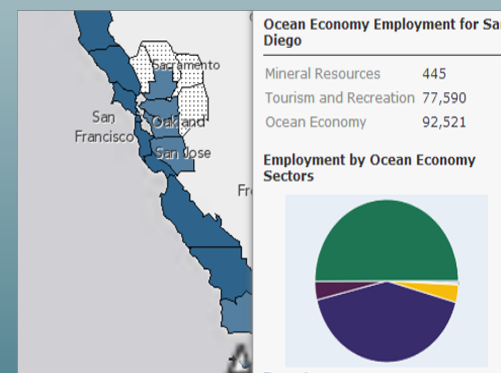
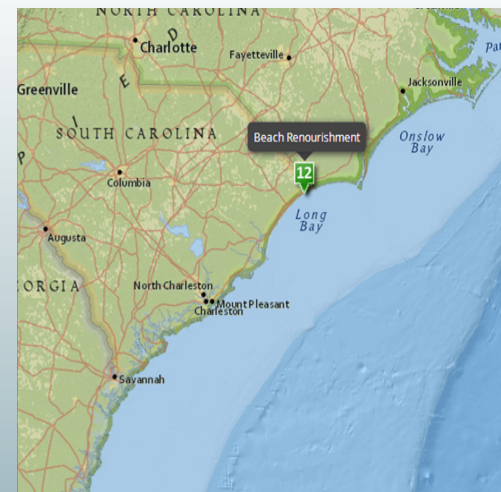
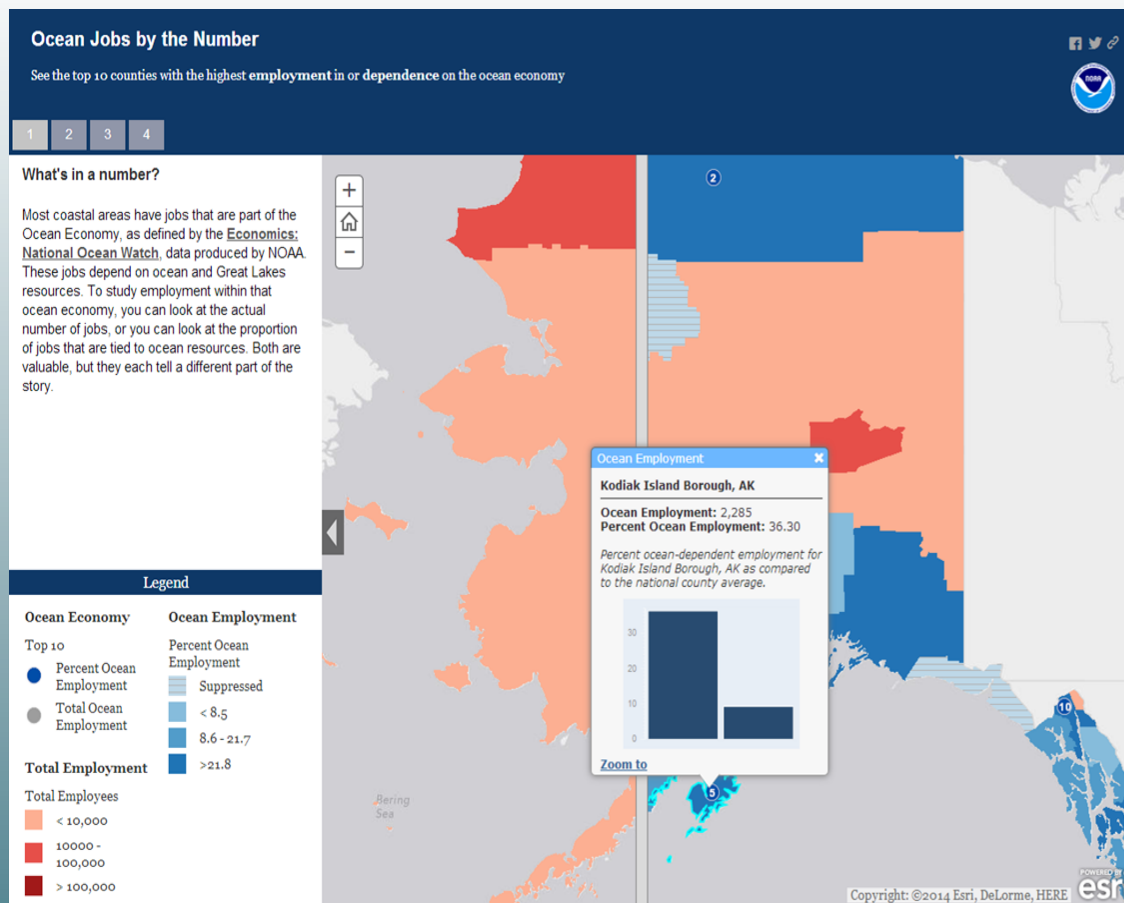
Improving global weather models for time-zero to
2-week weather prediction



1 Make communities more resilient

SEA LEVEL RISE & OTHER PLANNING TOOLS

Digital Coast/ENOW/Climate Resilience Toolkit



DIGITAL COAST ENOW EXPLORER

Tools to help us better understand the ocean and Great Lakes economy

1 Make communities more resilient

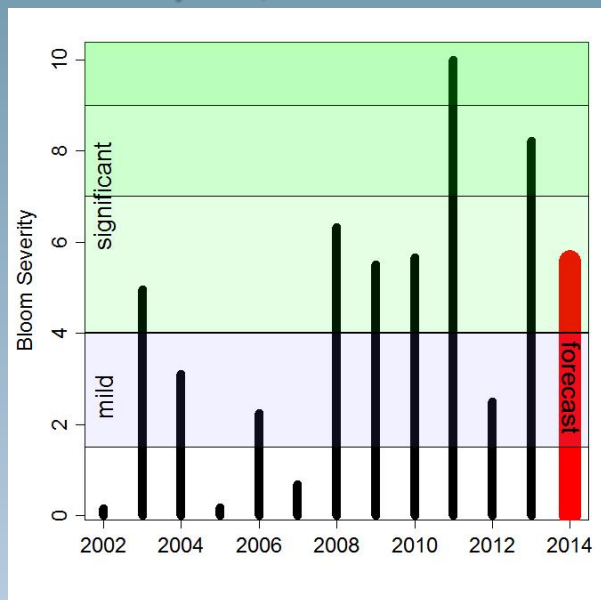
HARMFUL ALGAL BLOOM (HAB) FORECASTS

Operational in Texas and Florida

Experimental in Lake Erie, Gulf of Maine & Washington

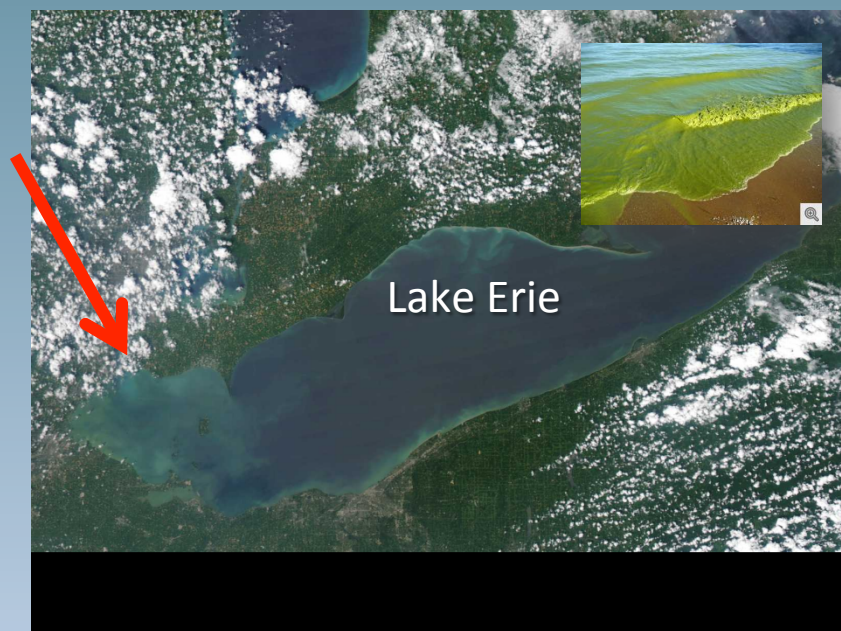
Lake Erie HAB Forecast

Issued July 10, 2014



Models rely on a 12-year Lake Erie nutrient-flow data set, satellite data analysis, and in-lake measurements

MODIS satellite Image



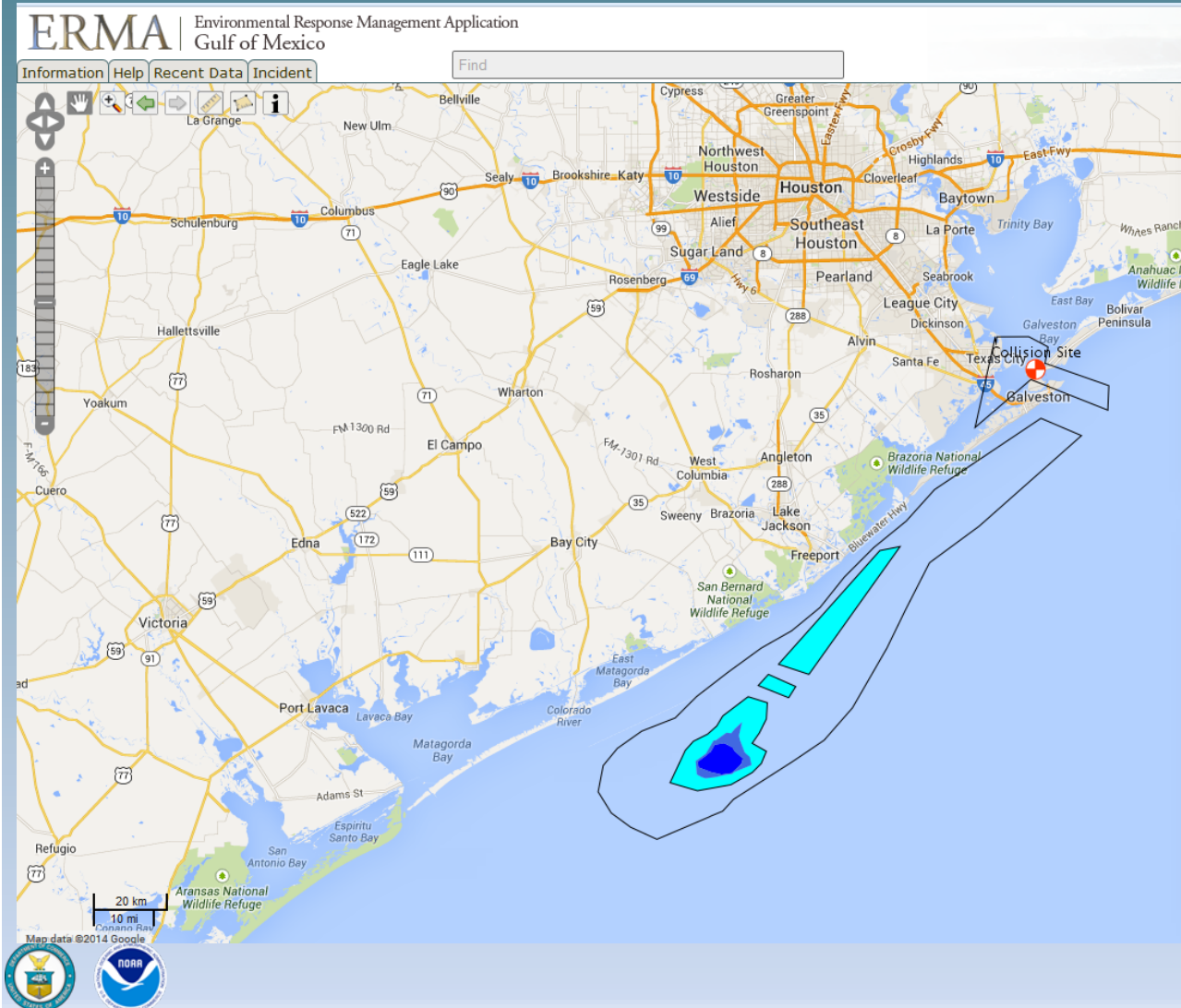
July 31, 2014

Microcystis blue-green algae bloom
500,000 people in northwestern Ohio
affected

1 Make communities more resilient

OIL SPILL TRAJECTORIES

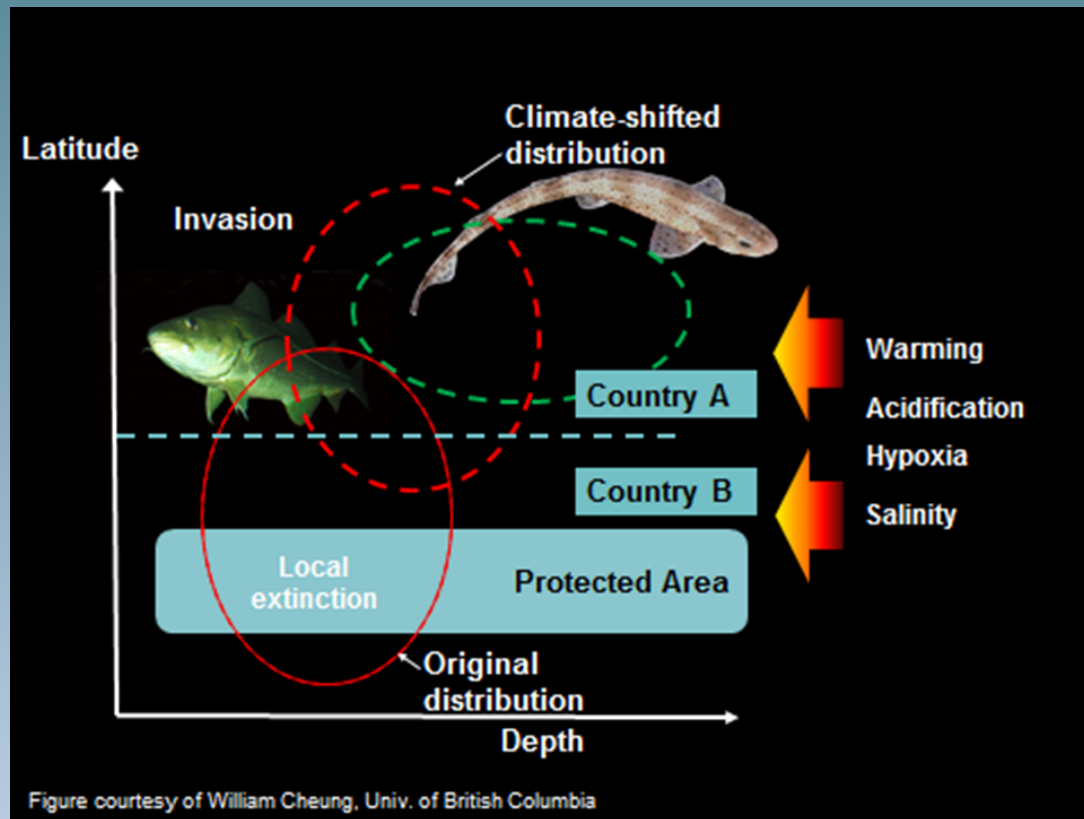
Texas/Gulf of Mexico Boat Collision – March 2012



1 Make communities more resilient

CLIMATE CHANGE, OCEAN ACIDIFICATION & OTHER IMPACTS

Economically-important fisheries



Walleye pollock
Alaska fisheries

CHANGING DISTRIBUTION & ABUNDANCE
Multiple drivers



2

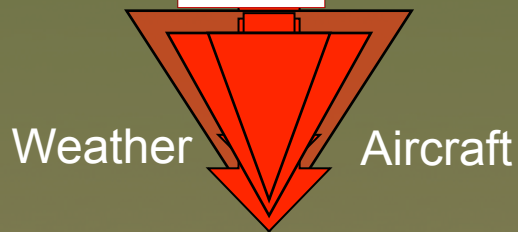
Evolve the
Weather
Service

3

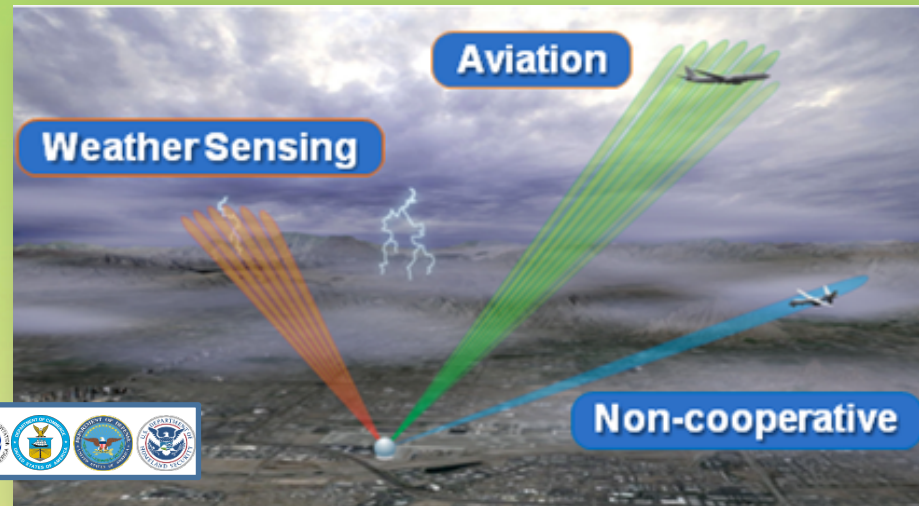
Invest in
observational
Infrastructure

MULTI-FUNCTION PHASED ARRAY RADAR

Game changers



MPAR



Eight System Types

Single Mission

Legacy
Requirements

Non-Scalable

Mechanically
Rotating

Single System

Multi-Mission

Legacy & Emerging
Requirements

Scalable to Mission
Needs

Electronically
Steered



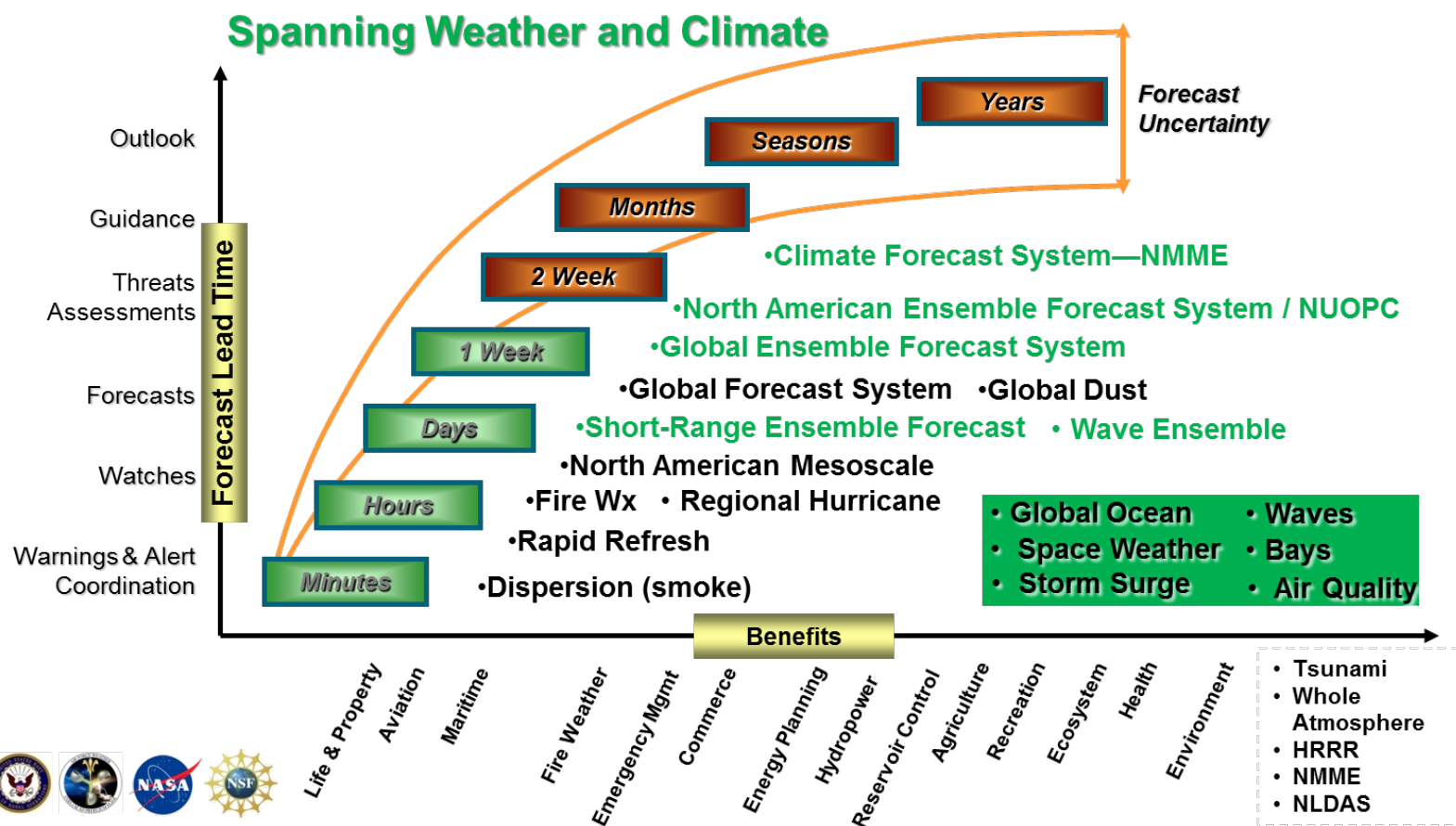
1 Make communities more resilient

2 Evolve the Weather Service

3 Invest in observational infrastructure

EARTH-SYSTEM PREDICTION CAPABILITIES

CHALLENGES & OPPORTUNITIES



FORECASTS INCREASINGLY BASED ON MULTI-MODEL ENSEMBLES

1 Make communities more resilient

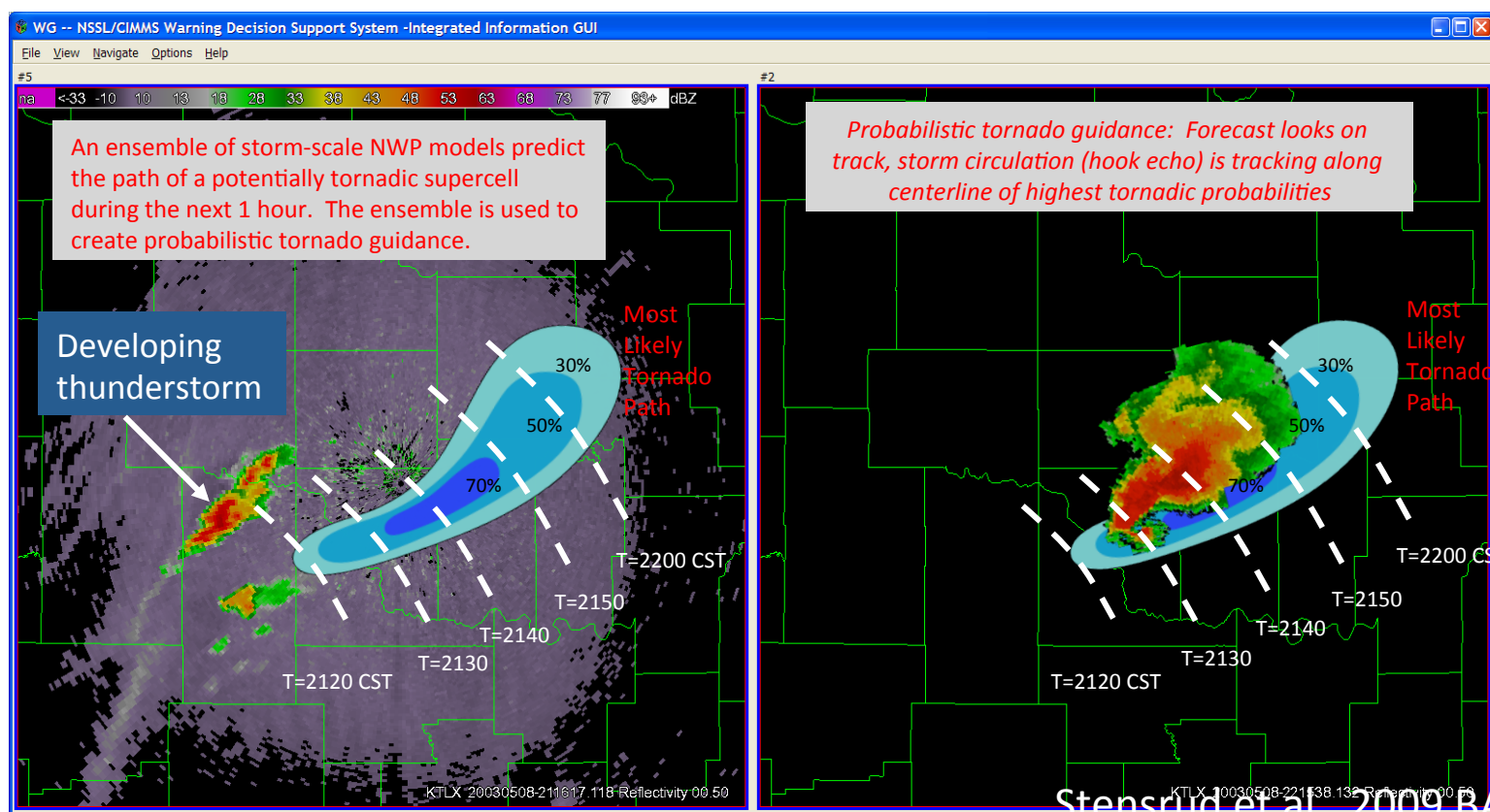
2 Evolve the Weather Service

3 Invest in observational infrastructure

CONVECTIVE-SCALE WARN-ON-FORECAST CHALLENGES & OPPORTUNITIES

Radar and Initial Forecast at 2100 CST

Radar at 2130 CST: Accurate Forecast



For tornadoes, large hail, extreme localized rainfall and other storm-scale phenomena

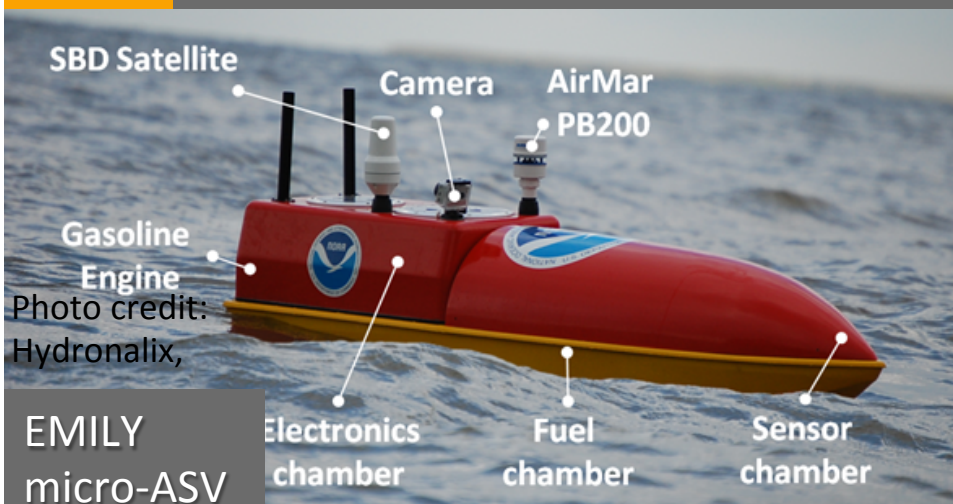
1
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NEW OBSERVATIONAL PLATFORMS

CHALLENGES & OPPORTUNITIES

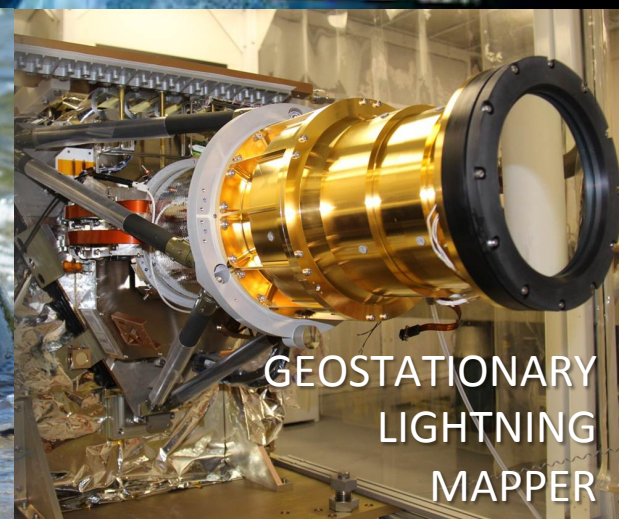


GOES-R

Geostationary Operational Environmental Satellite R-Series



Animal-borne sensors



1 Make communities more resilient

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INTEGRATED ECOSYSTEM ASSESSMENTS

CHALLENGES & OPPORTUNITIES

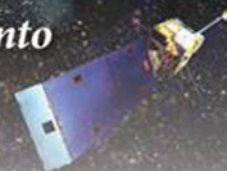


IEA
INTEGRATED ECOSYSTEM ASSESSMENT

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Information
Knowledge ← Data
Assessments
← Decisions
← Actions



THANK YOU



www.noaa.gov



ADDITIONAL SLIDES

1 Make communities more resilient

2 Evolve the Weather Service

3 Invest in observational Infrastructure

OCEAN ACIDIFICATION CHALLENGES & OPPORTUNITIES



Mathis et al., 2014,
*Progress in
Oceanography*

Correlating ecosystem with economic
risks for Alaska's fisheries

