



**NOAA
FISHERIES**

NOAA Fisheries Draft Climate Science Strategy

Council Briefing | January 2015

Outline

WHY

- Growing demands and requirements for climate-related information.

GOAL

- Increase the production, delivery and use of climate-related information to support agency and stakeholder decisions.

REQUEST

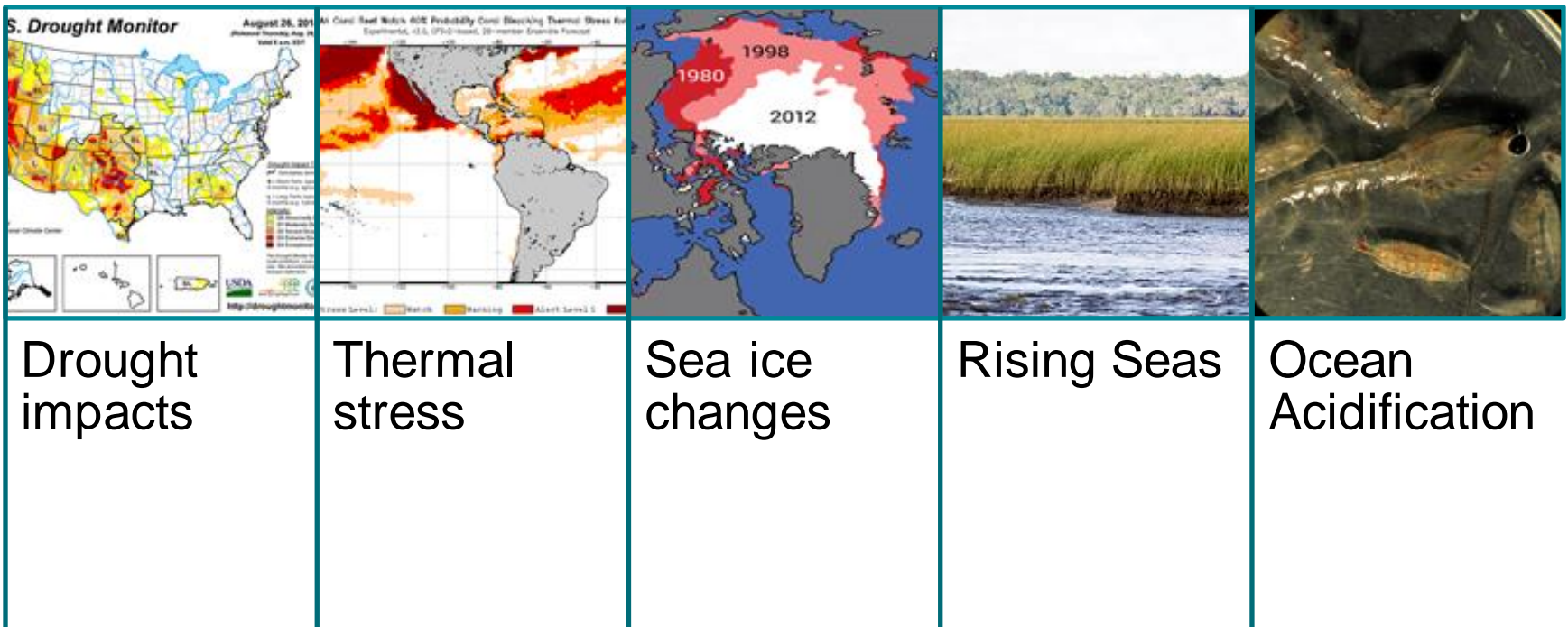
- Provide input on the draft Strategy and future Regional Action Plans.



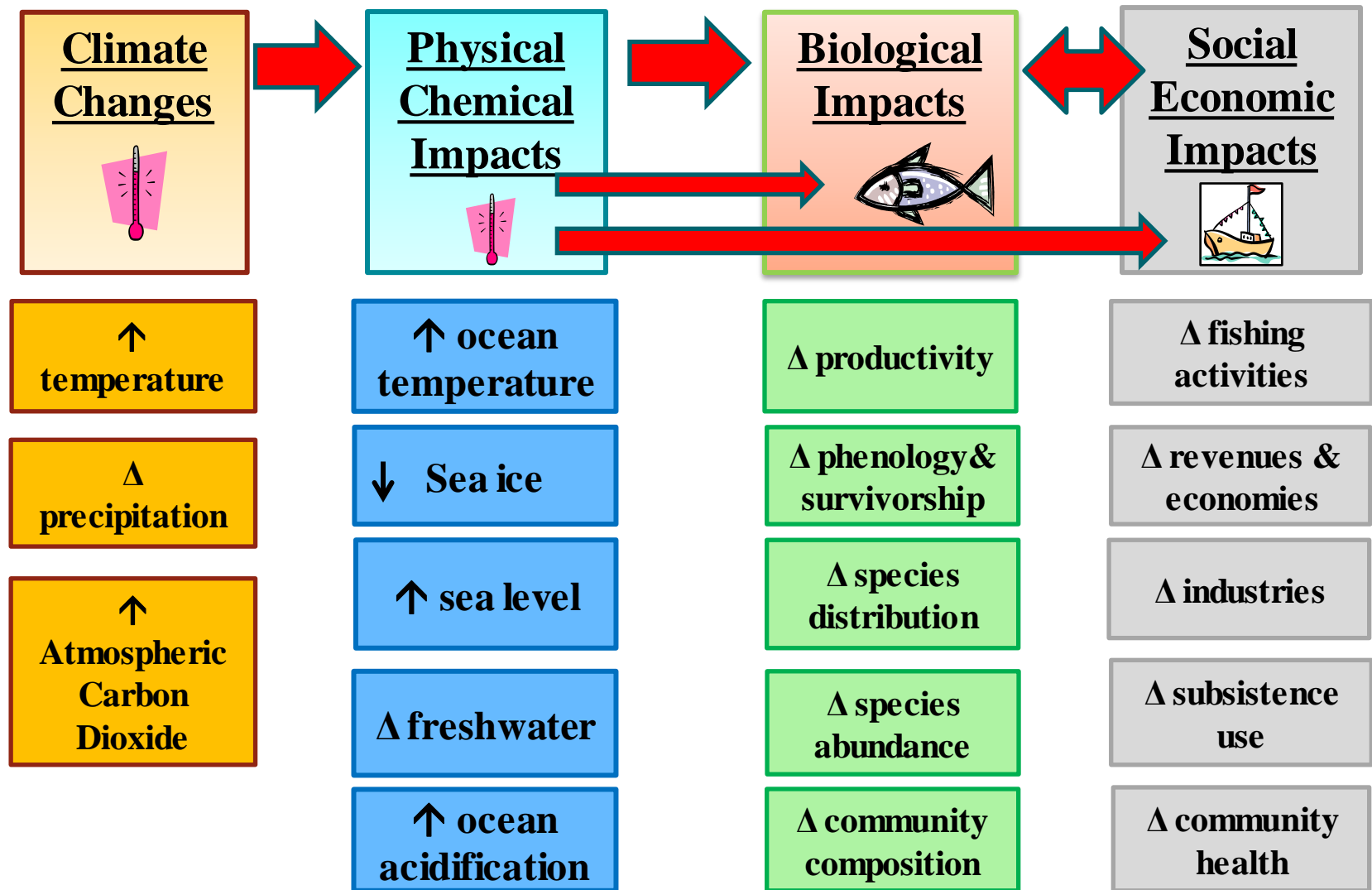
Our Changing Oceans

- **Climate change and ocean acidification are profoundly altering ocean ecosystems.**
- **Negative impacts expected for fisheries globally.**
- **Positive impacts expected in high latitudes.**
- **Other stressors exacerbate impacts.**
- **Significant challenges for resource management in changing conditions.**

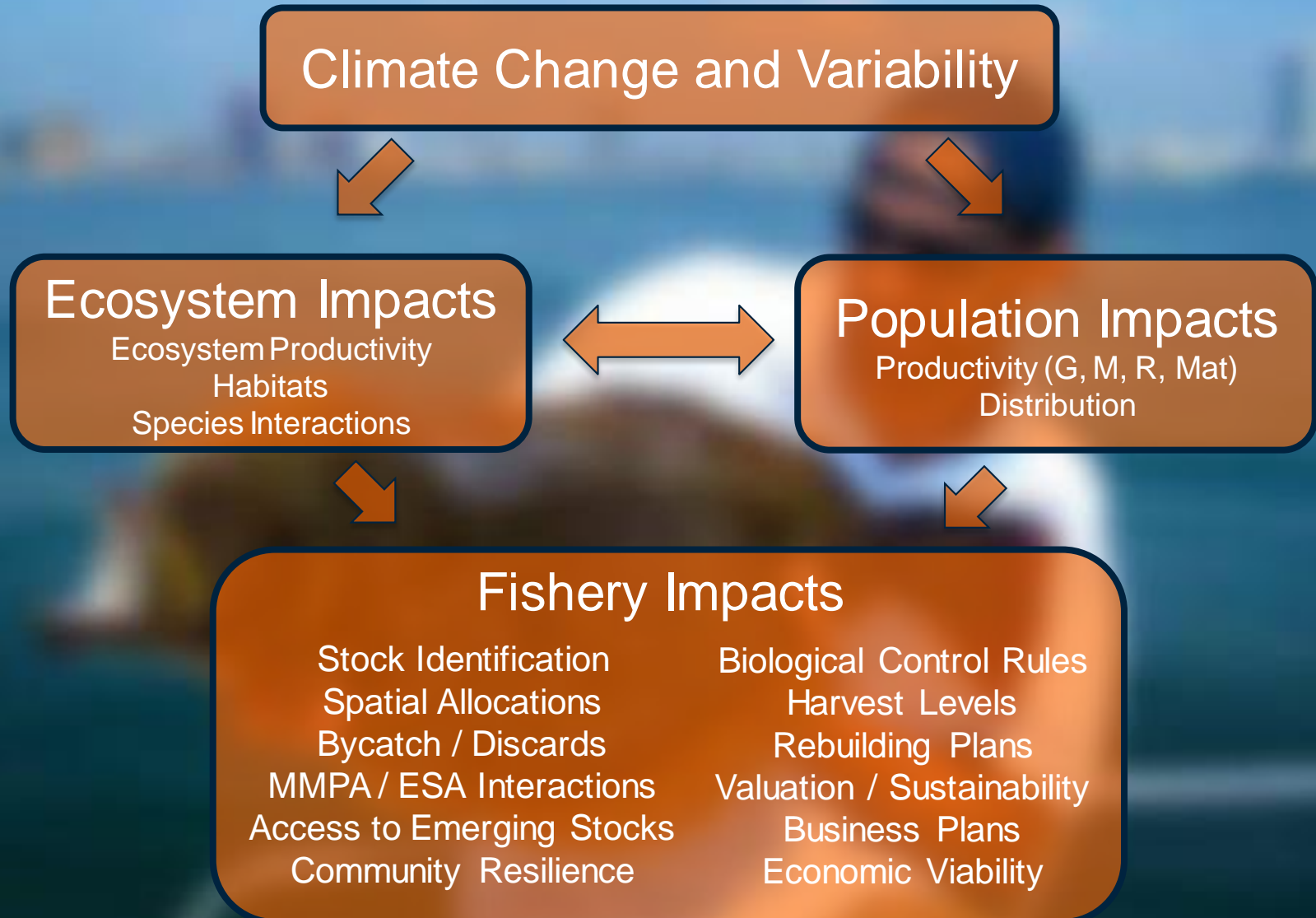
Growing Challenges for Resource Management



Possible Impacts of A Changing Climate?

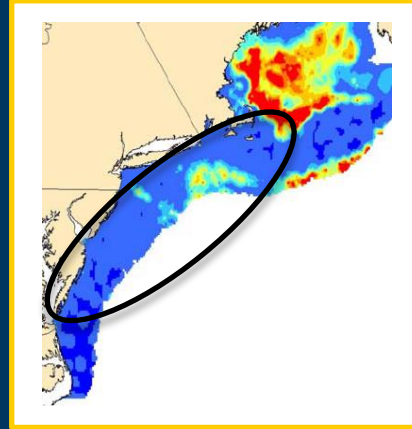
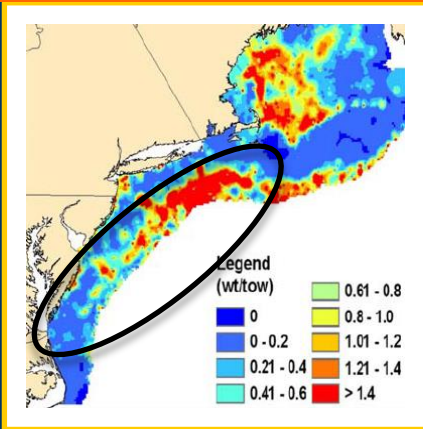


Some Implications for Fisheries Management?

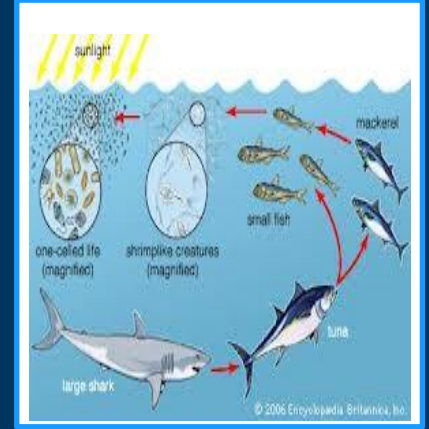
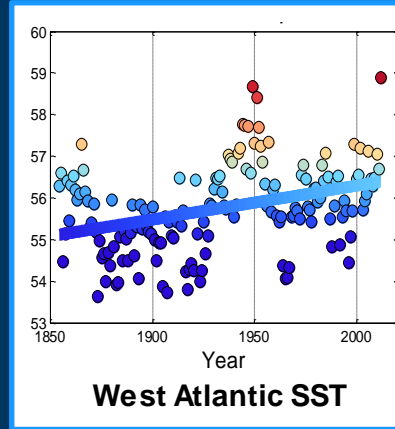


Key Information Requirements

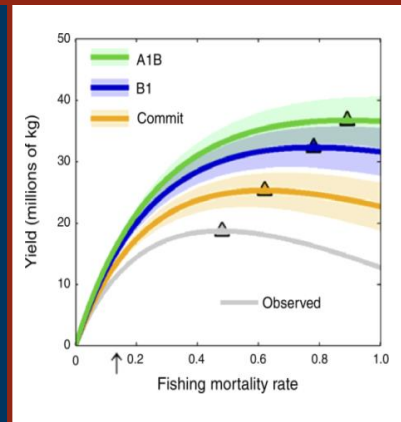
WHAT IS CHANGING?



WHY IS IT CHANGING?

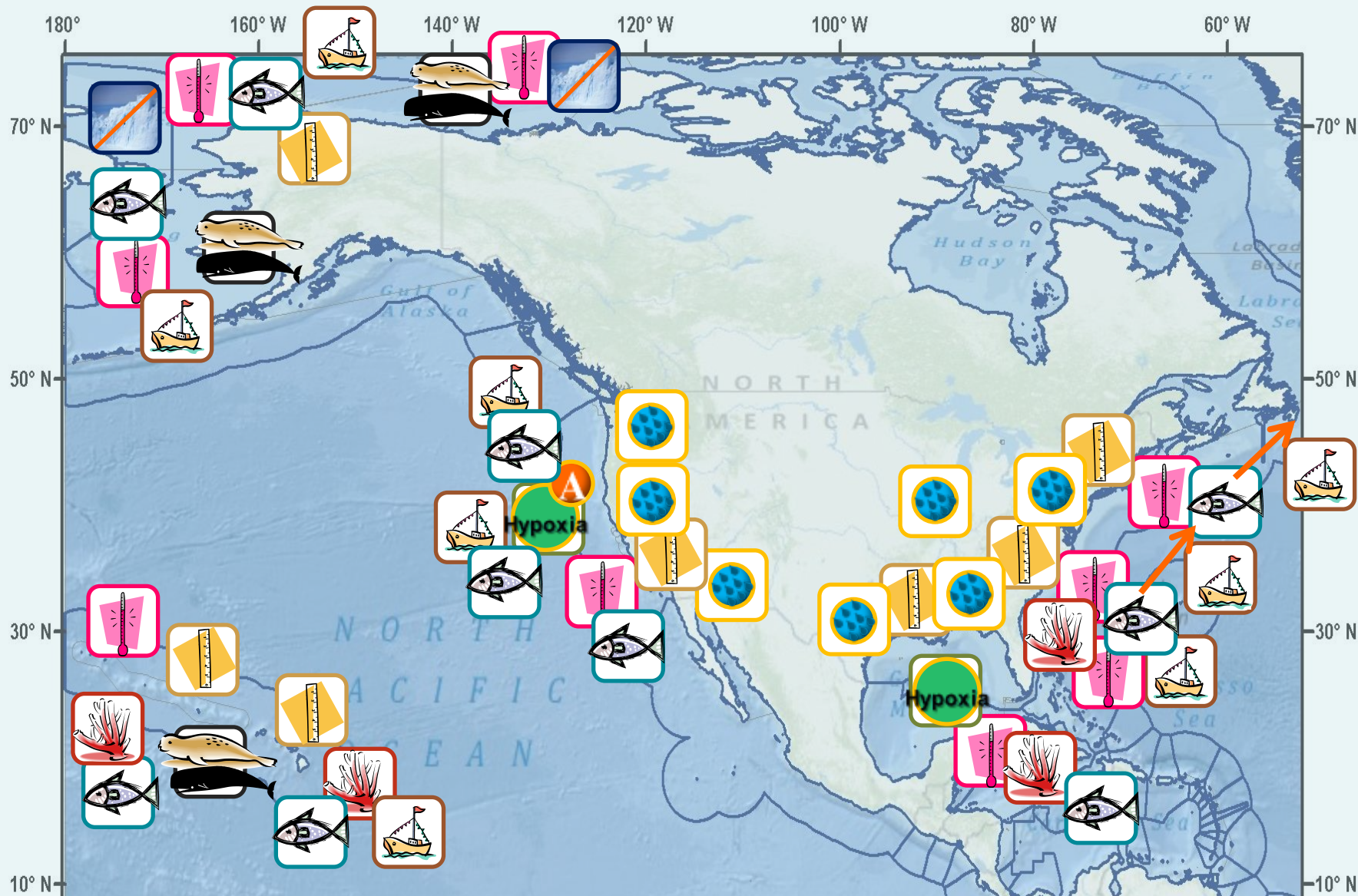


HOW WILL IT CHANGE?



HOW TO RESPOND?





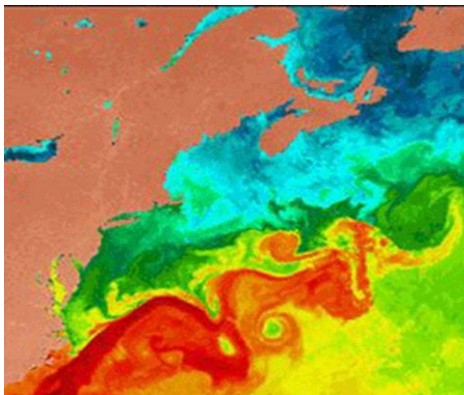
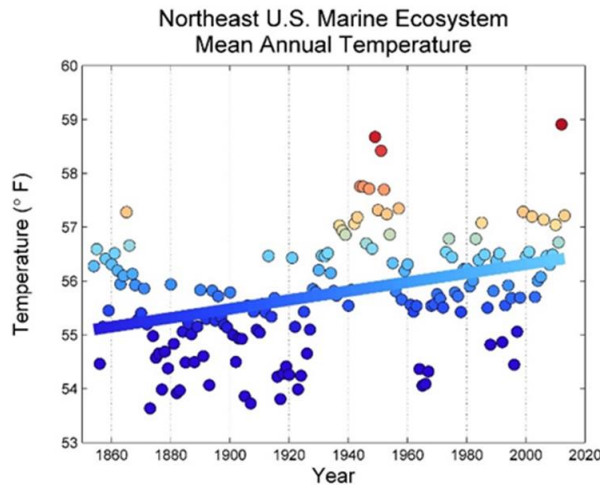
Observed or Projected Climate-related Changes in U.S. Marine Ecosystems



NOAA FISHERIES

Northeast Climate-related Issues

Climate Change – a long-term change in part of the land-atmosphere-ocean system



- Temperature increasing
- Salinity decreasing
- Ocean acidification
- Wind patterns changing
- Precipitation increasing
- Streamflow increasing
- Lake ice out earlier
- Nutrients changing
- Sea level rising
- And more

Observed or Projected Changes in Oceanography

Ocean temperature: 1854-2010 +1.2°C
2006-2055 +1.2°C

Salinity: 1977-2011 -0.4 psu
2006-2055 -0.1 psu

Sea Level: 1977-2009 +0.4 feet
by 2100 +3-6 feet

Ocean Acidification: 1980-2009 -0.04 pH
2006-2055 -0.08 pH

Changes in Marine Resources

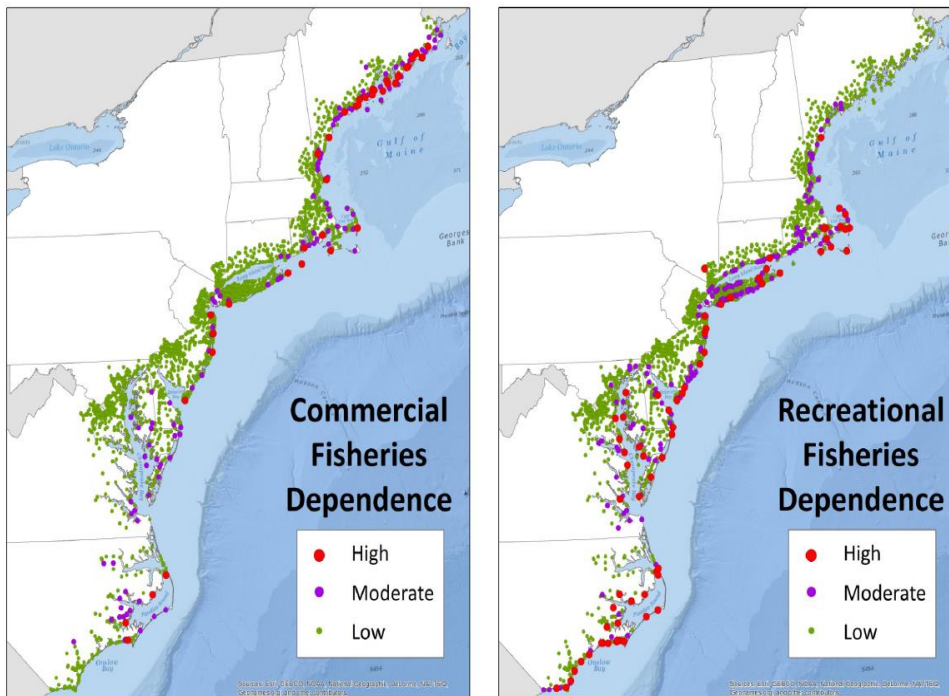
- SNE-MA Yellowtail, cold pool volume, & recruitment
- Northern shrimp thermal considerations for distribution & productivity
- Croaker thermal relationship w/ recruitment, productivity and projected distribution
- Cod thermal and zooplankton relationships w/ recruitment, productivity and projected distribution
- Distribution change for 30+ spp.,
- Productivity change for 15+ spp.
- Does not include ecological interactions
- There are other examples from the NE



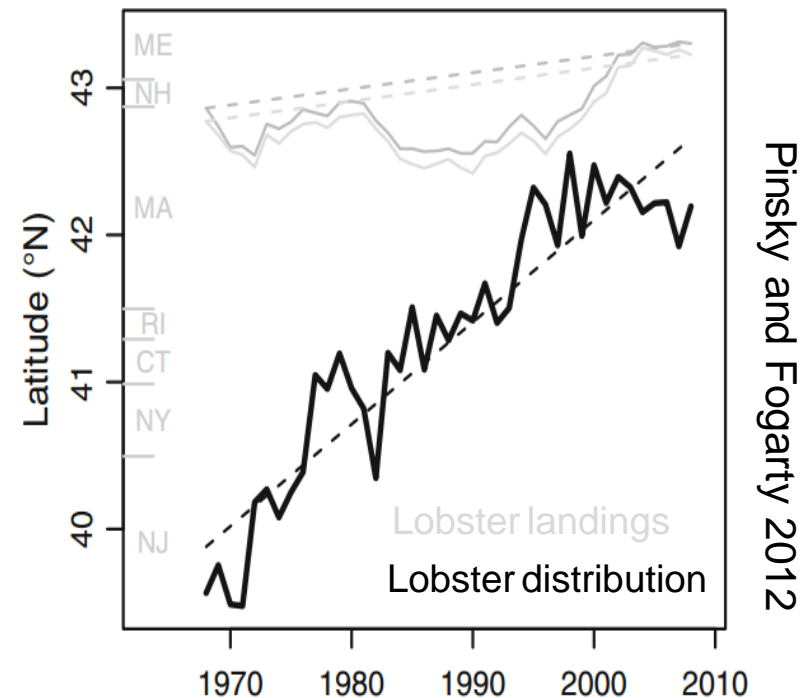
Implications for NE Fishing Communities?

- Fisheries are complicated: sectors, gears, permits, etc.
- Interactions with climate change will be complicated

What is at risk?



What are responses?



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- Provide input on the draft Strategy and future Regional Action Plans.



Draft Climate Science Strategy

Goal

- Increase the production, delivery and use of climate-related information to support NMFS and stakeholder decisions.

Content

- Identifies 7 key objectives to meet NMFS information requirements for resource management in a changing climate.

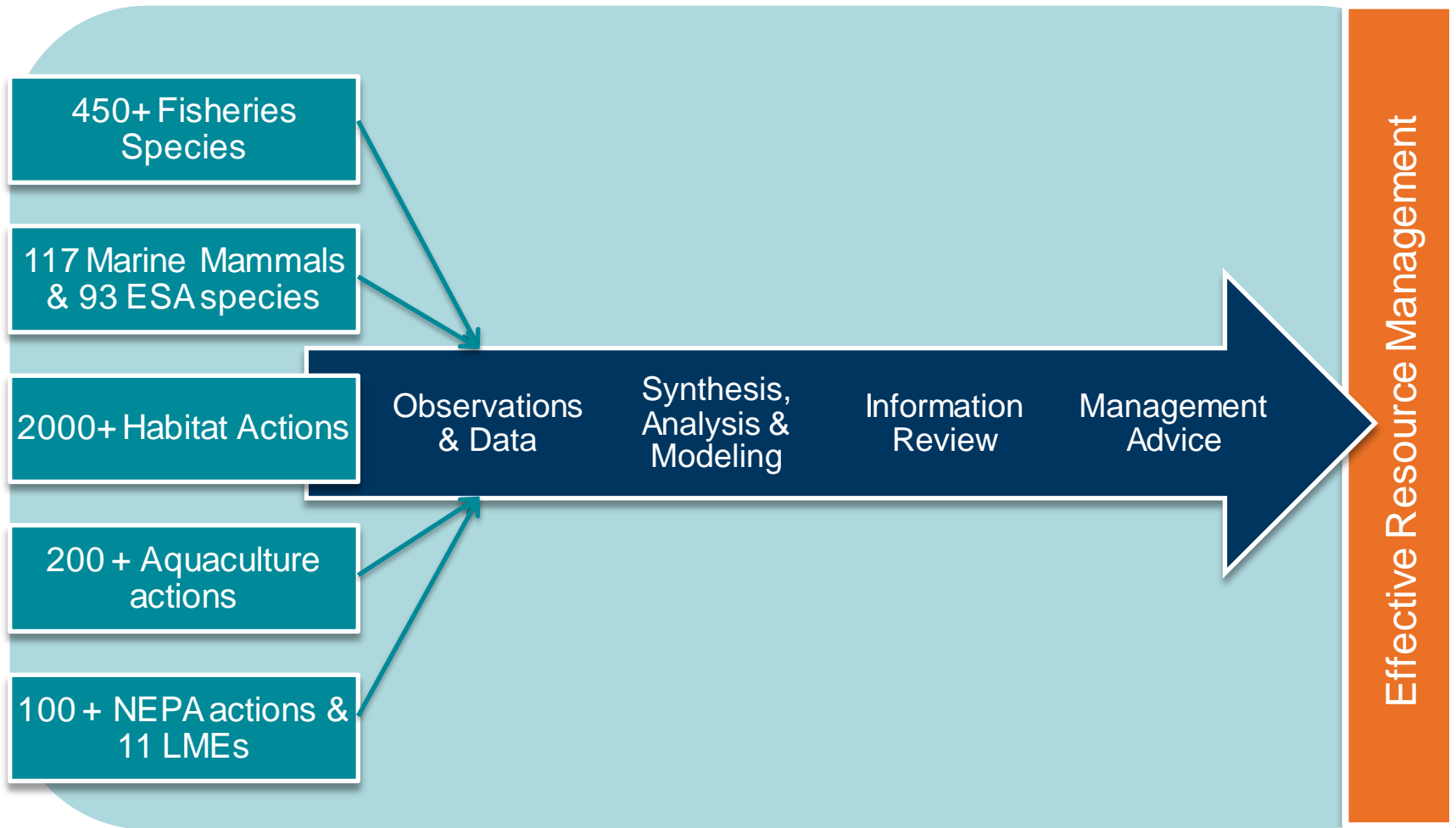
Intended use

- Help guide development of NMFS science enterprise at national to regional levels (e.g., regional action plans).

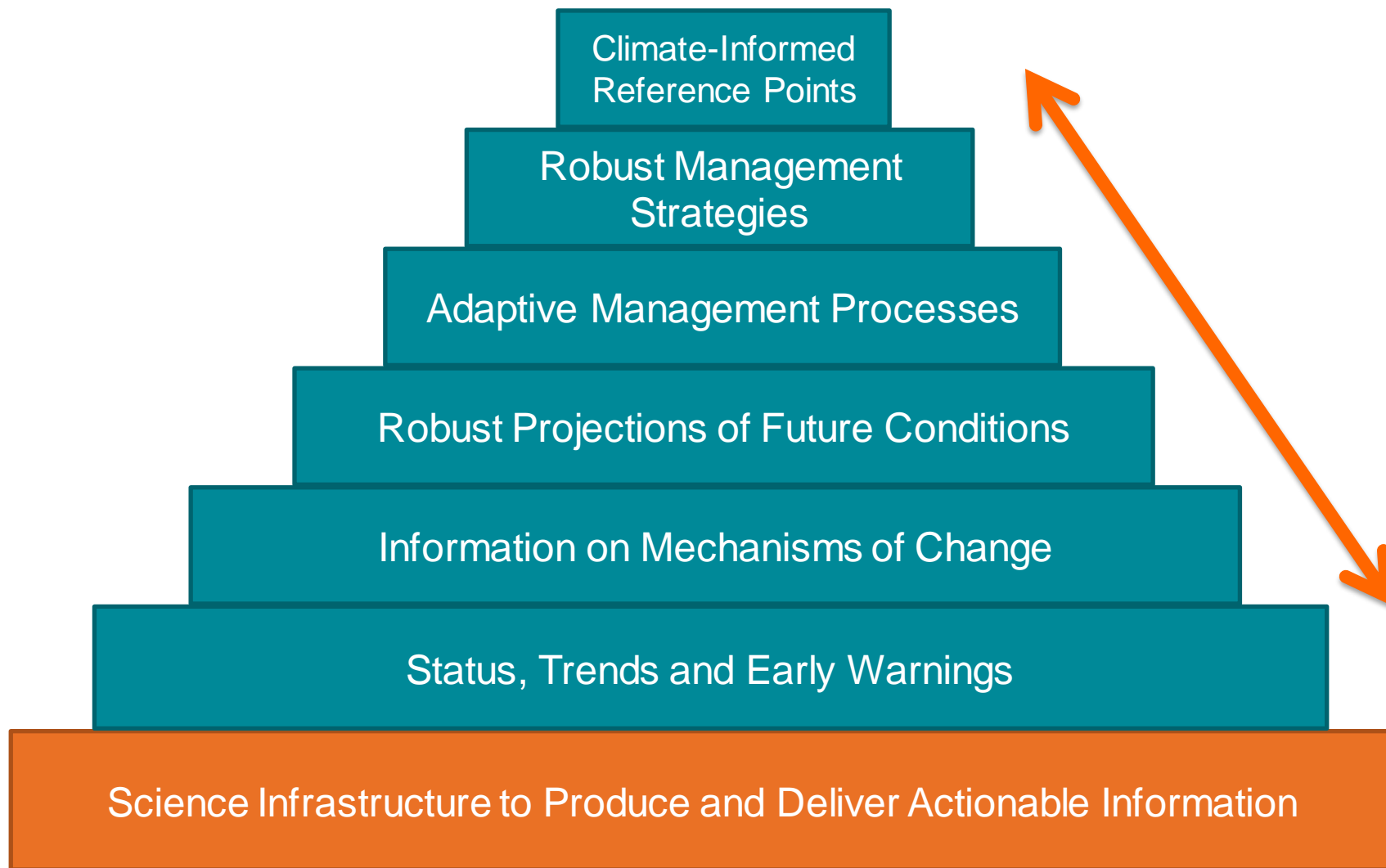
How do we improve the production, delivery and use of climate-related information required to fulfill NMFS mission?



Ocean Resource Management Process



Draft Climate Science Strategy



Draft Climate Science Strategy

Objective 1

Identify appropriate, climate-informed reference points.

Objective 2

Identify robust management strategies.

Objective 3

Implement adaptive decision processes that respond to changing climate conditions.

Draft Climate Science Strategy

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Identify appropriate, climate-informed reference points.

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Implement adaptive decision processes that respond to changing climate conditions.

Objective 4

Identify likely future states to plan for.

Objective 5

Identify mechanisms of climate effects to improve projections and responses.

Draft Climate Science Strategy

Objective 1

Identify appropriate, climate-informed reference points.

Objective 2

Identify robust management strategies.

Objective 3

Implement adaptive decision processes that respond to changing climate conditions.

Objective 4

Identify likely future states to plan for.

Objective 5

Identify mechanisms of climate effects to improve projections and responses.

Objective 6

Track trends and provide early warnings of change.

Objective 7

Strengthen the science infrastructure required to fill these needs.

Recommendations

Priority Near-term Actions

1

Conduct LMR climate vulnerability analyses in each region.

2

Maintain and develop Ecosystem Status Reports to track change and provide early-warnings.

3

Increase capacity to conduct climate-informed Management Strategy Evaluations

Recommendations

Priority Near-term Actions

-
- 1** **progress** Conduct LMR climate vulnerability analyses in each region.
 - 2** **progress** Maintain and develop Ecosystem Status Reports to track change and provide early-warnings.
 - 3** Increase capacity to conduct climate-informed Management Strategy Evaluations
-

Recommendations

Short term (6-24 months)

- 1 Complete region-level action plans.
- 2 Strengthen climate-related science capacity nation-wide.
- 3 Increase resources for process-oriented research.
- 4 Establish climate-ready terms of reference for ESA, MSFCMA, MMPA stock assessments and Biological Opinions, etc.

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Request for Input

1. Climate Science Strategy

- Input requested thru March 31.

2. Regional Action Plans

- To be developed in 2015.
- Future call for input on regional needs & priorities.

www.st.nmfs.noaa.gov/ecosystems/climate

Summary

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Thank you!

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