



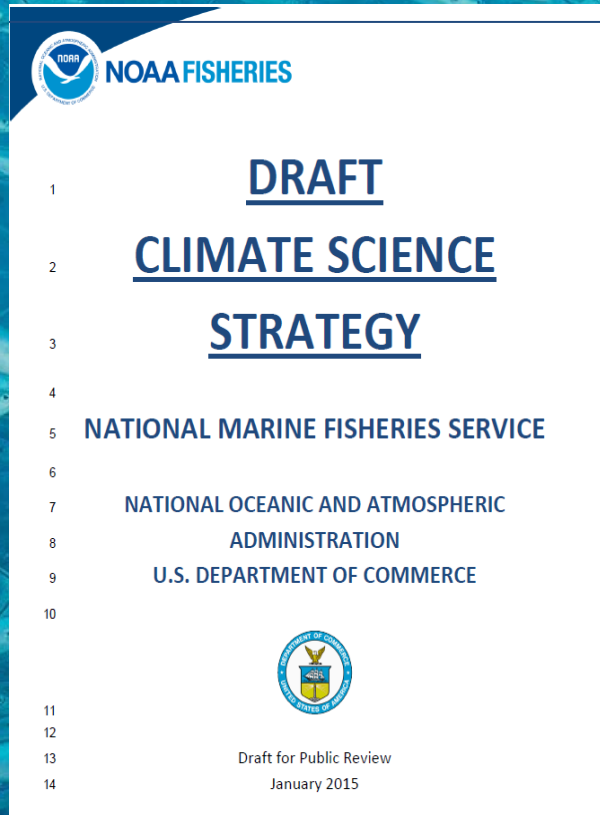
**NOAA
FISHERIES**

NOAA Fisheries Draft Climate Science Strategy

Council Coordination Committee
Briefing | February 2015

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.

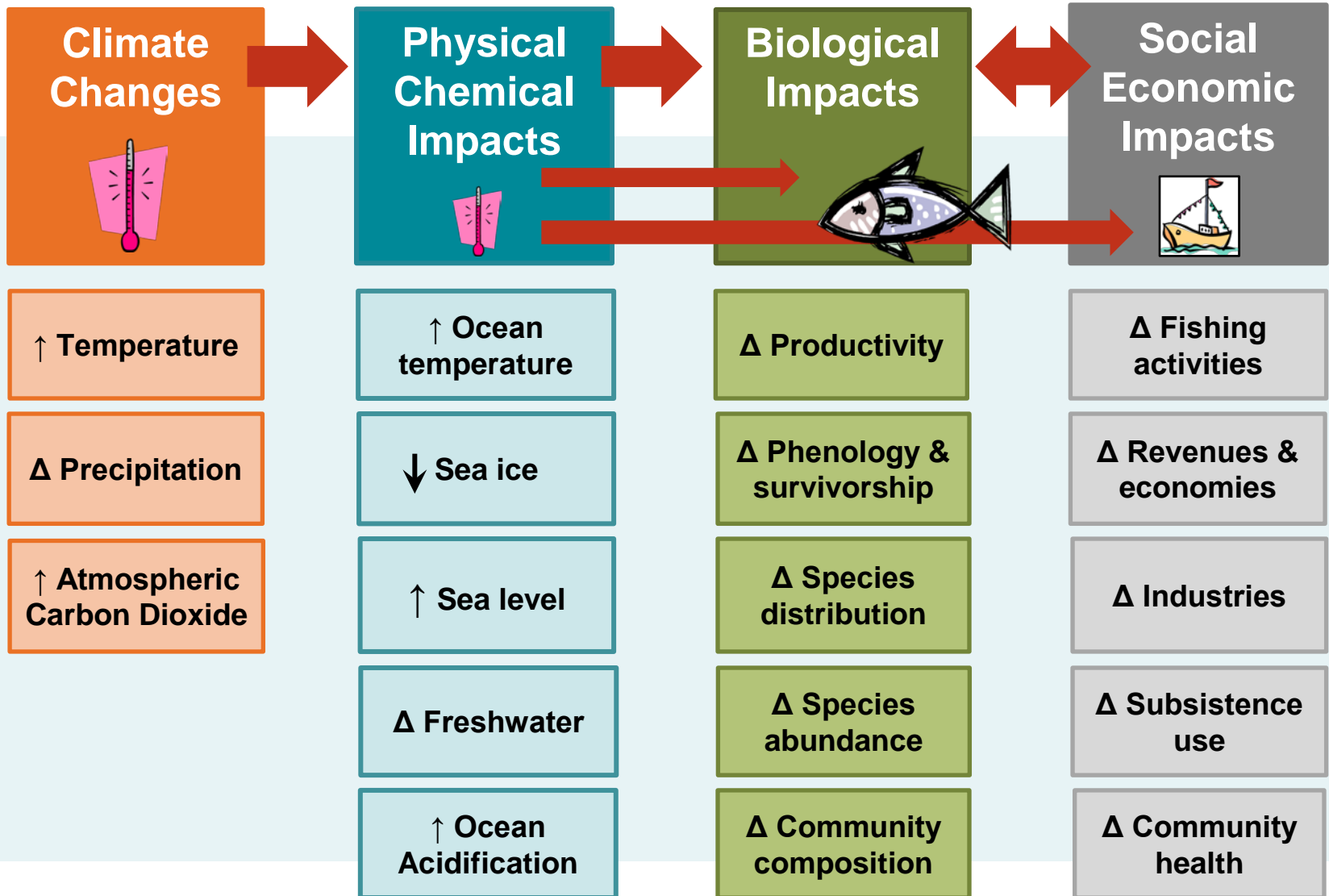
REQUEST

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.**
- **Some positive impacts expected for high latitude fisheries.**
- **Other stressors exacerbate impacts.**
- **Significant challenges for fisheries management in changing conditions.**

Possible Impacts of a Changing Climate



Implications for Fisheries Management

Climate Change and Variability

Ecosystem Impacts

Ecosystem Productivity
Habitats
Species Interactions

Population Impacts

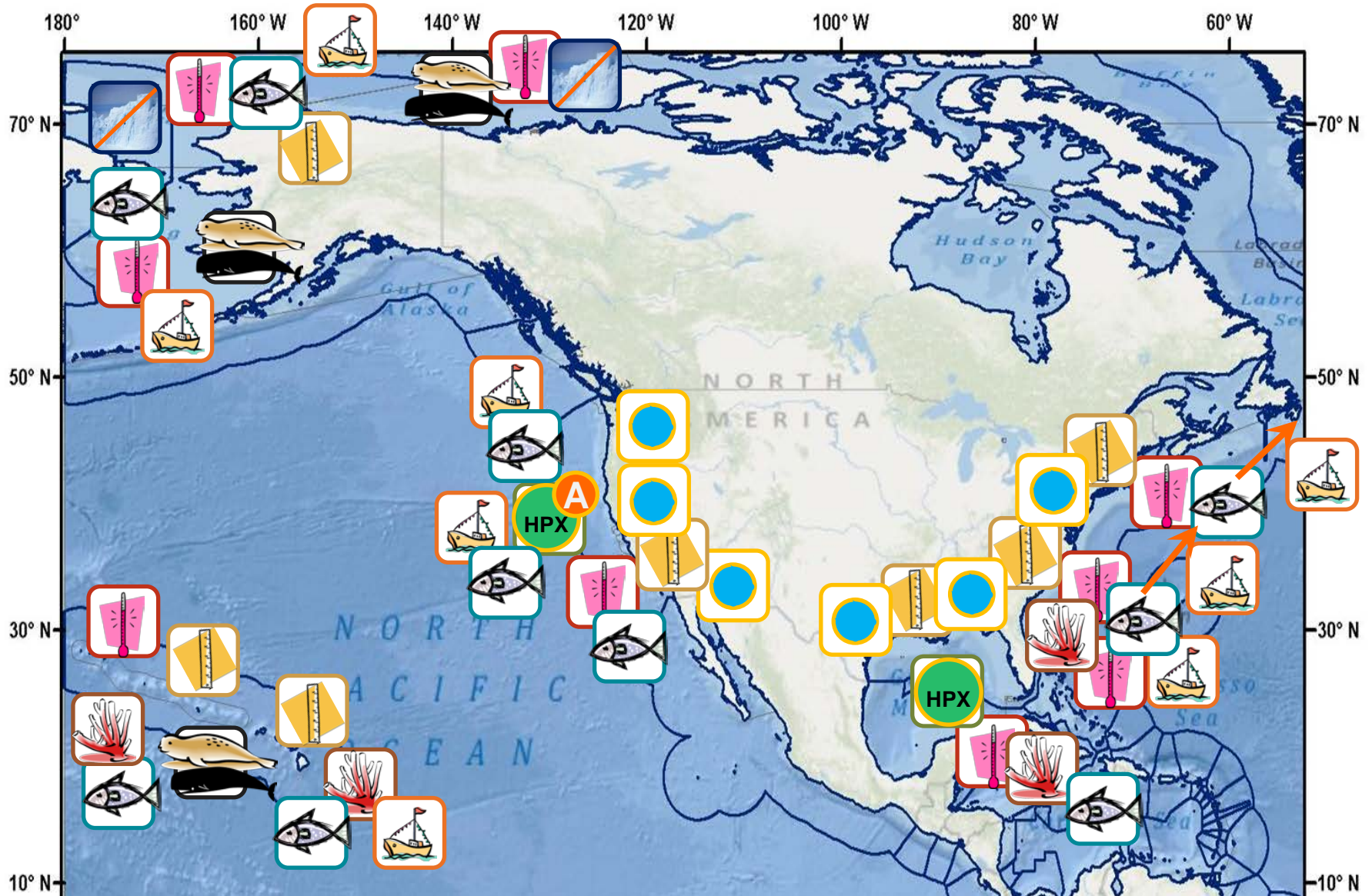
Productivity (G, M, R, Mat)
Distribution

Fishery Impacts

Stock Identification
Spatial Allocations
Bycatch / Discards
MMPA / ESA Interactions
Access to Emerging Stocks
Community Resilience

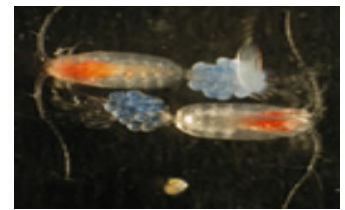
Biological Control Rules
Harvest Levels
Rebuilding Plans
Valuation / Sustainability
Business Plans
Economic Viability

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



Climate-Related Changes in Marine Resources

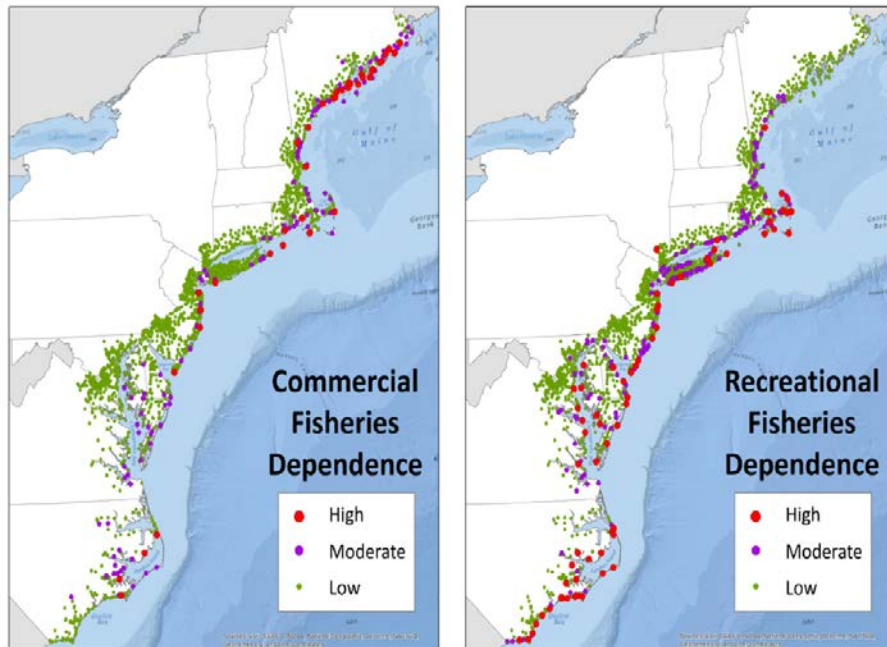
- Shifts in species distribution in many regions (150+ spp.)
- Changes in productivity in some areas (30+ spp.)
- ARCTIC: Projected impacts of reduced sea ice on arctic food webs and pollock productivity
- ATLANTIC: Projected impacts on zooplankton and key stocks (e.g., Atlantic cod recruitment & distribution)
- SUBTROPICS: Expanding species thermal habitat (e.g., Atlantic Croaker, Humboldt Squid)
- TROPICS: Major driver in ESA coral listing
- PACIFIC: Projected declines in Central Pacific primary production zones
- INVASIVES: Expanding habitat (e.g., Lionfish)?
- FISHERIES: Shifts in some areas (e.g., Northeast)



Implications for Fishing Communities

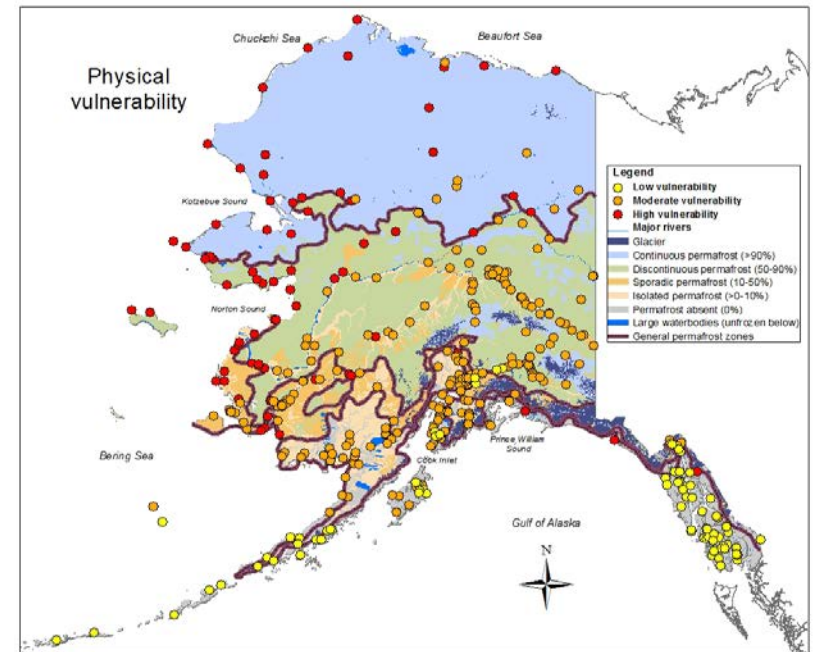
- Fishery impacts vary with sector, gear, etc.
- Interactions with climate change will be complicated

TRACKING CHANGE



NMFS Community Indicators Project

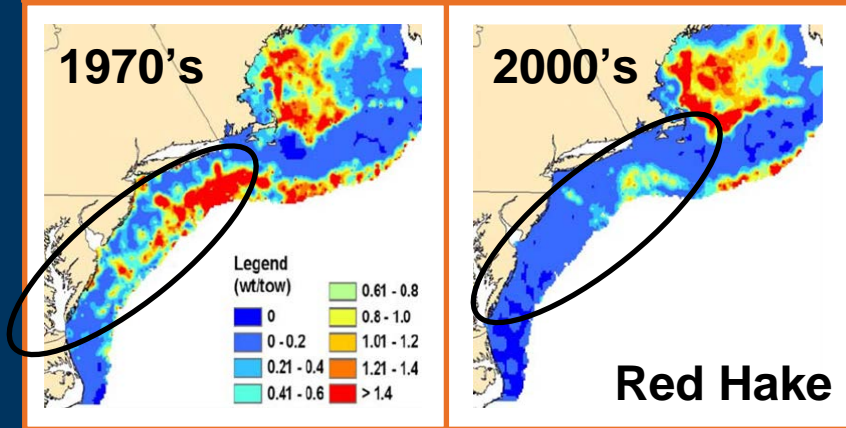
WHAT IS VULNERABLE?



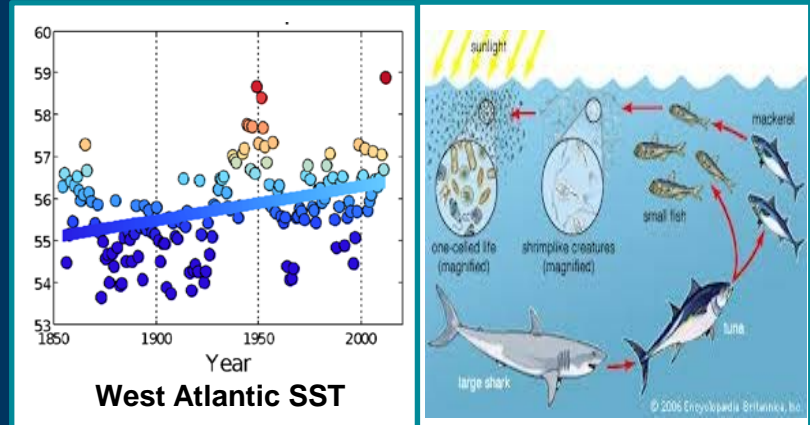
Himes-Cornell and Kasperski 2015

Key Information Requirements

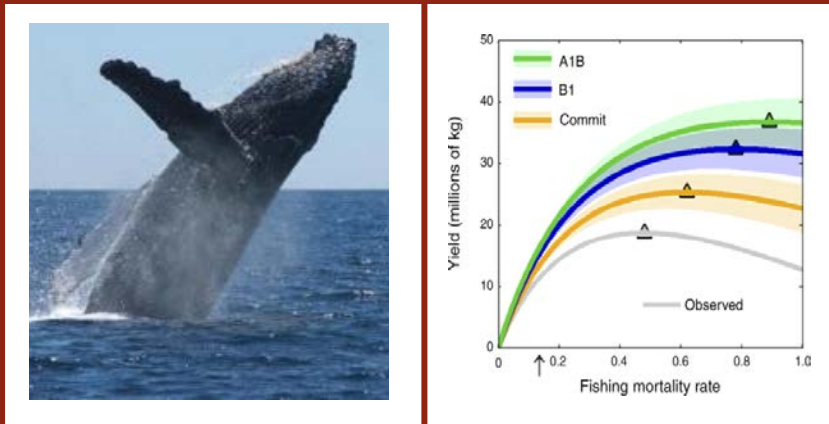
WHAT IS CHANGING?



WHY IS IT CHANGING?



HOW WILL IT CHANGE?



HOW TO RESPOND?



Draft Climate Science Strategy

GOAL

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

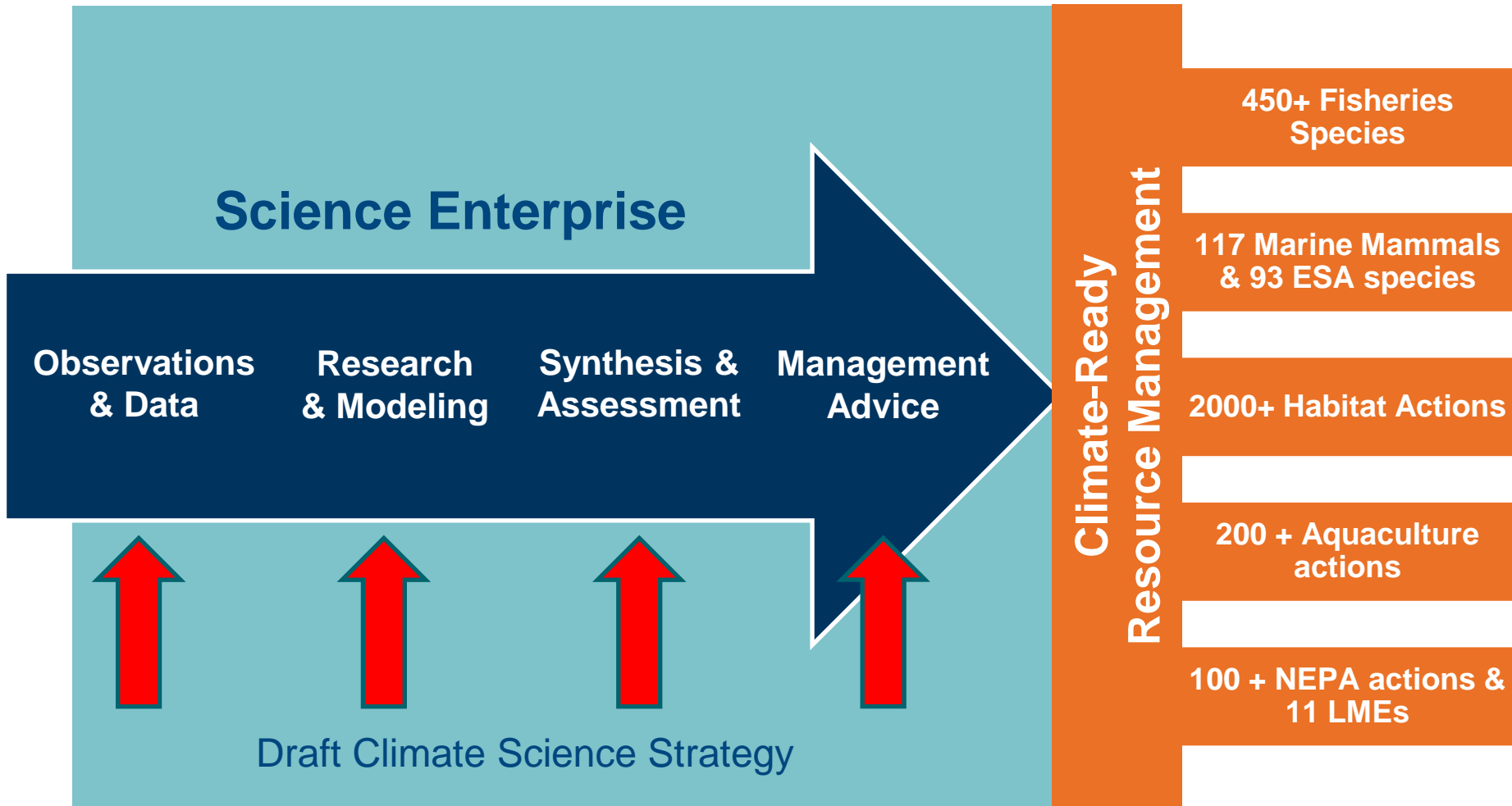
CONTENT

Identifies 7 key objectives to meet NOAA Fisheries information requirements in a changing climate.

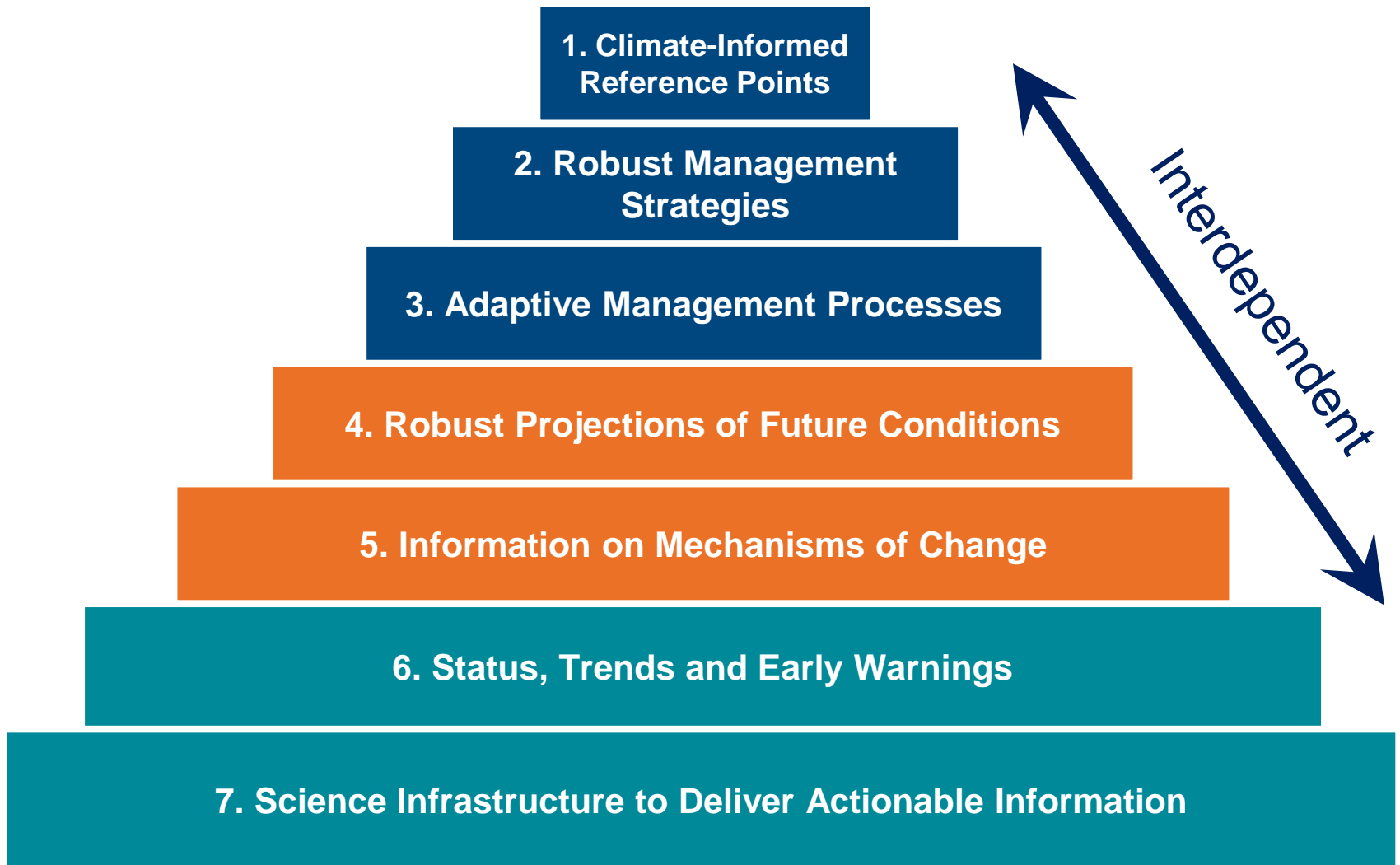
INTENDED USE

Guide development of our science enterprise at national to regional levels (e.g., regional action plans).

Strategy designed to meet climate-related information requirements across mission areas



Draft Climate Science Objectives



Recommendations— Immediate 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 Actions (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.

Expected Results:

- ***Better tracking*** of ecosystem changes that provide early warnings of climate-related changes.
- ***Increased understanding*** of the mechanisms of change and the vulnerability of fish stocks, communities.
- ***Near and long term forecasts*** of ocean & resource conditions.
- ***Climate sensitive*** stock assessments and biological reference points.
- ***Robust management scenarios.***



Request for Input

1. Climate Science Strategy

- Input requested thru March 31.

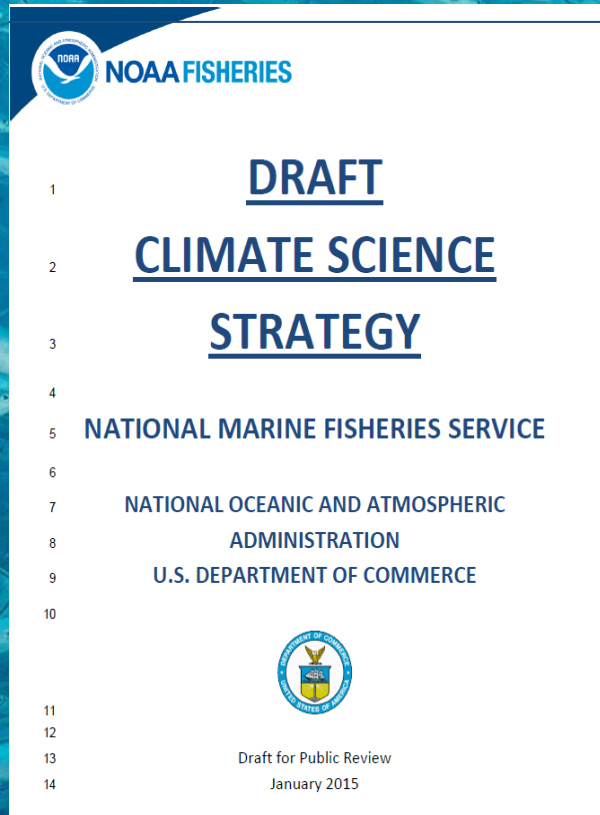
2. Regional Action Plans

- Developed in 2015.
- Future call for input on regional needs & priorities.

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

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Questions?

For more information:
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