



**NOAA  
FISHERIES**

# Advancing Climate-Ready Fisheries Management

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NOAA Fisheries Service

Fisheries Forum Workshop, May 2017



**NOAA FISHERIES**

# Growing Challenges for Effective Management



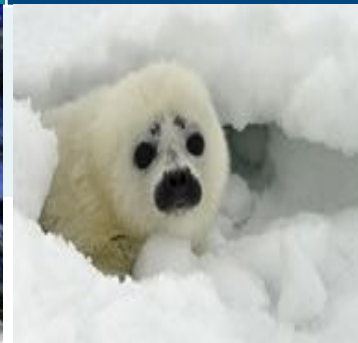
Droughts

Warming  
Oceans

Loss of Sea Ice

Rising Seas

Ocean  
Acidification

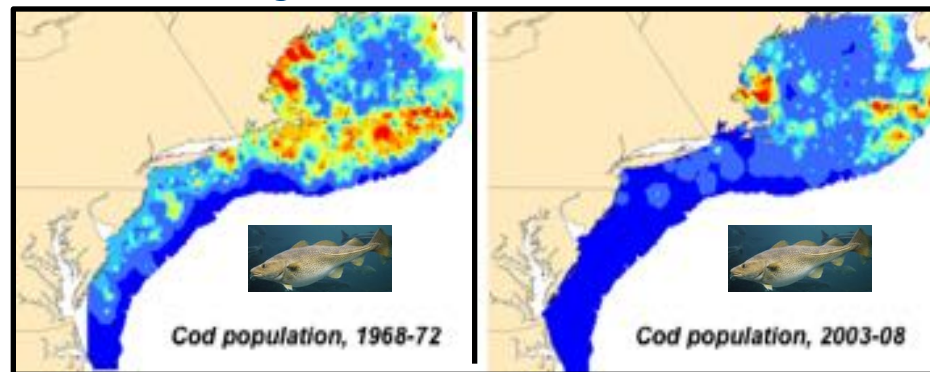


# The impacts are real...

## Changing Productivity



## Shifting Distributions



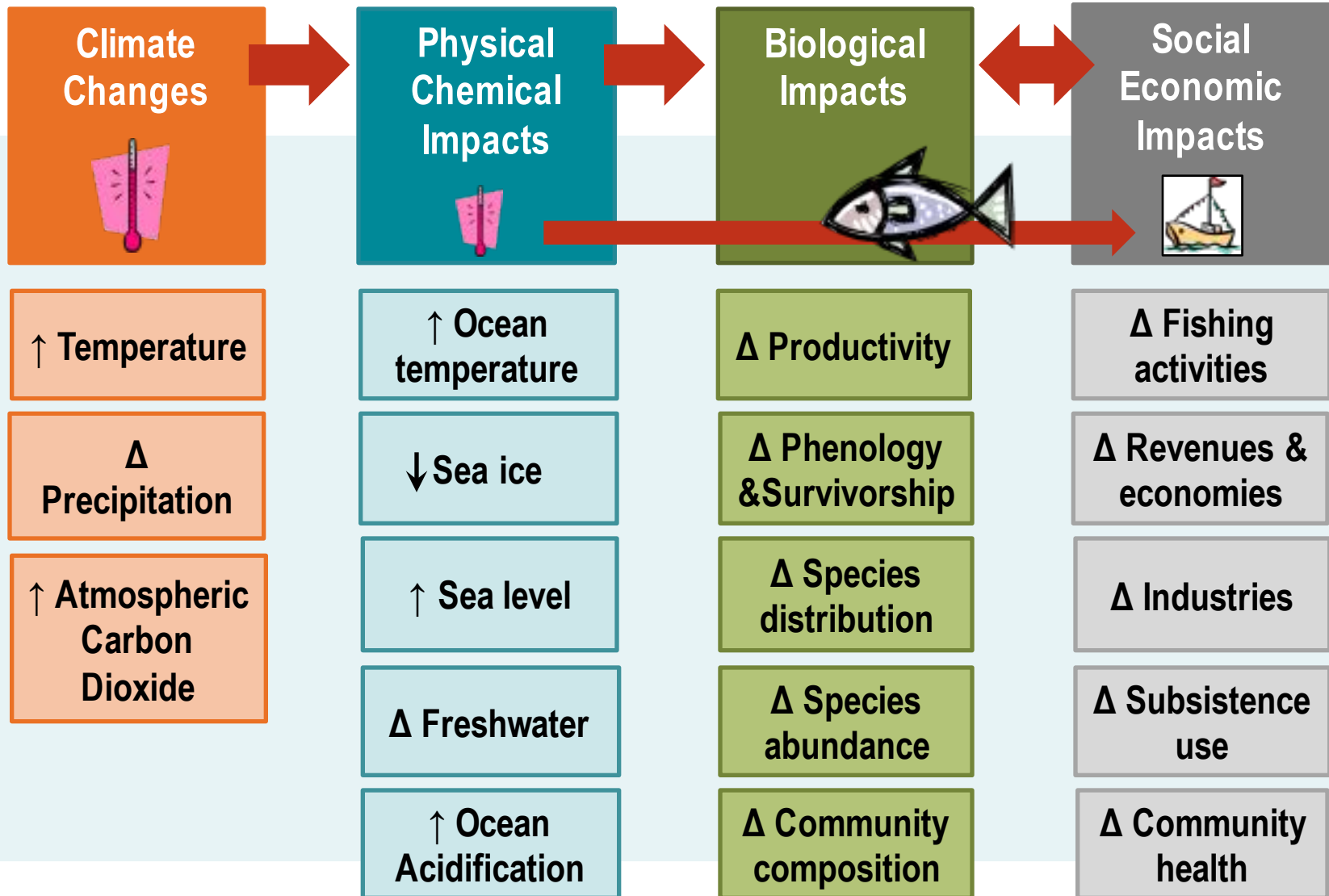
## Changing Abundance



## Changing Fisheries



# The Impacts Are Expected to Increase





# Implications for Fisheries Management

## Climate Change and Variability

### Ecosystem Impacts

Ecosystem Productivity  
Habitats  
Species Interactions

### Population Impacts

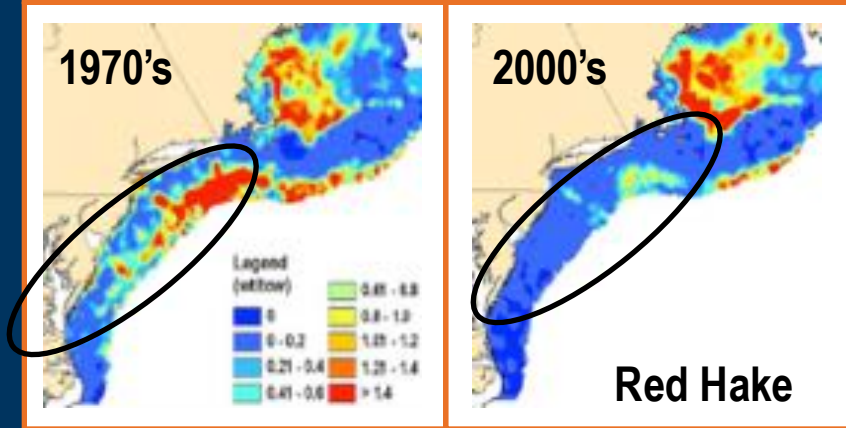
Productivity (G, M, R, Mat)  
Distribution

### Fishery Impacts

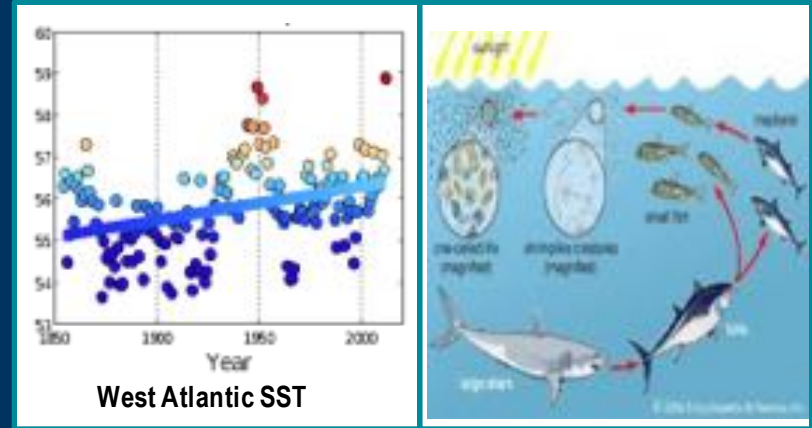
Stock Identification	Biological Control Rules
Spatial Allocations	Harvest Levels
Bycatch / Discards	Rebuilding Plans
MMPA / ESA Interactions	Valuation / Sustainability
Access to Emerging Stocks	Business Plans
Community Resilience	Economic Viability

# Growing Demands for Information

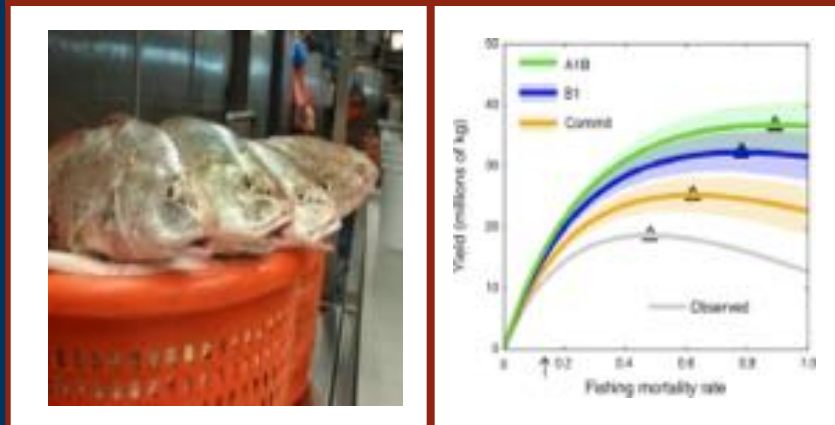
## WHAT IS CHANGING?



## WHY IS IT CHANGING?

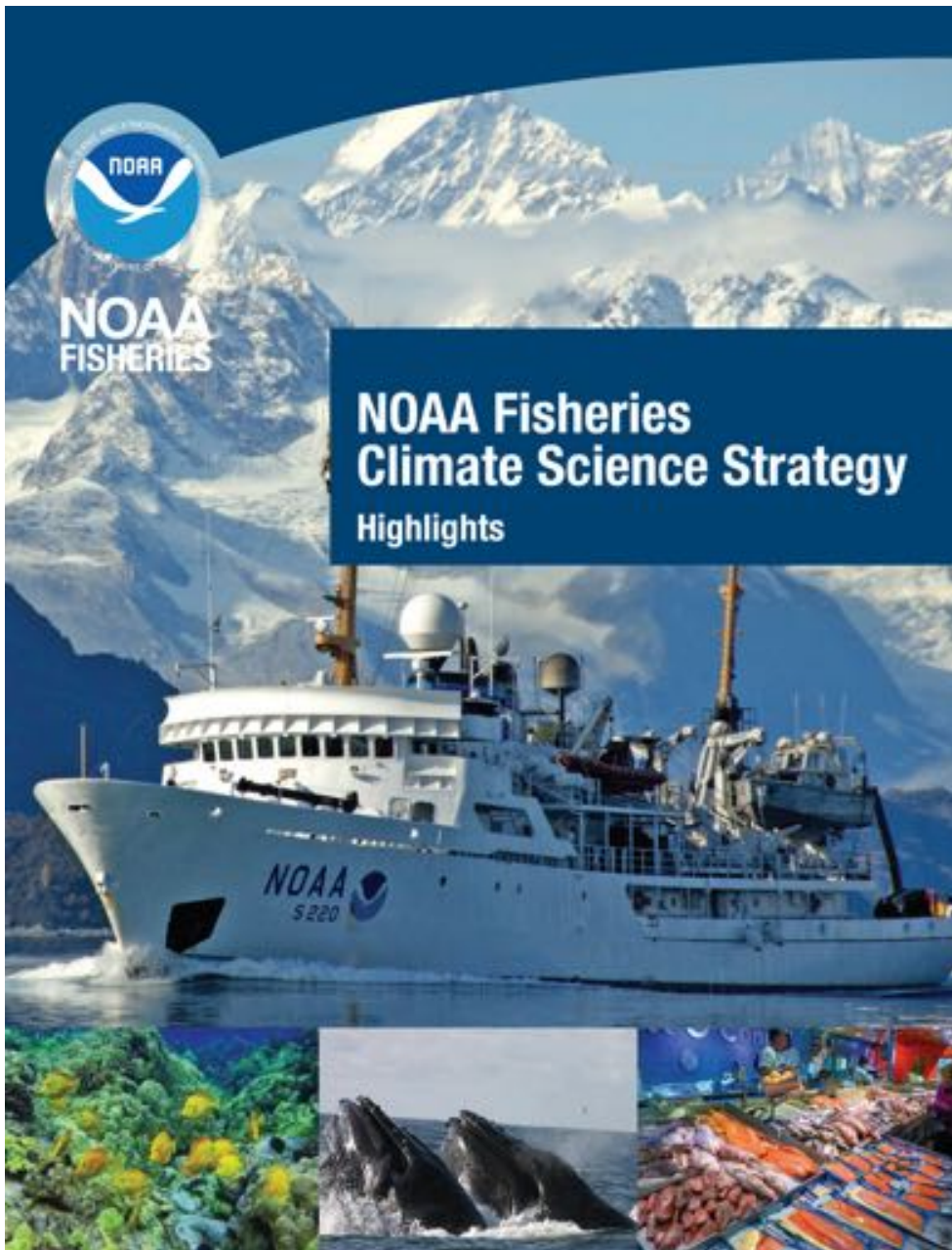


## HOW WILL IT CHANGE?



## HOW TO RESPOND?



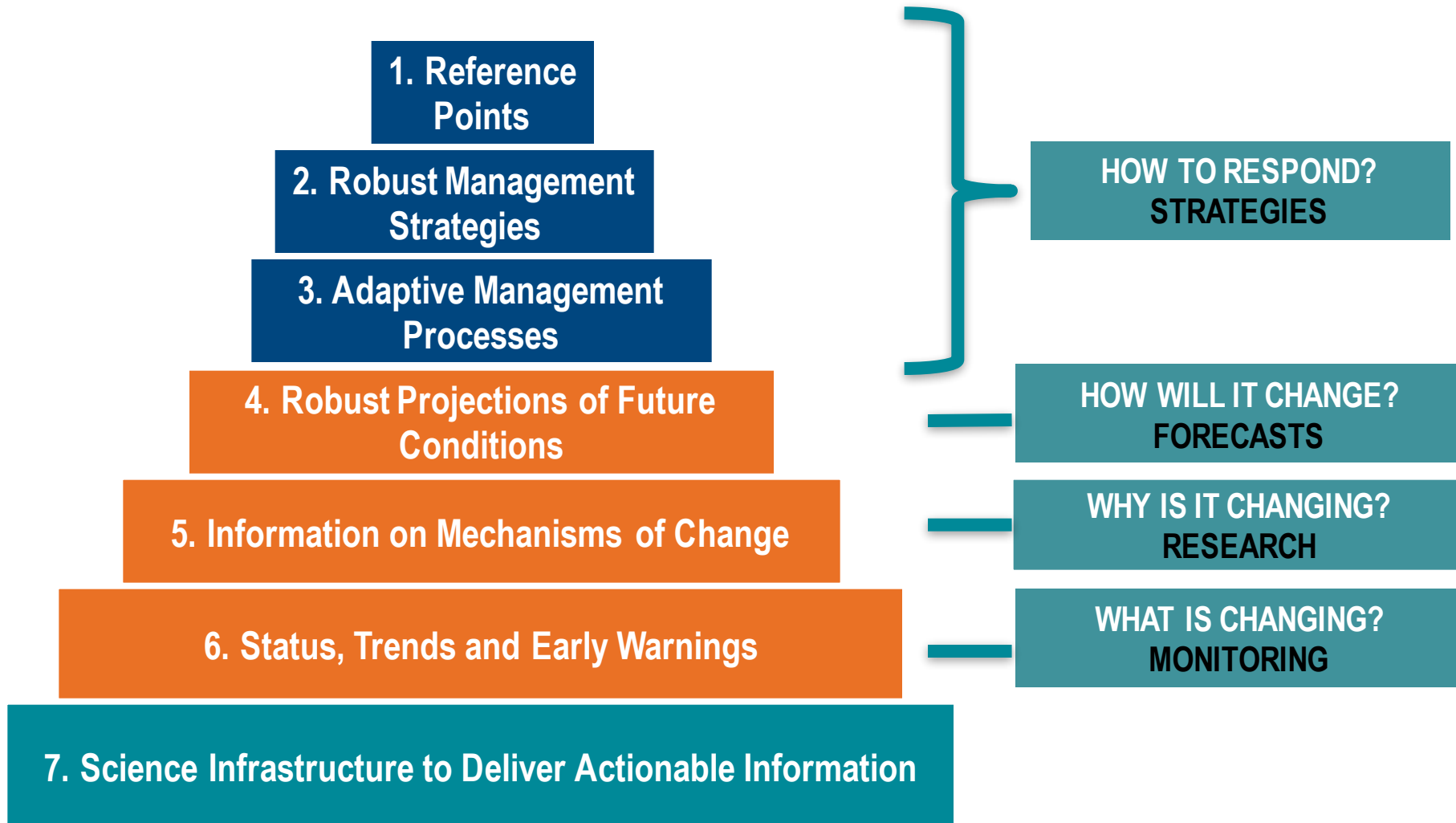


**Goal:**  
**Increase the production, delivery and use of climate-related information to fulfill NOAA Fisheries mandates**



# NOAA Fisheries Climate Science Strategy

## Key information for climate-ready management

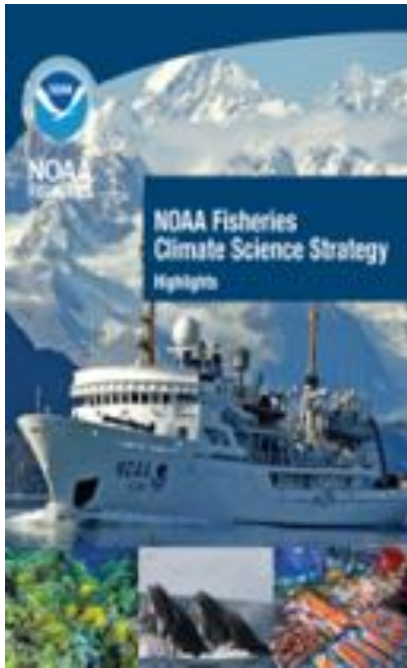




# NMFS Climate Science Strategy

## Regional Action Plans

- Over 200 actions to support climate-ready fisheries management



### RESULTS:



*Critical  
Information*

*Climate-  
Ready  
Management*


*Resilient  
Resources &  
Communities*

# Some Key Actions


## WHAT IS CHANGING?

- ✓ Maintain existing monitoring of key fisheries and ecosystem conditions
-  Strengthen Ecosystem Status Reports and early warnings
-  Track and project distributions of over 650 fisheries species (e.g., OCEANADAPT)

## WHY & HOW WILL IT CHANGE?

-  Complete Fish Stock Vulnerability Assessments (Northeast, Bering Sea, Calif Current)
- ✓ Launch new Fish Stock Vulnerability Assessments (Pacific Islands, Gulf of Mexico)
- ✓ Improve Fishing Community Vulnerability Assessments
- ✓ Research climate-fisheries impacts to inform surveys, stock assessments, responses
- ✓ Improve near-term forecasts and longer-term projections

## HOW TO RESPOND?

- ✓ Build Management Strategy Evaluation capacity in each region
-  Evaluate fishery management strategies under future ocean scenarios (e.g., Bering Sea)

# What's at risk and how to respond?

What species  
& fisheries  
are most  
vulnerable?

What's the  
best option to  
reduce risks?



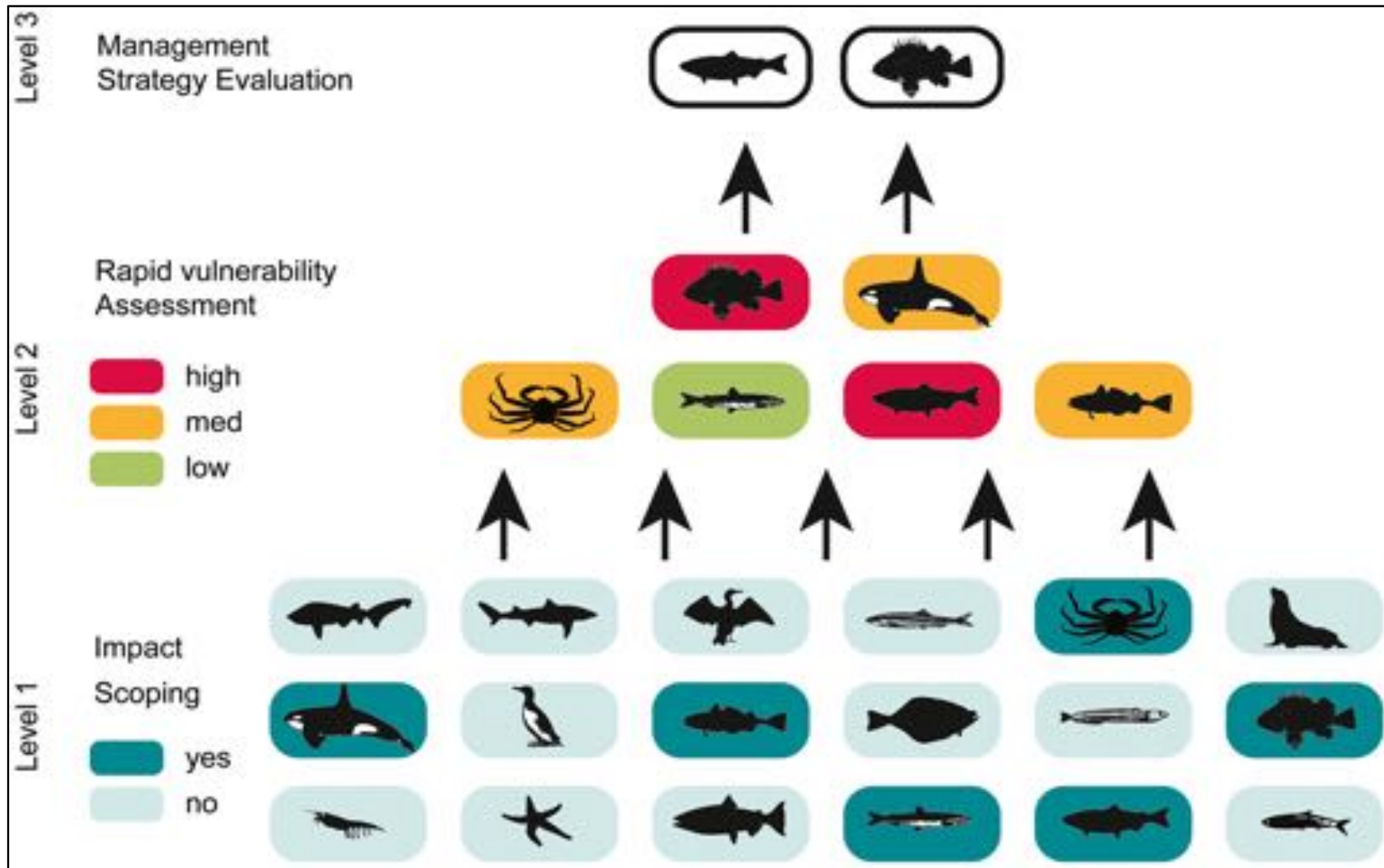
How do it  
better next  
time?

Take  
Action

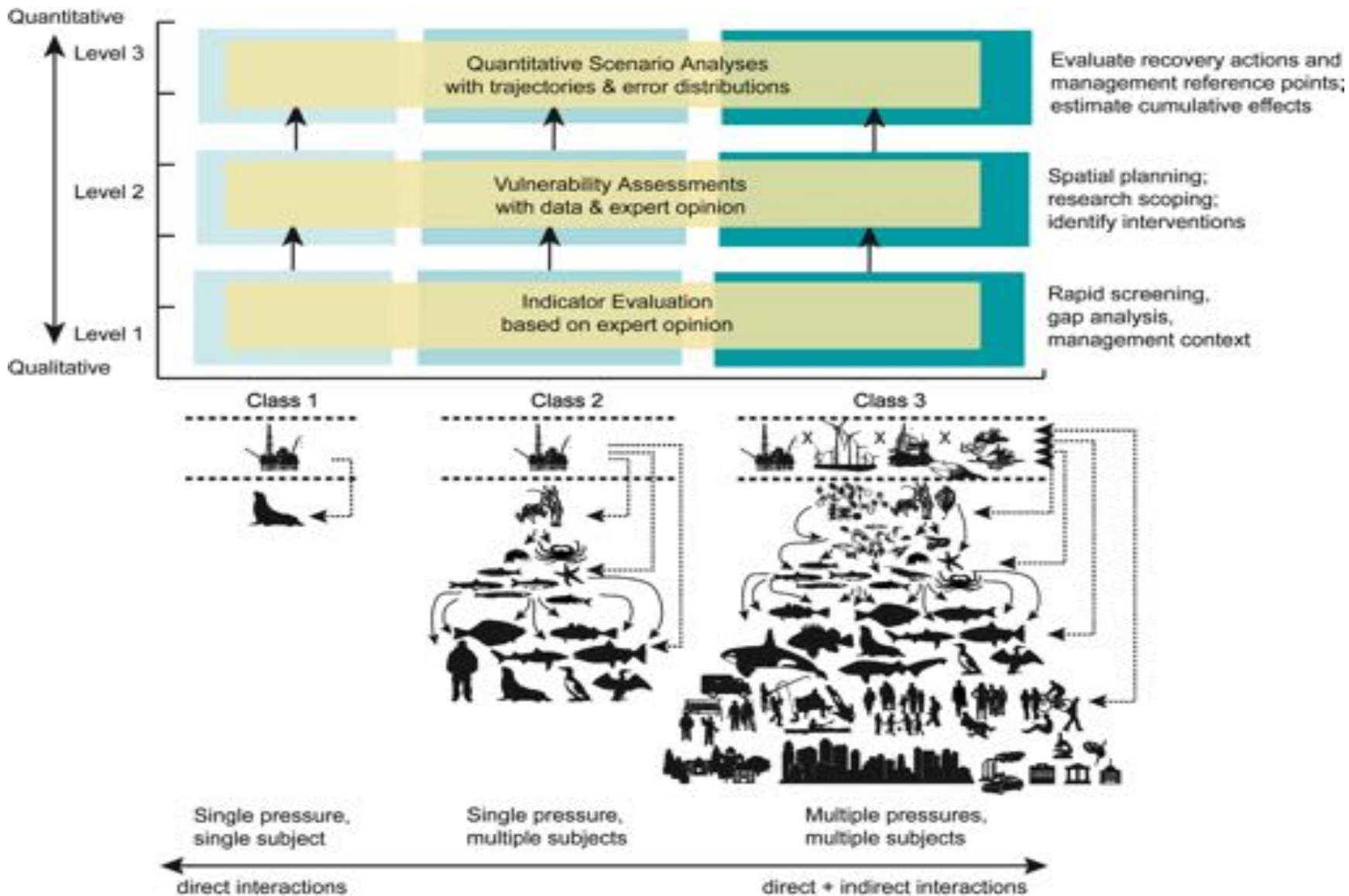
How did  
it work  
out?



# Range of tools for assessing risks and responses....

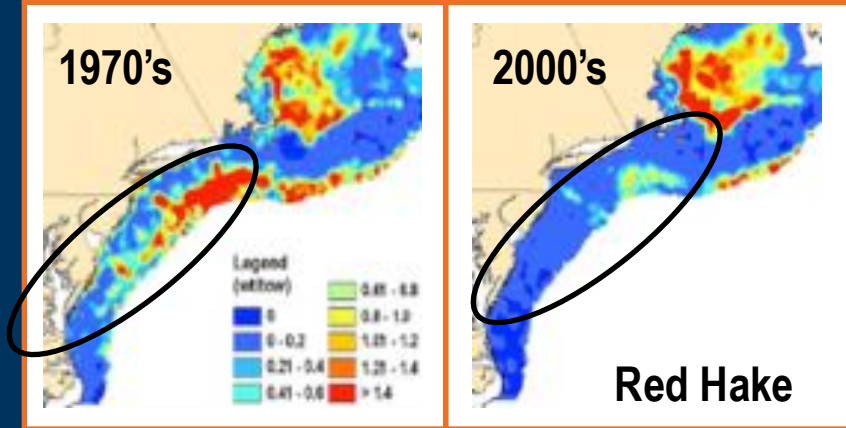


# Framework for ecosystem risk assessment...

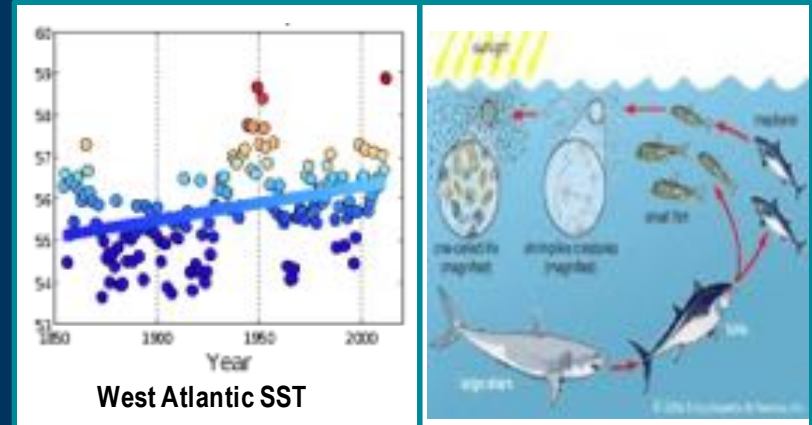


# Growing Demands for Information

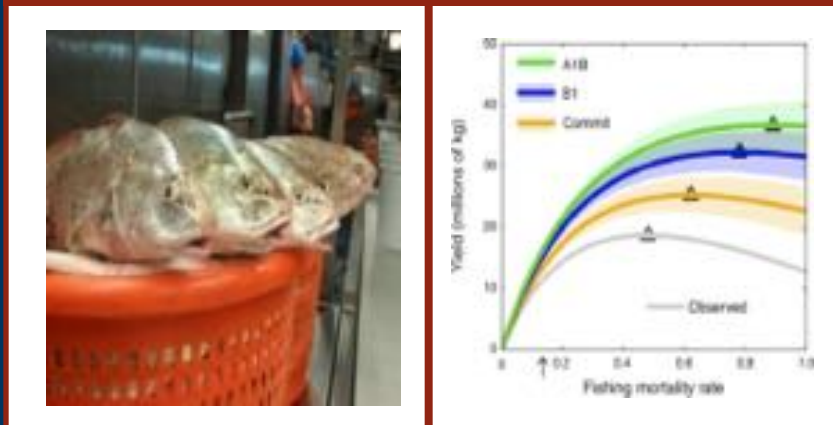
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## WHY IS IT CHANGING?



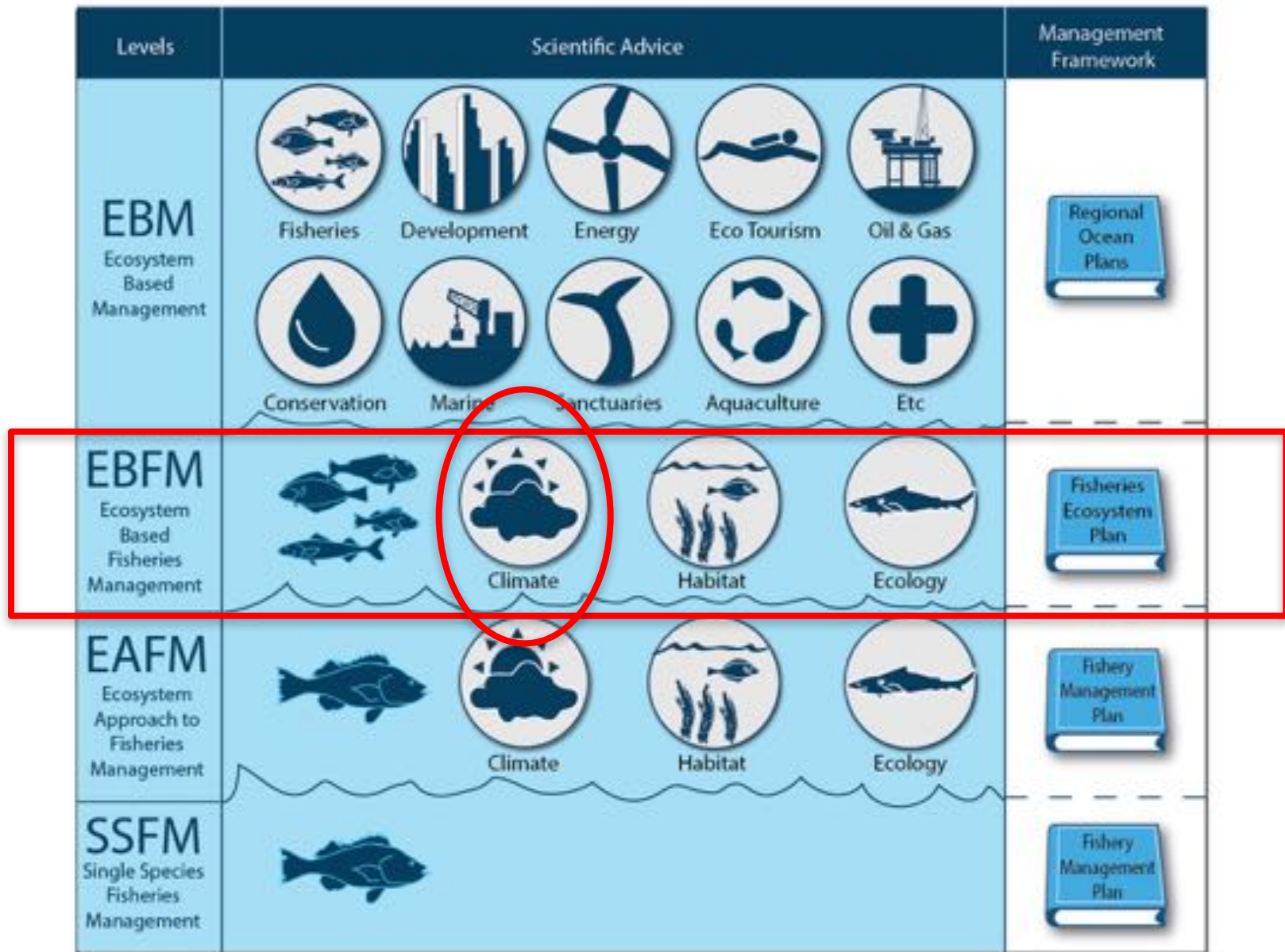
## HOW WILL IT CHANGE?



## HOW TO RESPOND?







# Thank You

[www.st.nmfs.noaa.gov/ecosystems/climate](http://www.st.nmfs.noaa.gov/ecosystems/climate)

