

# Climate and Ecosystems Subcommittee

MAFAC May 2024



# Climate change drivers that will affect fish

Warming waters

Ocean acidification

Deoxygenation

Extreme events, such as marine heatwaves

Harmful Algal Blooms (HABs)

Changing ocean currents

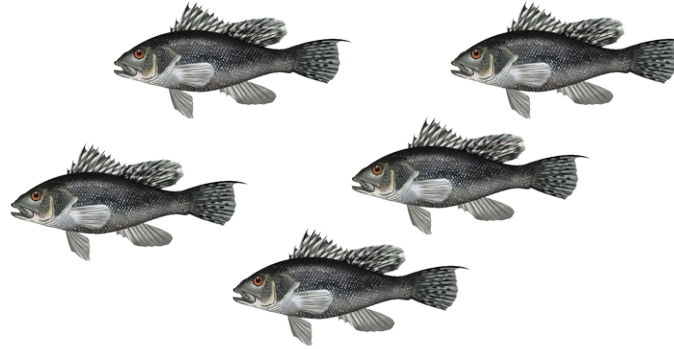
## Individual fish impacts



Changes in:

- Growth rate
- Mortality
- Reproduction
- Size
- Behavior (e.g., feeding)

## Population impacts



Changes in:

- Productivity
- Distribution and range
- Recruitment
- Resilience to other stressors

## Ecological impacts



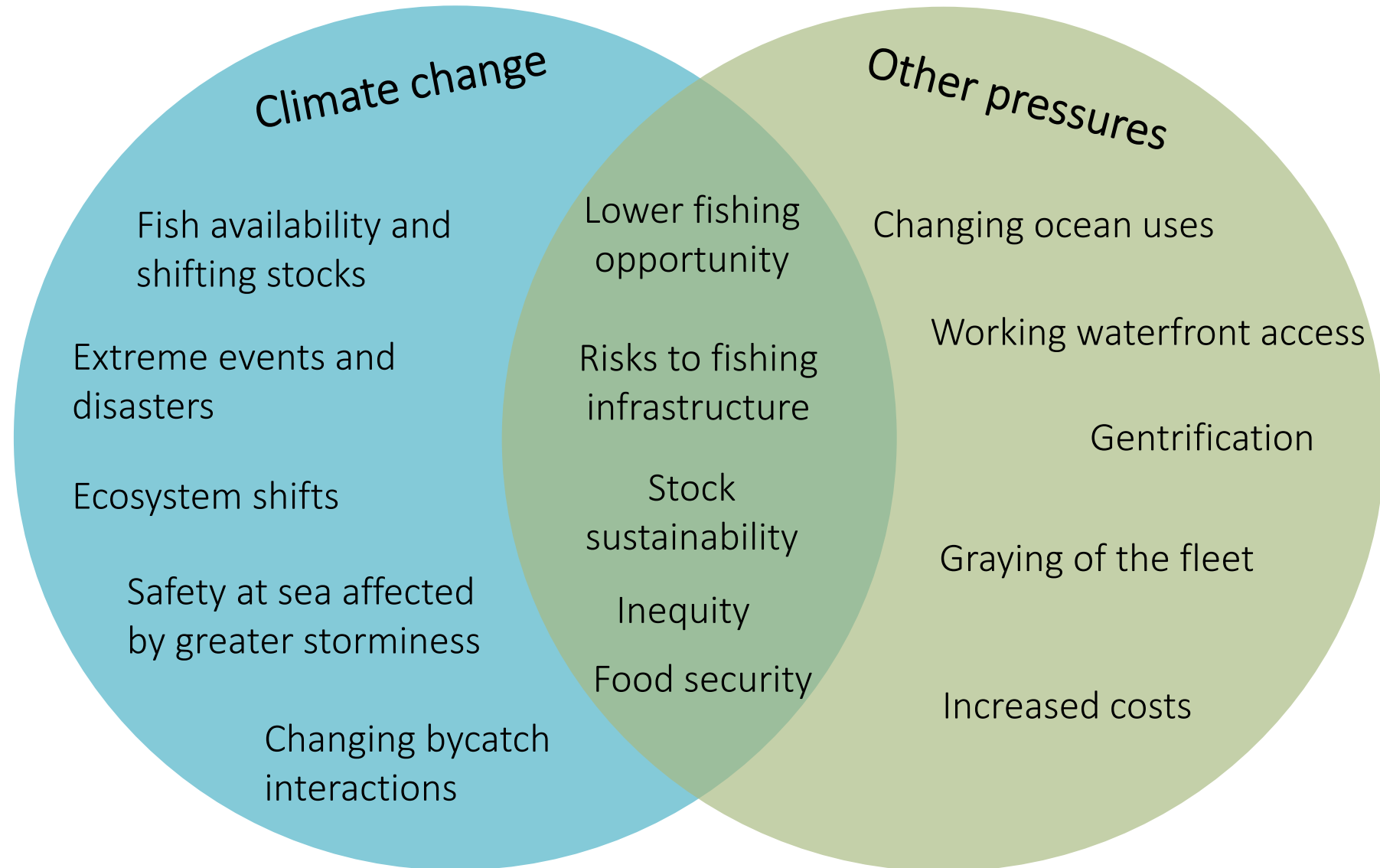
Changes in:

- Prey availability
- Predators
- Competitors
- Habitat
- Diseases
- Ecological interactions

# Impacts to fisheries and fishing communities

Climate change interacts with a host of other issues facing fishing-dependent communities.

For Tribes and Indigenous communities, there are specific risks to food security and risk of profound loss of culture, tradition and identity.



# Fundamental climate challenge for management

Our science-based management system is built on assumption of stationarity and takes a retrospective approach by using the past to manage for the future.

This won't work with climate change. Need to manage for variability and uncertainty.



# Limited use of climate information in management

U.S. Government Accountability Office



[Home](#) > [Reports & Testimonies](#) > [Federal Fisheries Management: Opportunities Exist to Enhance Climate Resilience](#)

## **Federal Fisheries Management: Opportunities Exist to Enhance Climate Resilience**

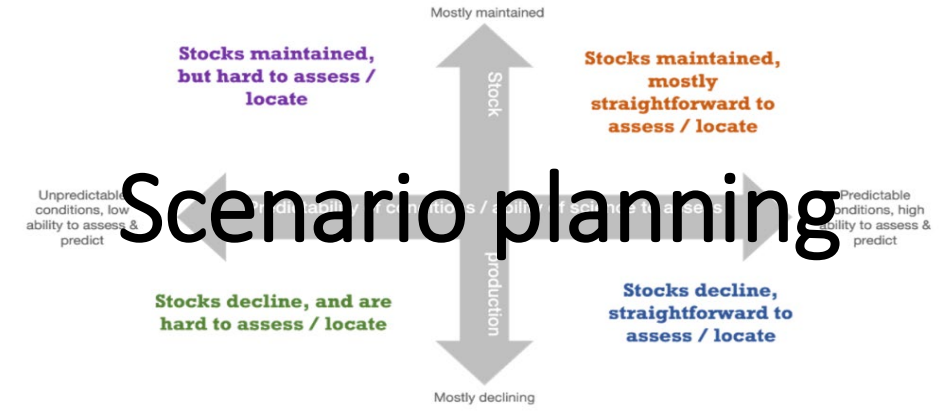
GAO-22-105132

Published: Aug 18, 2022. Publicly Released: Aug 18, 2022.

The GAO found that only **12** of **46** fishery management plans considered climate information.

The GAO recommended that NOAA Fisheries work with federal fisheries managers to identify and prioritize climate resilience opportunities and develop a plan to implement them.

# U.S. initiatives show solutions exist, but uptake is slow and inertia for business as usual is high



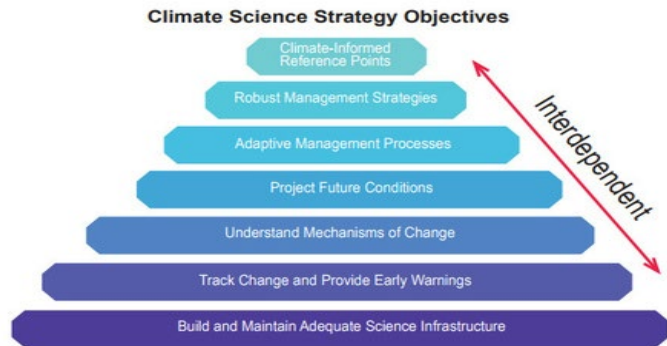
Agenda Item D.2.a  
Supplemental NMFS Powerpoint  
September 2016

## NOAA Fisheries Ecosystem Based Fishery Management Road Map

NOAA FISHERIES Headquarters

## NOAA FISHERIES CLIMATE SCIENCE STRATEGY

Jason S. Link, Roger Griffis, Shallin Busch (Editors)



**Risk Tables**

Species	Assess	Fstatus	Bstatus	FW1Pred	FW1Prey	FW2Prey	Climate	DistShift	EstHabitat
Ocean quahog							h	mh	
Surfclam							mh	mh	
Summer flounder		h	lm				lm	mh	h
Scup							lm	mh	h
Black sea bass							mh	mh	h
Atl. mackerel		h	h				lm	mh	
Butterfish								h	
Longfin squid	lm		lm					mh	
Shortfin squid	lm	lm						h	
Golden tilefish			lm				mh		
Blueline tilefish	h	h	mh				mh		
Bluefish			lm					mh	h
Spiny dogfish	lm		lm					h	
Monkfish	h	lm	lm					mh	
Unmanaged forage	na	na	na		lm	lm	na	na	na
Deepsea corals	na	na	na				na	na	na

ICES Journal of Marine Science

ICES Journal of Marine Science (2021), 78(10), 3562–3580. <https://doi.org/10.1093/icesjms/fsab219>

### Quo Vadimus

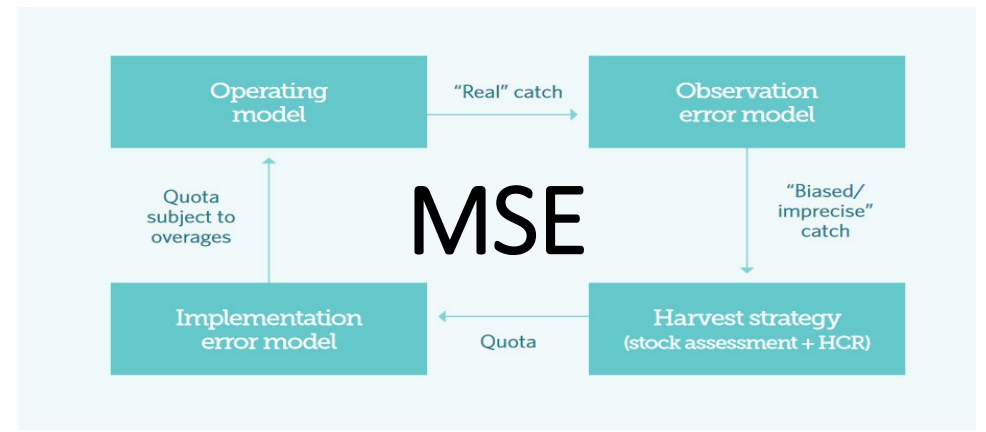
#### Proposed business rules to incorporate climate-induced changes in fisheries management

J.S Link<sup>1\*</sup>, M.A. Karp<sup>2</sup>, P. Lynch<sup>3</sup>, W.E. Morrison<sup>4</sup>, and J. Peterson<sup>1b</sup>



Figure 1. Generic science to management process (linked to column headings of Table 3). Although presented in a linear fashion, it is understood that the process iterates over the period of management cycles.

## Climate Ecosystems and Fisheries Initiative



# Disasters are outpacing our efforts

So far, investment in climate-ready fisheries hasn't matched need in the U.S.

\$1.4 B

Fishery revenue lost due to disasters  
with at least partial environmental cause  
1994-2019

\$349 m

One-time investment in climate-  
ready fisheries in Inflation  
Reduction Act



What is holding us back  
from climate-ready  
management?



# Subcommittee's initial two charges

## WHAT does “climate-ready fisheries” mean?

After a year of discussion and support from outside voices, we offered recommendations to NMFS on what constitutes “climate-ready fisheries,” “climate-ready fisheries management,” and “climate-resilient fishing communities.”



## HOW can we address the science-to-management gap?

Lots of production of scientific information and tools, but little to no adoption by managers like the Councils. What recommendations can we offer to improve this?



# Revised Charge

Help NOAA Fisheries understand how to best support climate ready fisheries by:

- Task 1: Identify key insertion points for climate-relevant information into routine fisheries management processes to achieve incremental gains towards climate resilience and designing ways to support better and faster uptake and utilization of this information by the regional councils; and
- Task 2: Understand what actions may be needed outside of routine fisheries management processes to improve resilience of fisheries and how NOAA can begin to address these missing pieces through a holistic approach.



Clark James Mishler



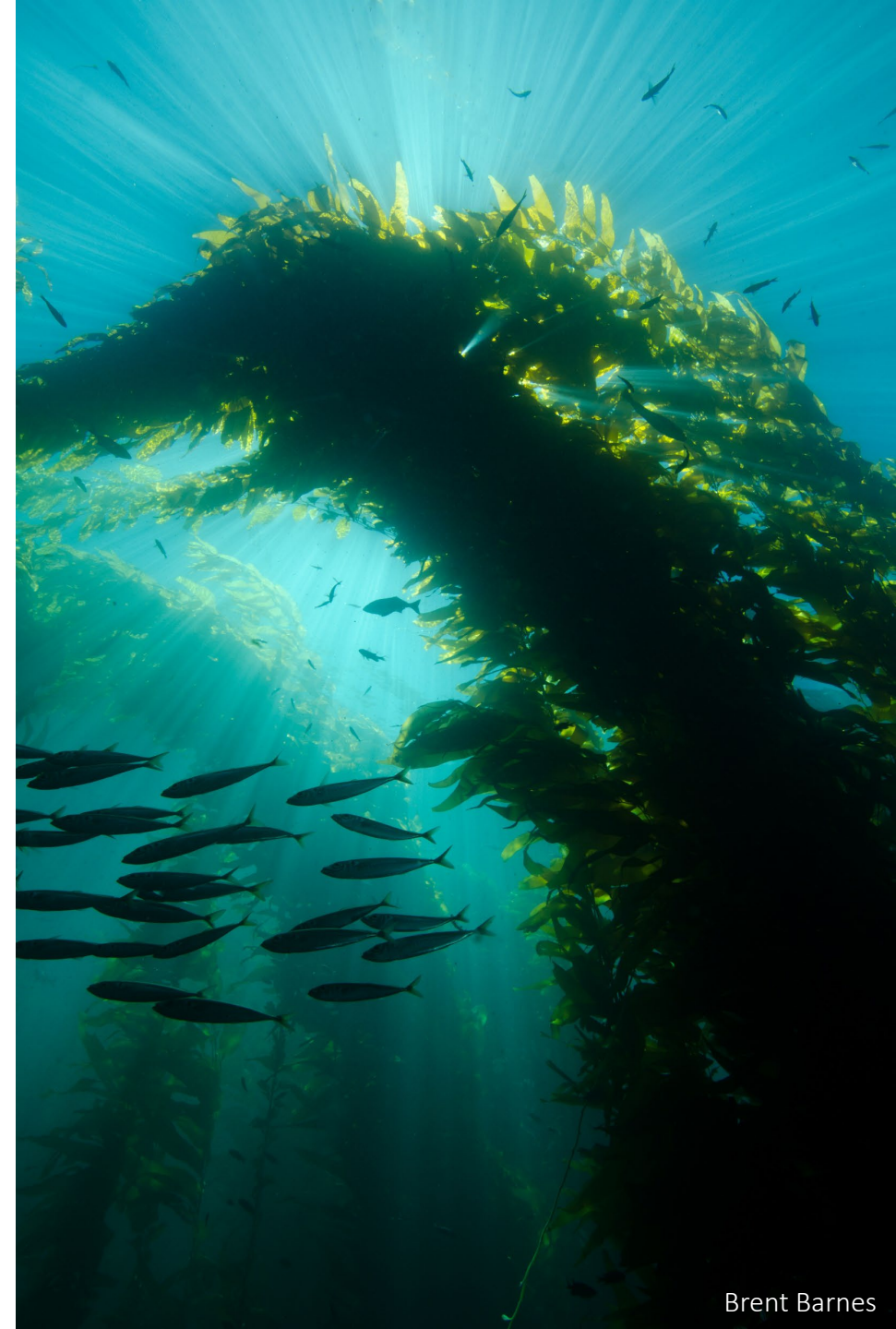
Peter Mangolds



Barbara McKinney

# Task 1: Increasing uptake

- Identify points in the routine fisheries management process where climate info can be incorporated.
- Identify barriers to greater incorporation of climate info and suggest approaches to remove these barriers.
- Consider mechanisms for tracking and incentivizing greater utilization of climate info within routine fisheries management processes.
- Identify ways that equity intersects with the insertion of climate into the fisheries management process.



# Task 2: Missing pieces for resilience

- Assemble a list of needs related to climate readiness in fisheries that cannot be resolved through incremental improvements to routine fisheries management processes.
- Draw upon a variety of perspectives to understand possible levers, opportunities, and barriers to addressing needs within this category.
- Identify whether the intervention(s) required to overcome these barriers are primarily related to “process,” “purpose,” or “people.”
- Understand which of these needs can be addressed by NOAA Fisheries under existing statutory mandates, and which cannot



# Proposed Deliverables

Relaxing chair because  
this will be so easy y'all

You should join  
our subcommittee

## Task 1: Increasing uptake

- Recommendations for near-term actions, including tracking, for implementation in fisheries mgmt
- Recommendations for supporting Fishery Management Council decision making

## Task 2: Missing pieces for resilience

- Document barriers to achieving climate resilience + NMFS's role in lowering them
- ID how NMFS can support fishing communities in the face of climate change

