

# 10 Ocean Prophecies

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# Take Aways

A photograph of a white lighthouse with a red lantern room, situated on a rocky coastline. The scene is captured during sunset or sunrise, with a warm orange and yellow glow in the sky. The lighthouse is on the left side of the frame, and the ocean with distant islands is visible on the right. The foreground consists of dark, jagged rocks.

- We are facing unprecedented and impactful changes
- We know enough to act
- We can most effectively do so by pulling together





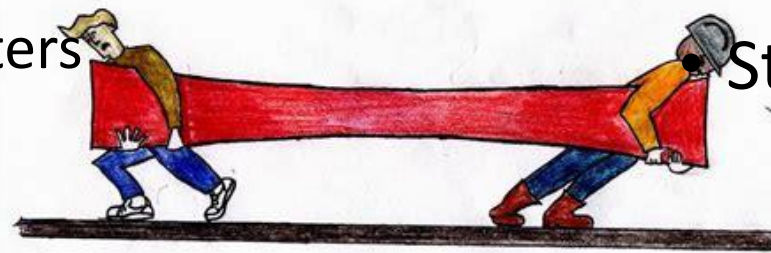
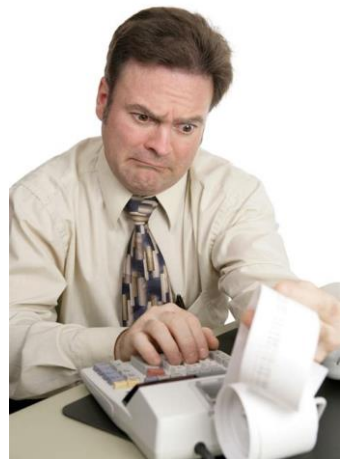
# Prophetic vs. status quo tensions

## Shock and Change

- Prophets
  - Oracles
- Magi
  - Wise Men
- Wizards
  - Astrologers, Seers
- Economists
- Statisticians
- Scientists
  - Forecasters

## Maintain System

- Kings
  - Monarch
- Sultan
  - Suzerain, Mandarin
- Chiefs
  - Kahuna, Sachem
- Accountants
- Bureaucrats
- Apparatchiks
- Statisticians



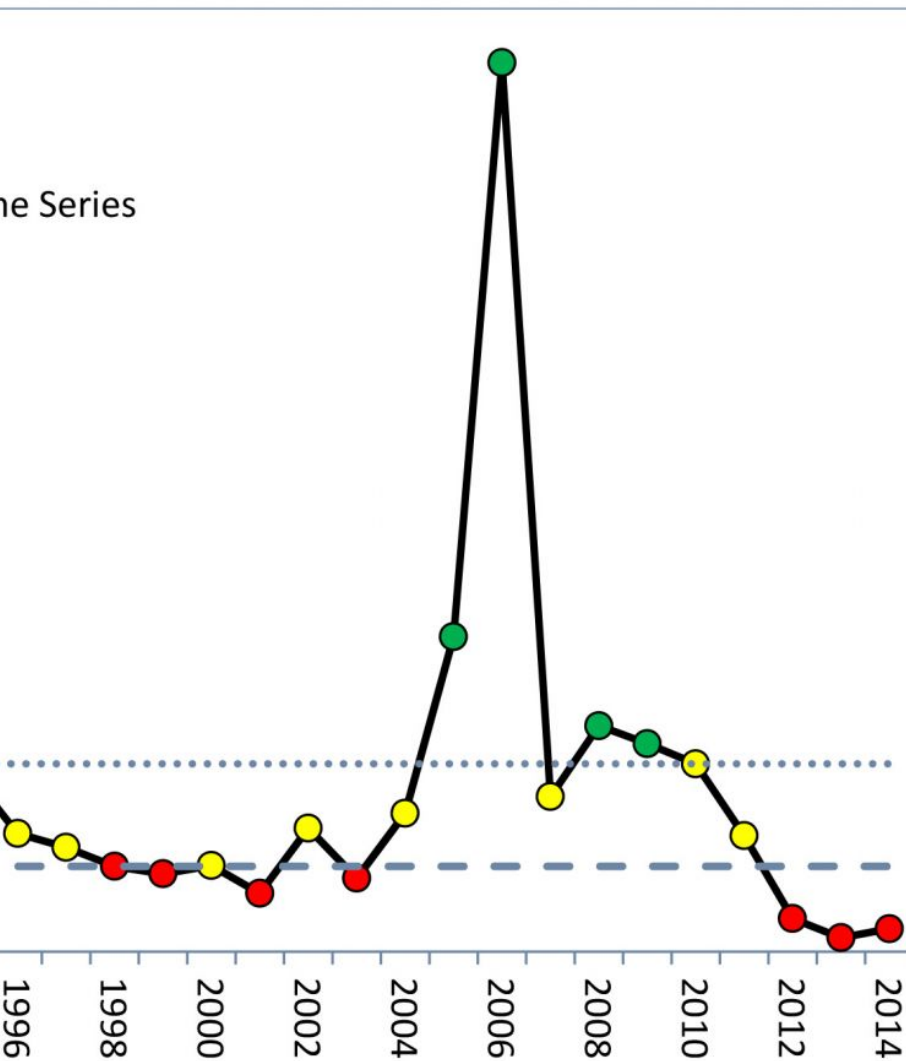




# from the Gulf of Maine Summer Shrimp Survey

Gulf of Maine Northern Shrimp, 2014

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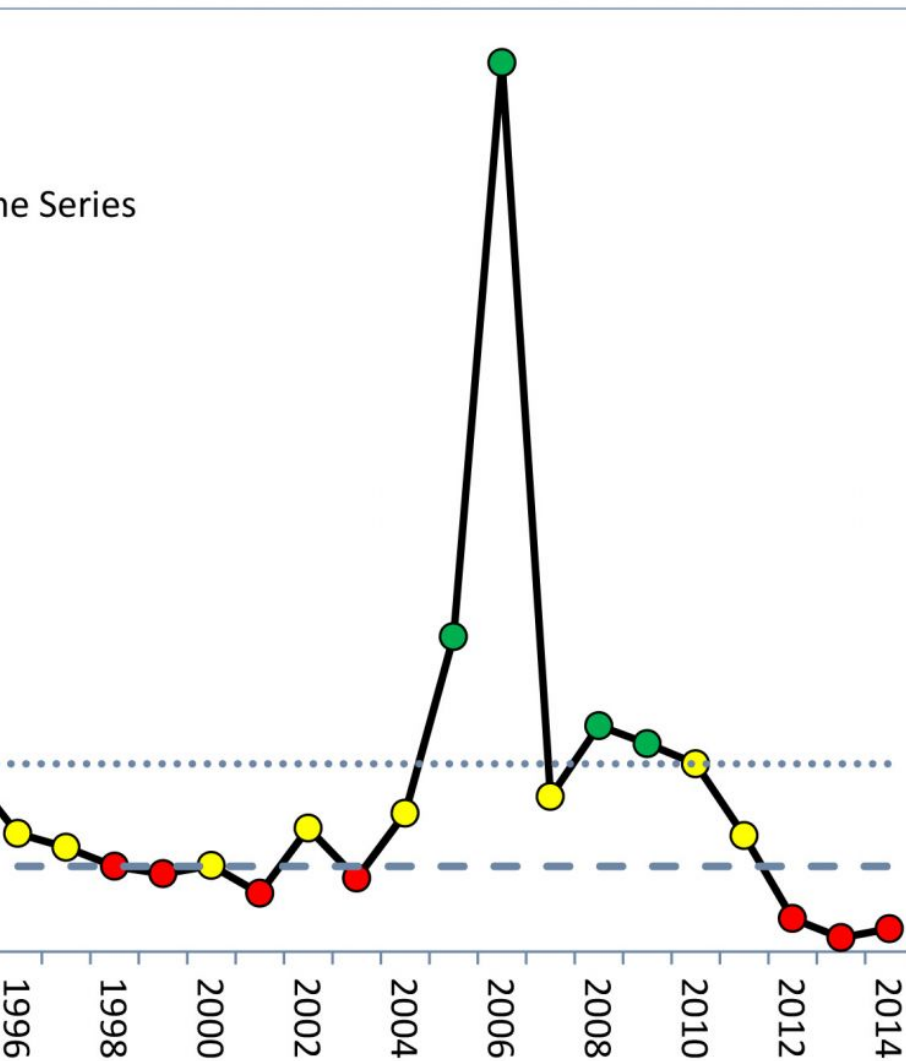


ex relative to the reference period (dashed line) and to  
line). The reference period (1985-1994) is the time  
stable landings and value. Green dots are values that are  
(M); red dots are values that are equal to or below the

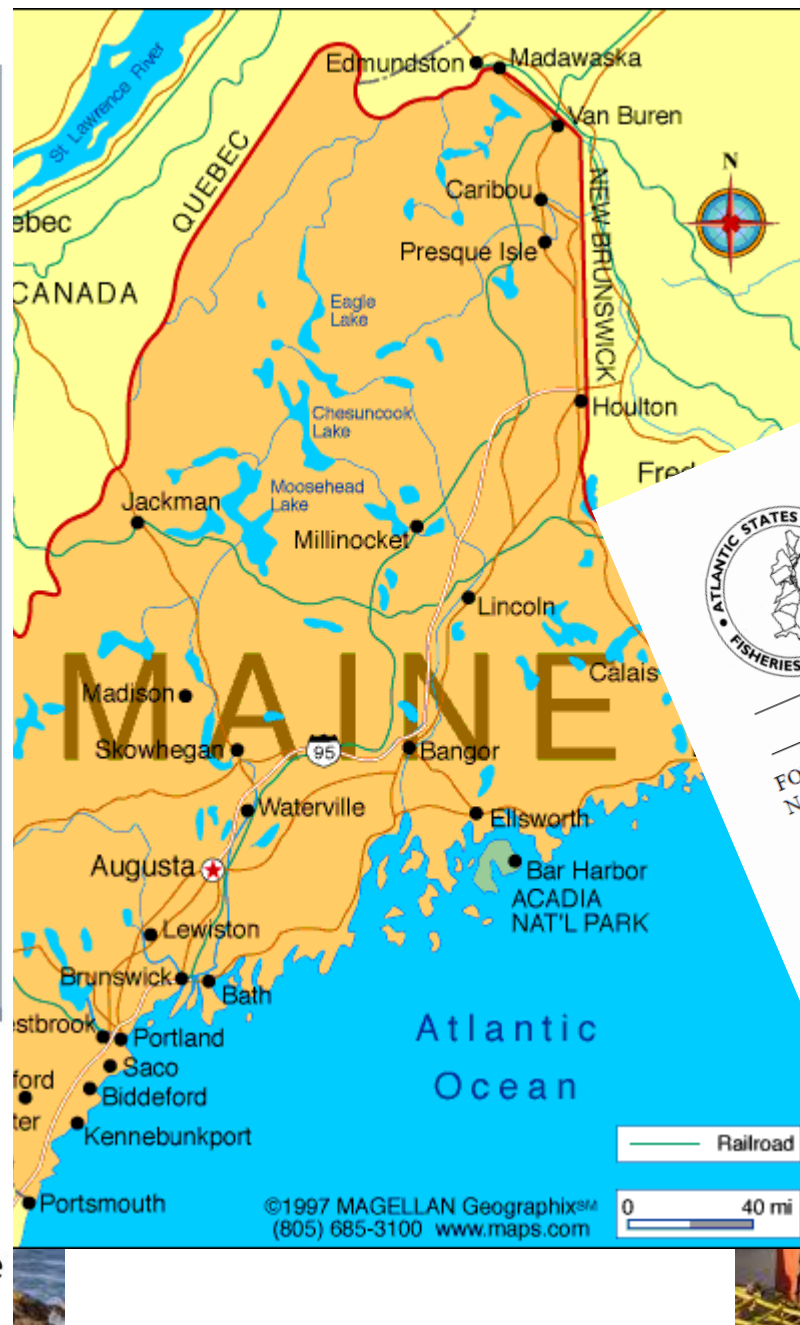


# from the Gulf of Maine Summer Shrimp Survey

Gulf of Maine Northern Shrimp, 2014



ex relative to the reference period (dashed line) and to the line). The reference period (1985-1994) is the time of stable landings and value. Green dots are values that are above the reference period; red dots are values that are equal to or below the



FOR IMMEDIATE RELEASE  
November 5, 2014

## ASMFC Northern Shrimp Section Establishes Moratorium for 2015 Commercial Fishing Season

Draft Amendment 3 PID Approved for Public Comment

Portland, ME – The Atlantic States Marine Fisheries Commission's Northern Shrimp Section has established a moratorium for the 2015 commercial fishery. This action was taken in response to the findings of the 2014 Stock Status Report, indicating current fishable biomass is the lowest on record. A suite of indicators in the 2014 Stock Status Report, including abundance and biomass indicators, suggest the fishery is overfished.



### Atlantic States Marine Fisheries Commission

## NEWS RELEASE

Vision: Sustainably Managing Atlantic Coastal Fisheries

PRESS CONTACT: Tina Berger  
703.842.0740



$\Delta \sim 40$  mi per decade  
 $\sim 10$  m per decade deeper





$\Delta \sim 40$  mi per decade  
 $\sim 10$  m per decade deeper



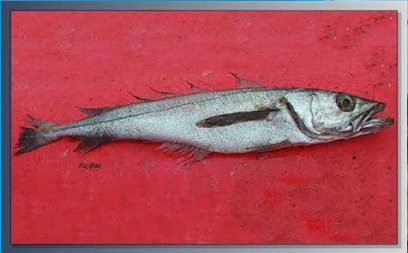


$\Delta \sim 40$  mi per decade  
 $\sim 10$  m per decade deeper



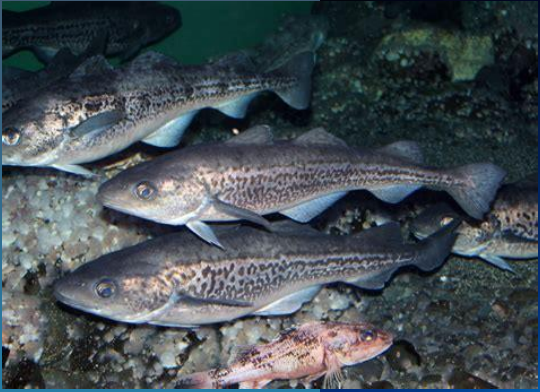
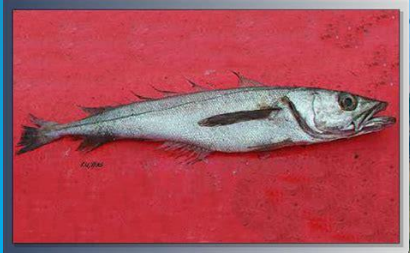


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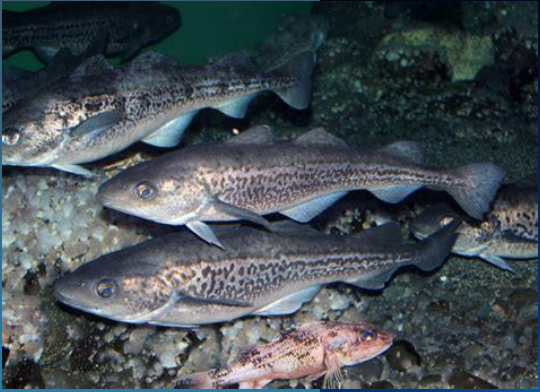
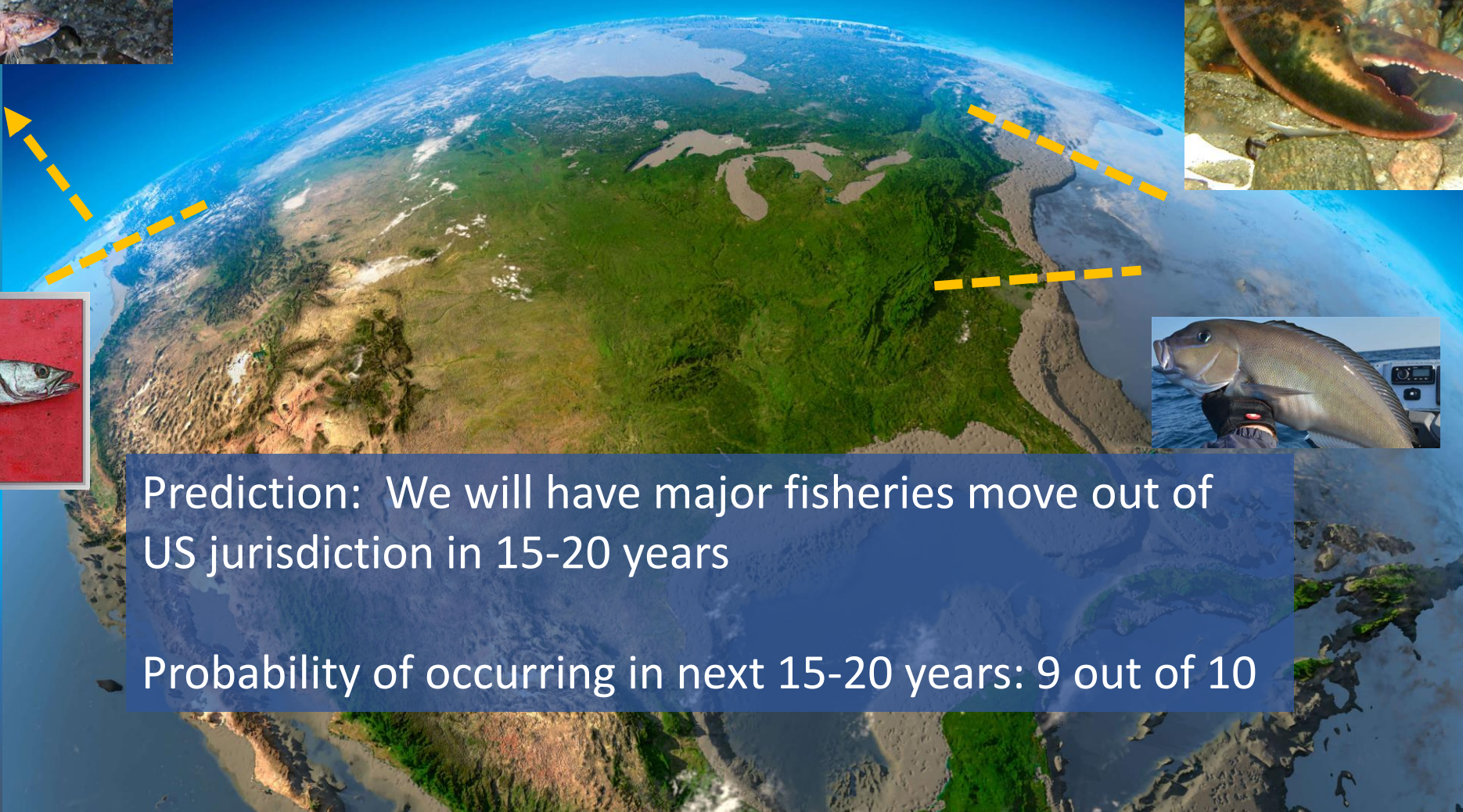
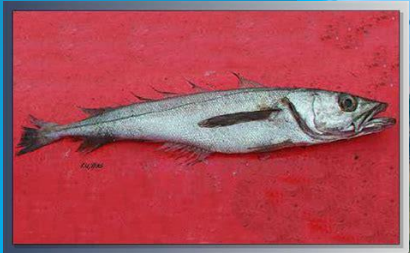


$\Delta \sim 40$  mi per decade  
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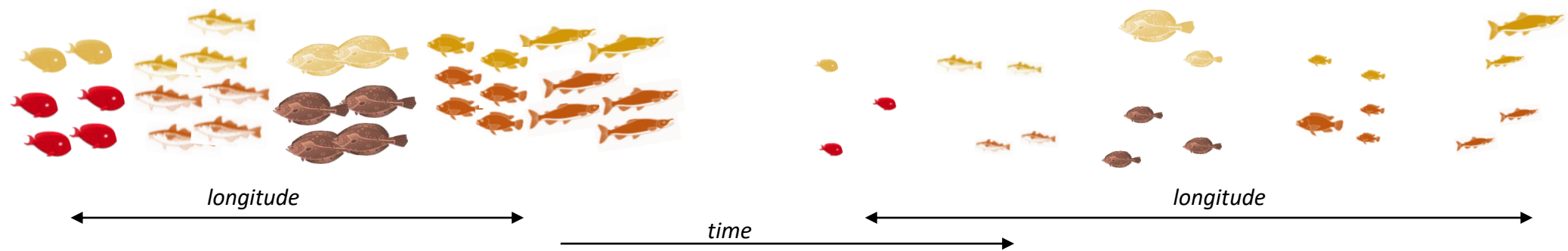


Prediction: We will have major fisheries move out of US jurisdiction in 15-20 years

Probability of occurring in next 15-20 years: 9 out of 10

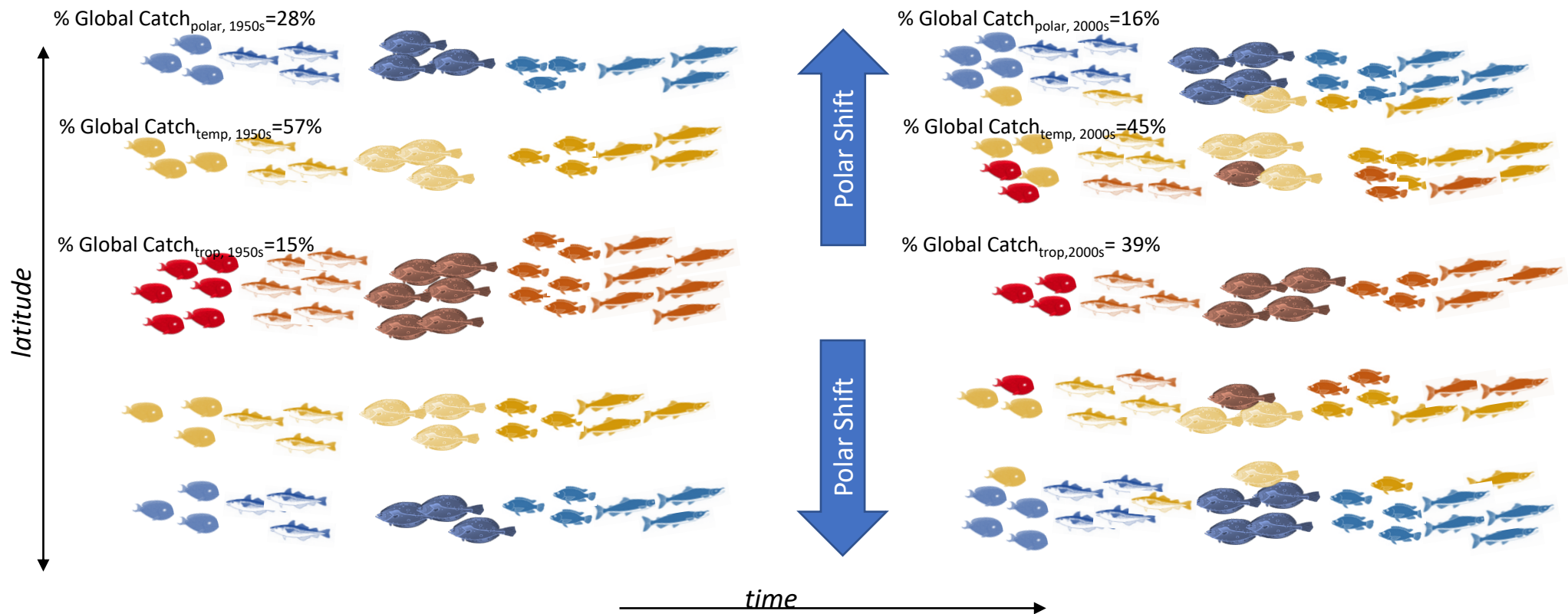
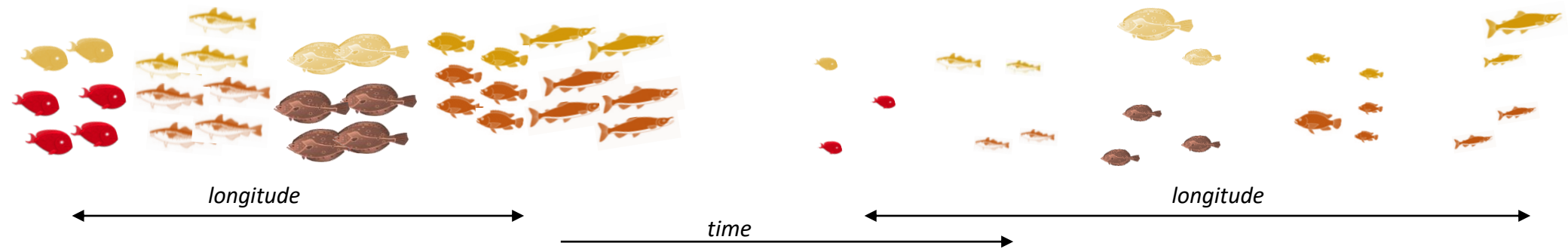


Tropical Pressure  
Special Case of Ecosystem Overfishing



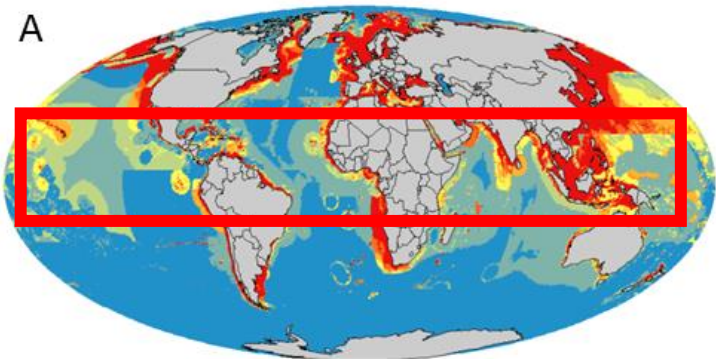


Tropical Pressure  
Special Case of Ecosystem Overfishing



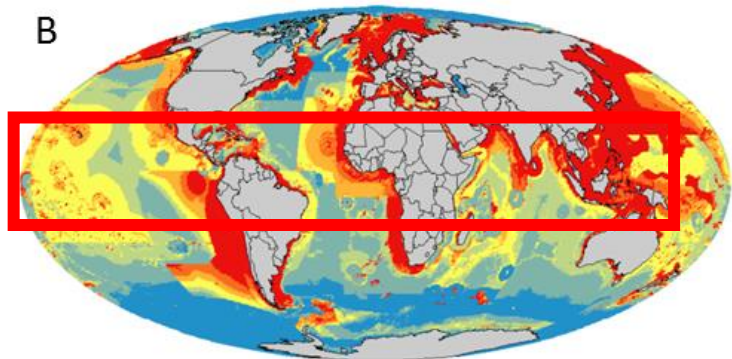
1950s

A



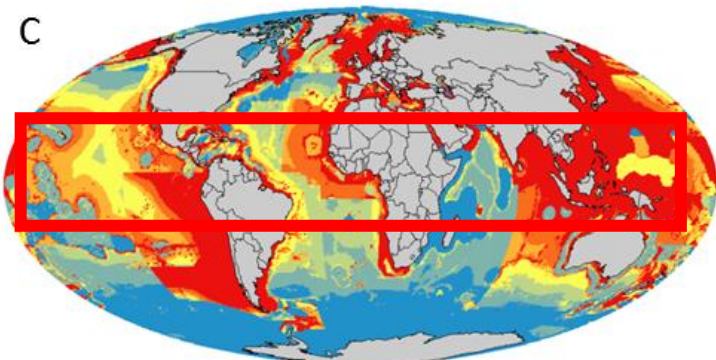
1970s

B



2010s

C



tonnes yr<sup>-1</sup>

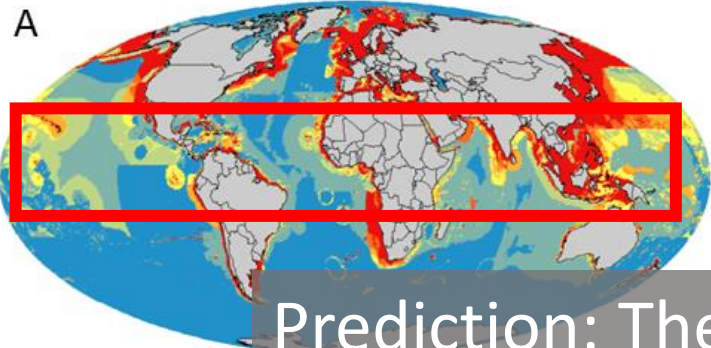
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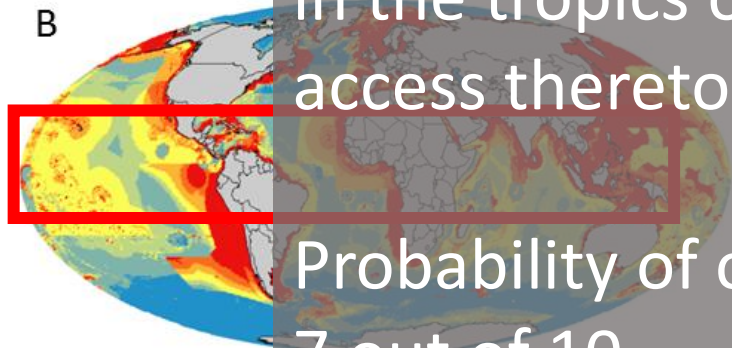
Tropical Pressure + Polar Shift = Tropical Crunch



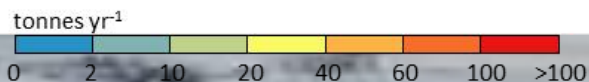
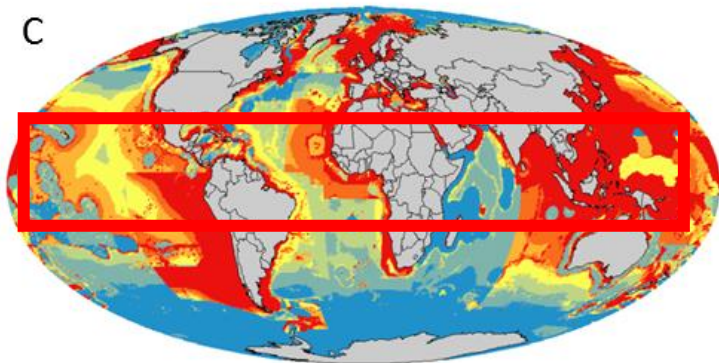
1950s



1970s



2010s



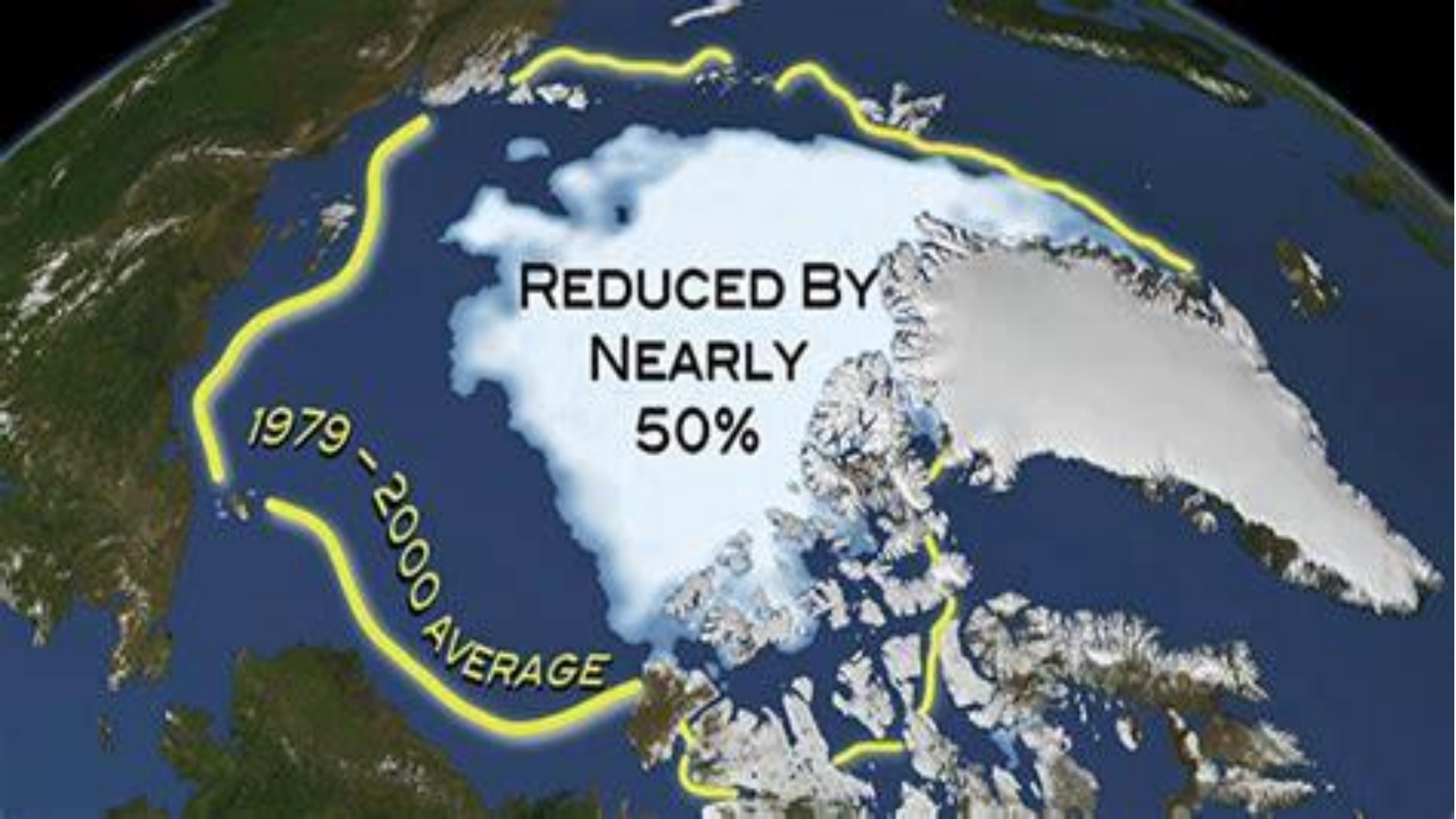
Prediction: There will be a significant conflict in the tropics over fisheries resources, or access thereto

Probability of occurring in next 10-20 years:  
7 out of 10

Tropical Pressure + Polar Shift = Tropical Crunch



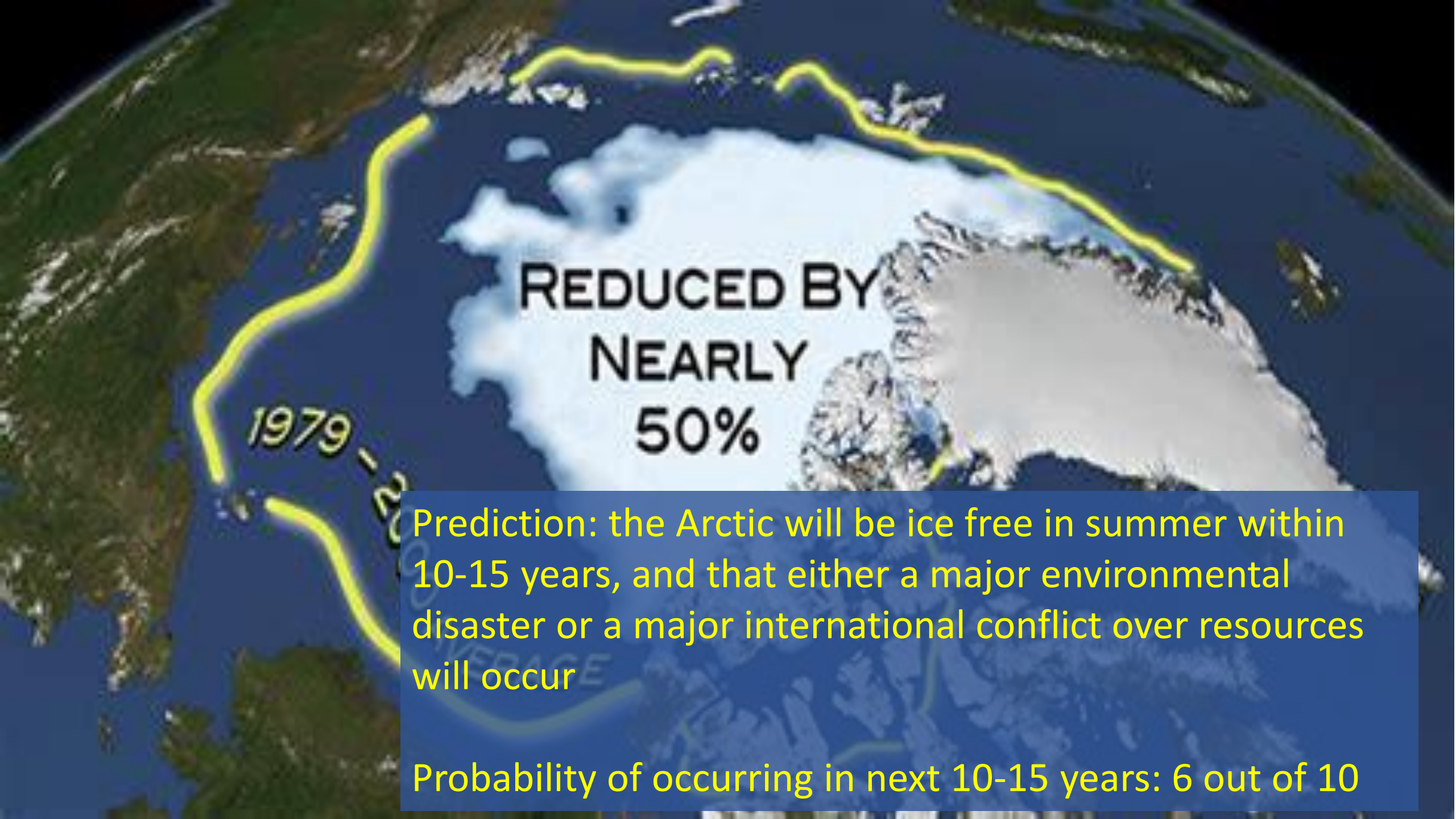




**REDUCED BY  
NEARLY  
50%**

**1979-2000  
AVERAGE**





**REDUCED BY  
NEARLY  
50%**

1979

Prediction: the Arctic will be ice free in summer within 10-15 years, and that either a major environmental disaster or a major international conflict over resources will occur

Probability of occurring in next 10-15 years: 6 out of 10











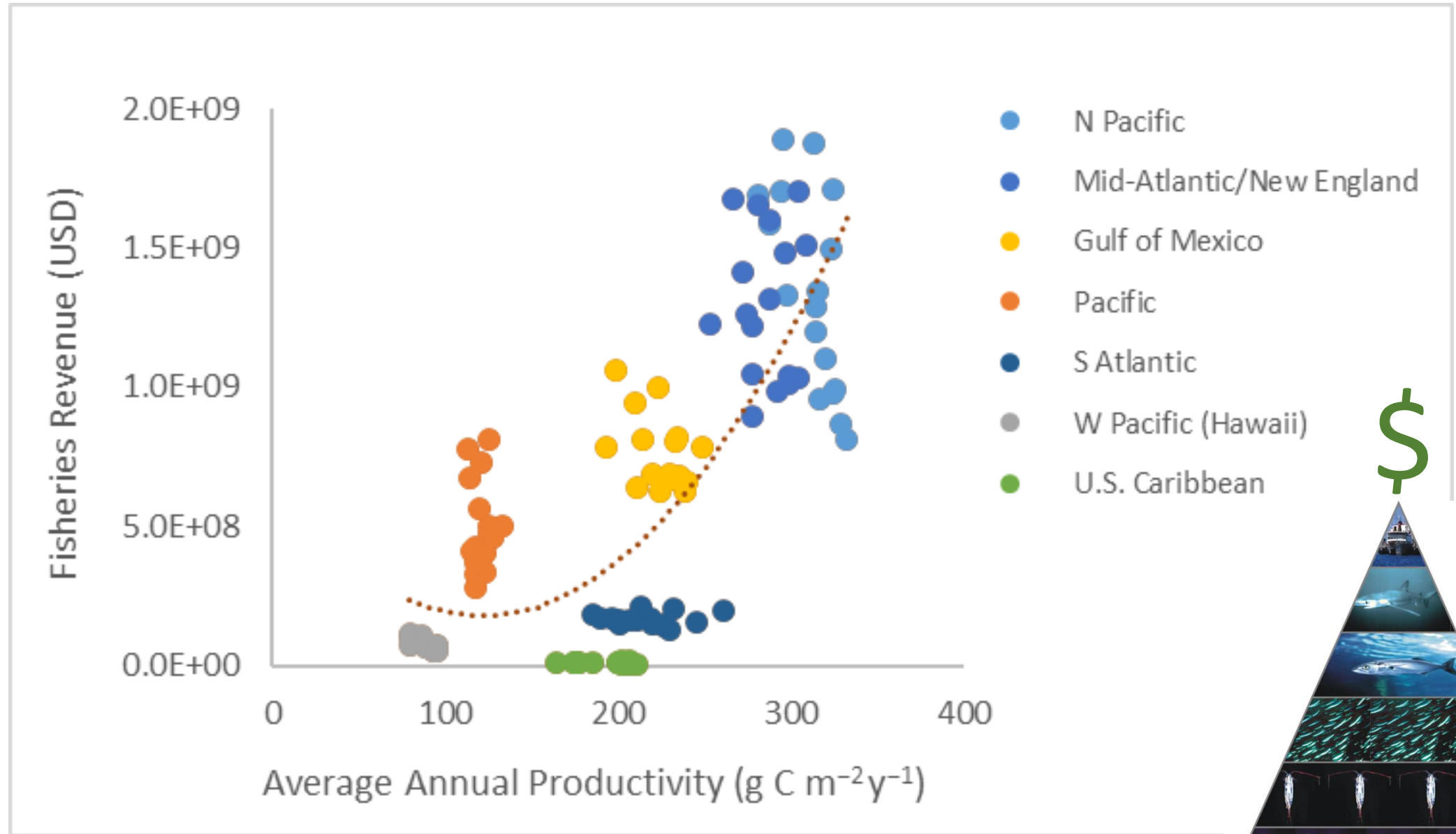


Prediction: Harmful algal blooms will continue to increase, with loss of water quality and an increase in toxin loads, resulting in a major health crisis in a large coastal population

Probability of occurring in next 15-20 years: 4 out of 10









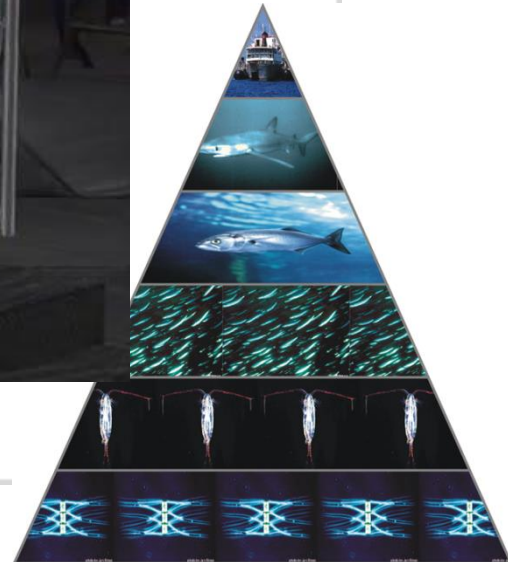


England

\$

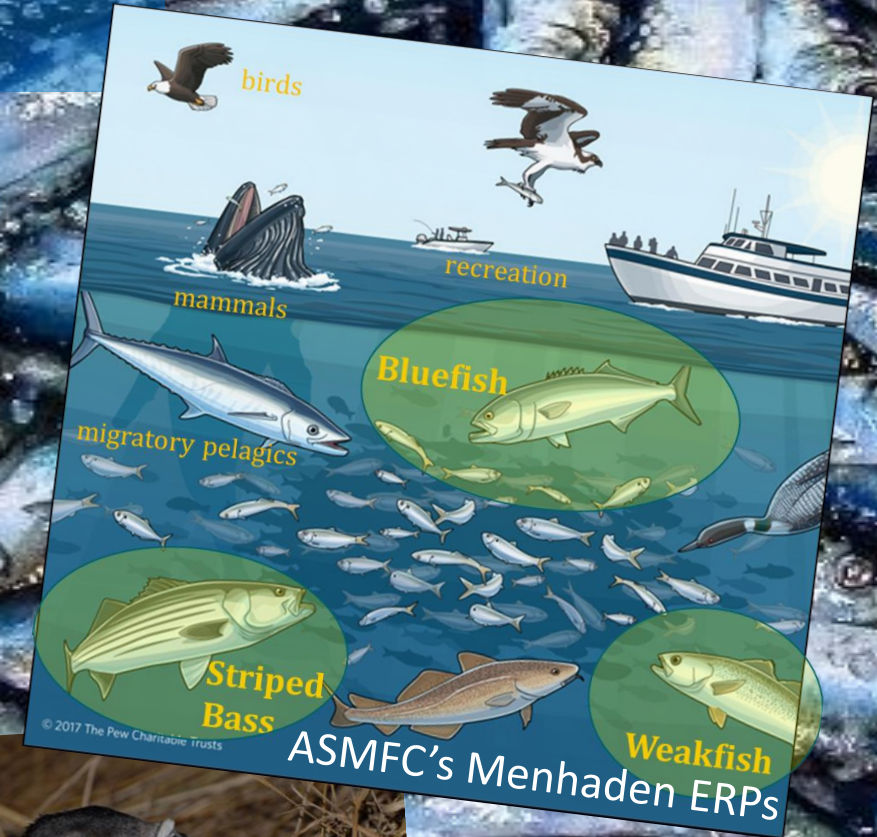
Average Annual Productivity ( $\text{g C m}^{-2} \text{y}^{-1}$ )

Marshak  
unpubl. data



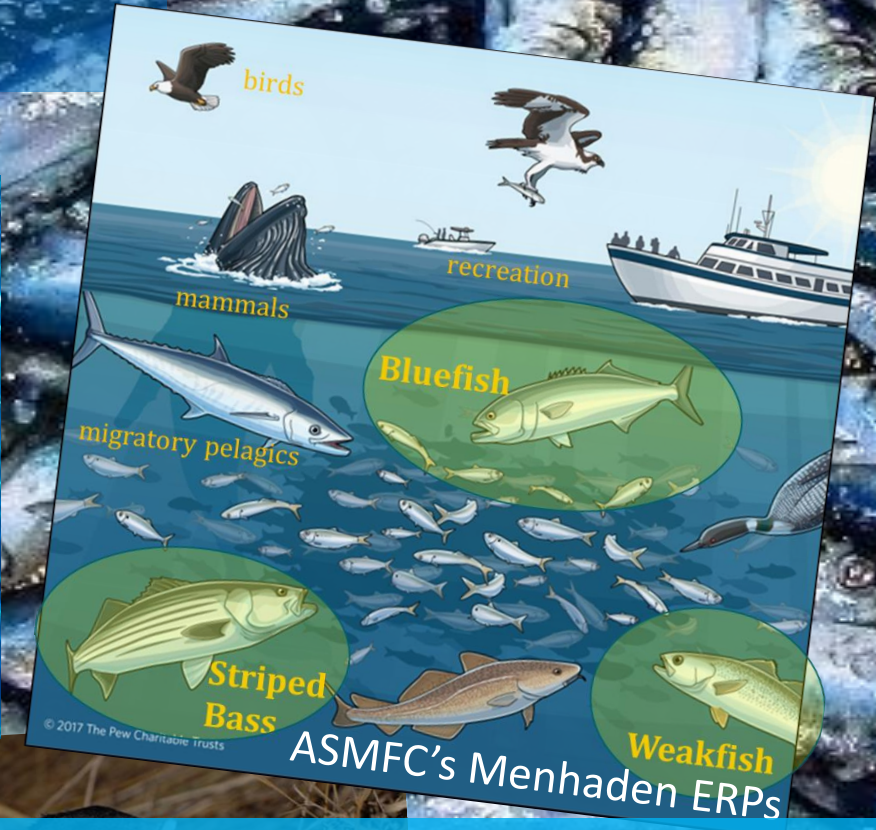


# Example fisheries “cage matches”





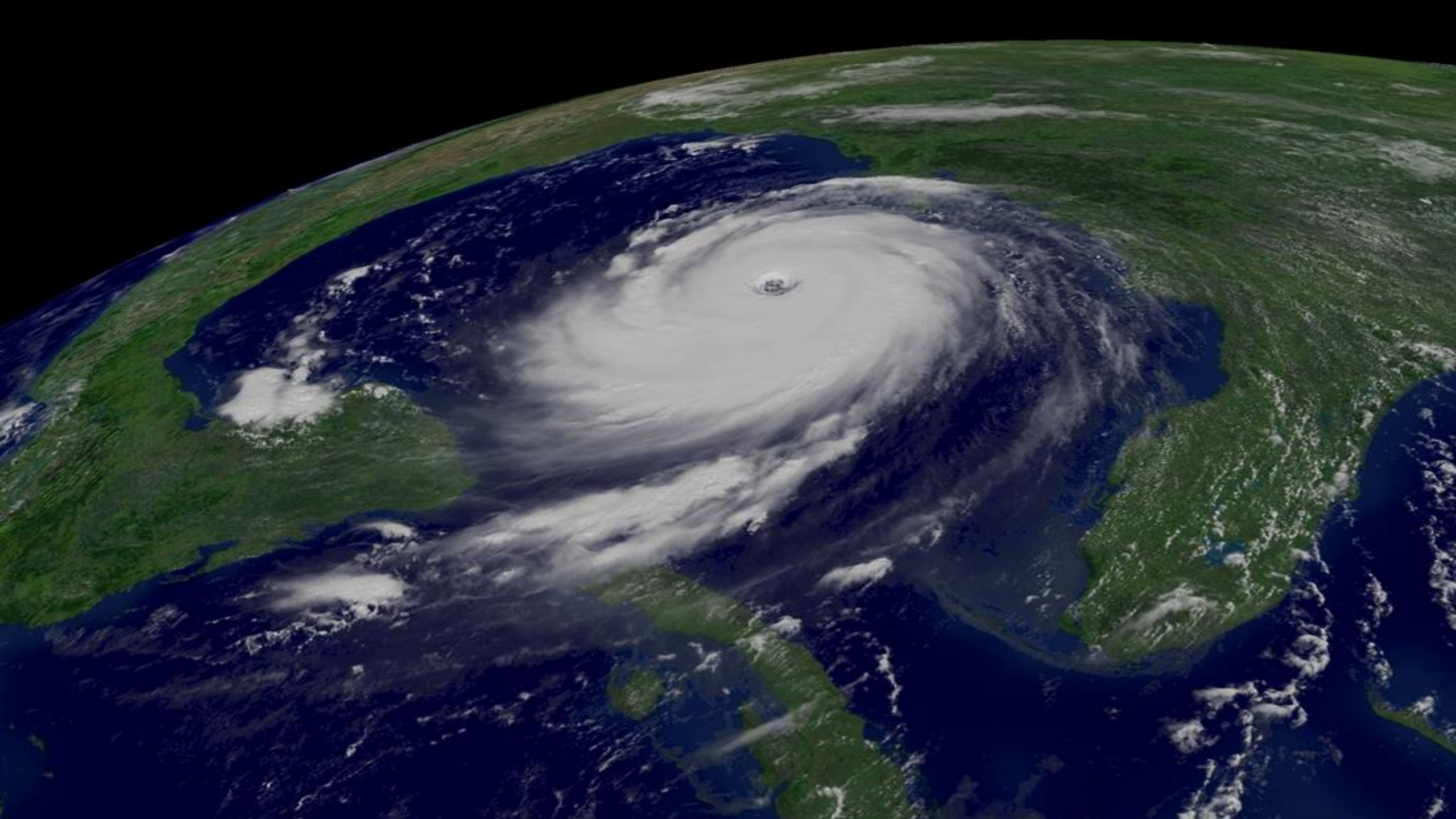
# Example fisheries “cage matches”



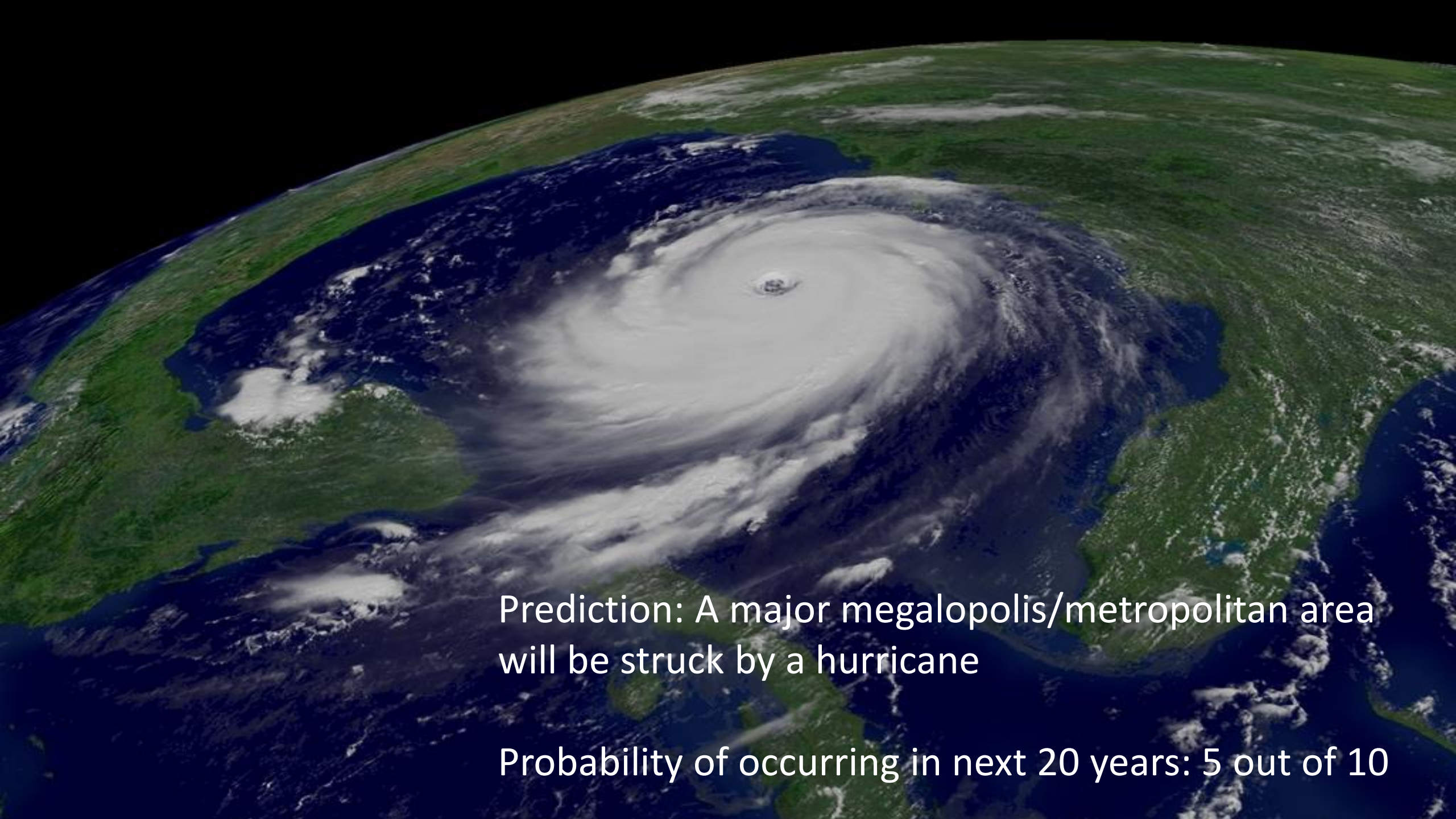
Prediction: ocean production constraints will sharpen, such that major stakeholders will have significant conflicts resulting in increased lawsuits and loss of yields

Probability of occurring in next 10-15 years: 7 out of 10









Prediction: A major megalopolis/metropolitan area  
will be struck by a hurricane

Probability of occurring in next 20 years: 5 out of 10

















Prediction: A major megalopolis/metropolitan area will be inundated to the point of losing significant infrastructure, value and population

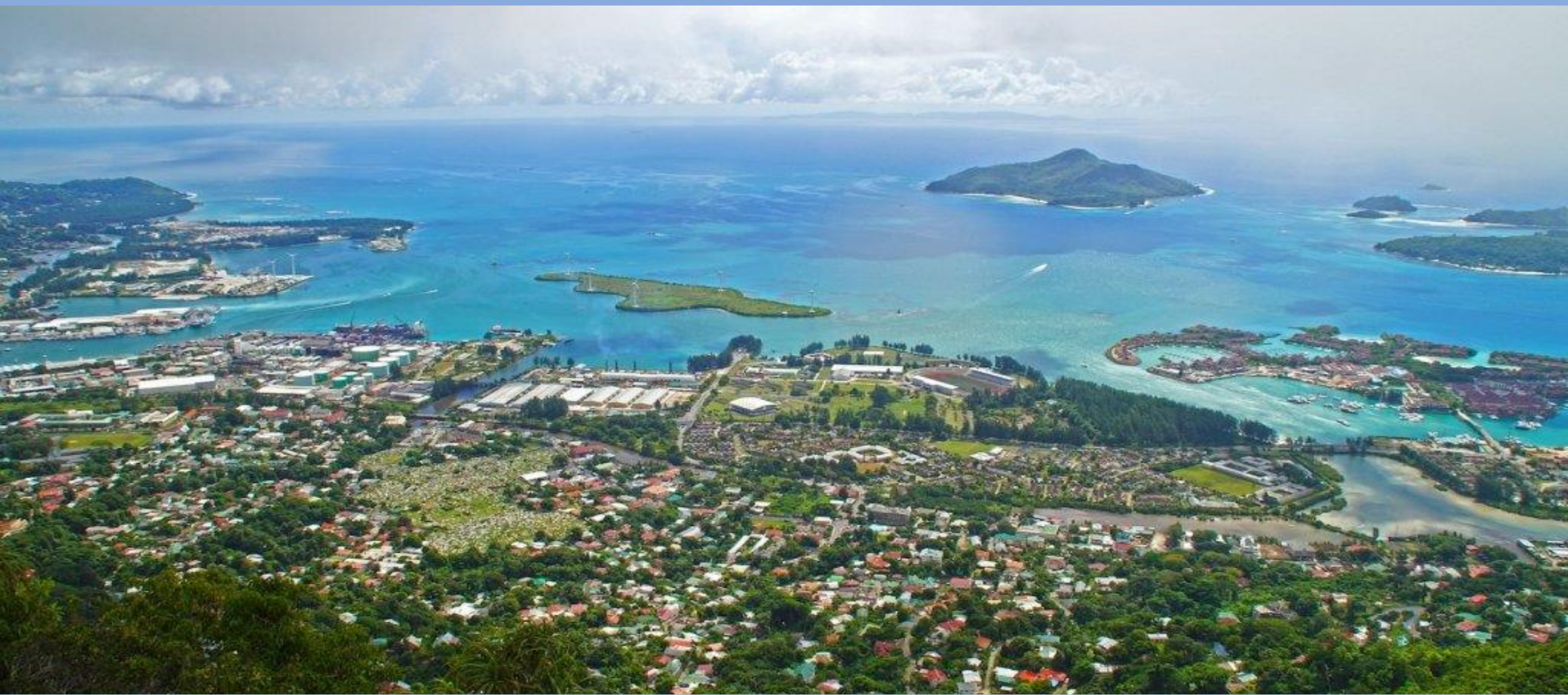
Probability of occurring in next 10-20 years: 8 out of 10



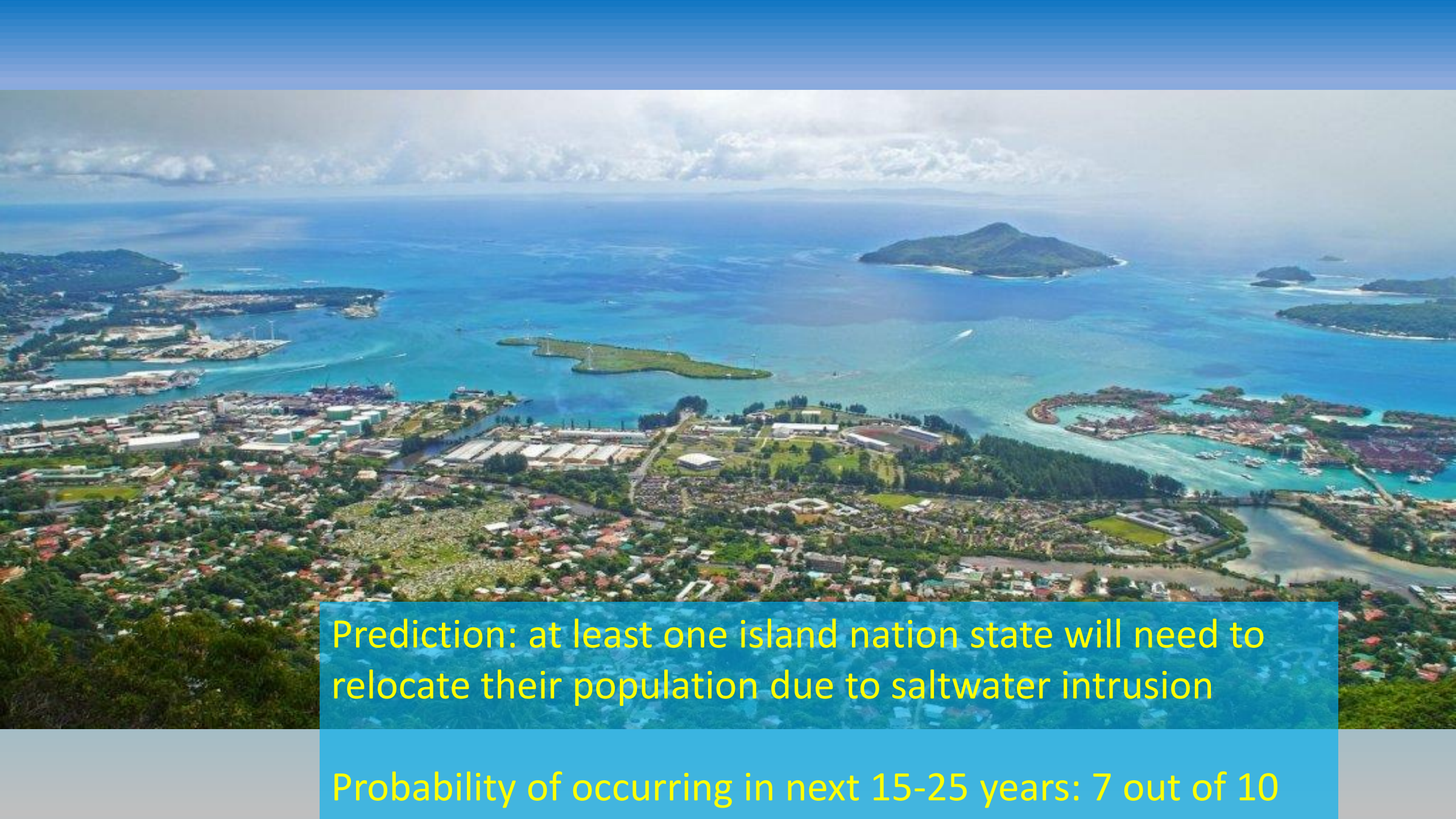












Prediction: at least one island nation state will need to relocate their population due to saltwater intrusion

Probability of occurring in next 15-25 years: 7 out of 10



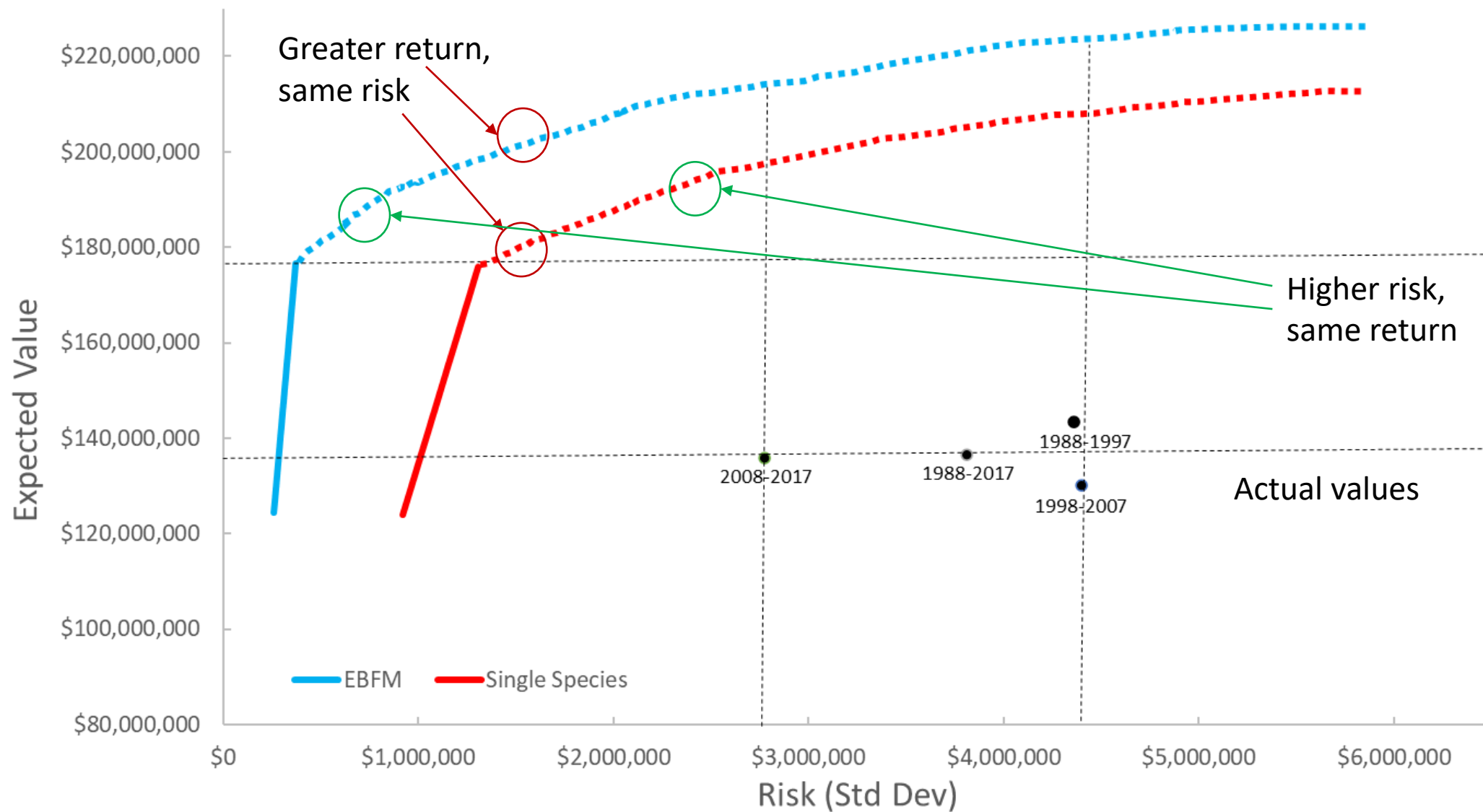






Courtesy Dickey-Collas et al. 2016, ICES JMS

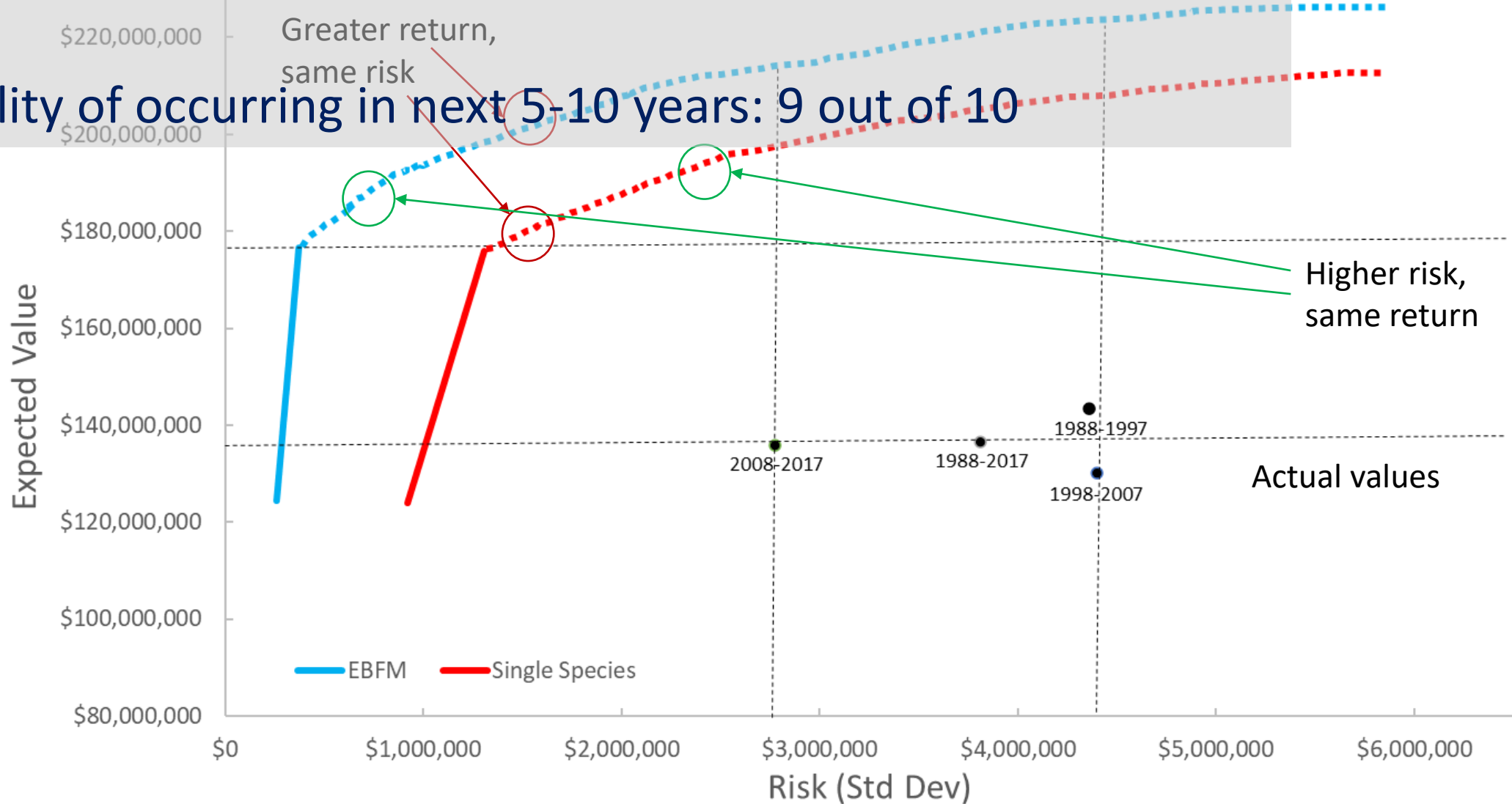






Prediction: loss of anywhere from one-half to two billion dollars due to lack of coordination across ocean use sectors

Probability of occurring in next 5-10 years: 9 out of 10





# 9 Prophecies...

1. Distribution shifts
2. Tropical crunch
3. Open Arctic
4. More nasty stuff
5. More cage matches
6. Can't always dodge hurricanes
7. Sea level rise
8. Wither Island States
9. We're leaving money on the table

Plus, there's more...



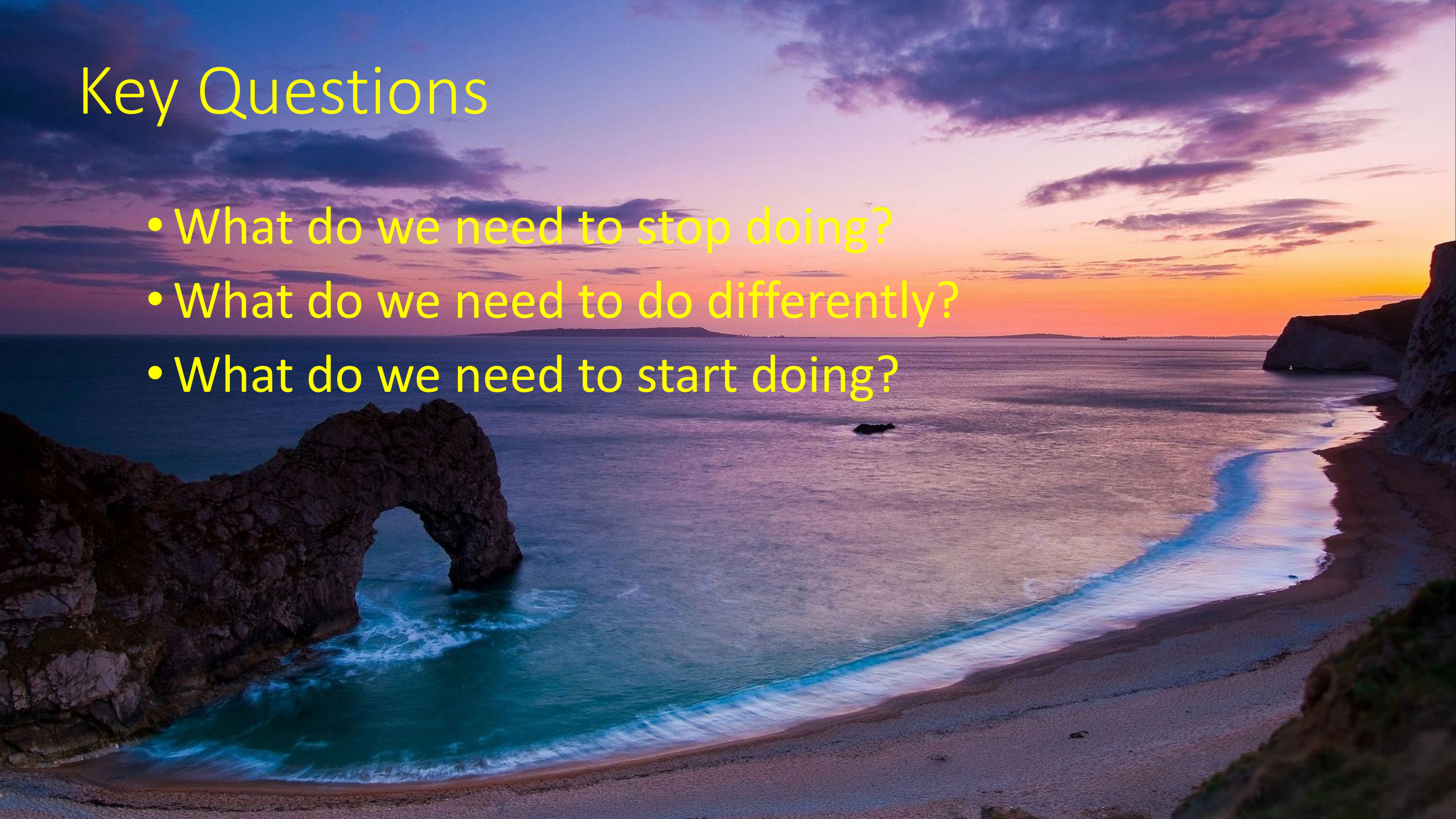
# Common solutions





# Key Questions

- What do we need to stop doing?
- What do we need to do differently?
- What do we need to start doing?





# Key Questions

- What do we need to stop doing?
- What do we need to do differently?
- What do we need to start doing?

Prediction: we will rise to the challenge and find solutions to these other Predictions

Probability of occurring in next 10-20 years: ? out of 10



# Take Aways

- We are facing unprecedented and impactful changes
- We know enough to act
- We can most effectively do so by pulling together

# Thank you!

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