

Groundfish Stock Status and Stock Assessment Process

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Background

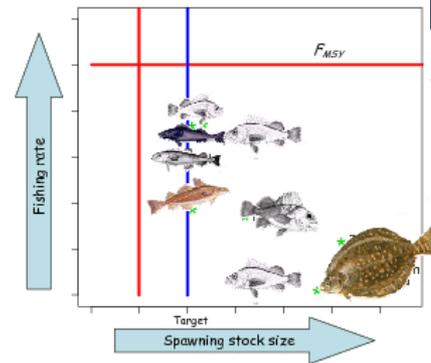


- Stock Assessment Science
 - NY Department of Environmental Conservation
 - MA Division of Marine Fisheries
 - NOAA/NMFS Northeast Fisheries Science Center
- Professor at SMAST
 - Stock assessment
 - Stock structure, movement and spatially explicit population models
- New England Fishery Management Council's Scientific and Statistical Committee
- International Council for the Exploration of the Sea, Strategic Initiative on Stock Assessment Methods

Outline



- Stock Assessment
- Stock Assessment Process
- Groundfish Stock Status
- My Perspectives
- Discussion



Stock Assessment

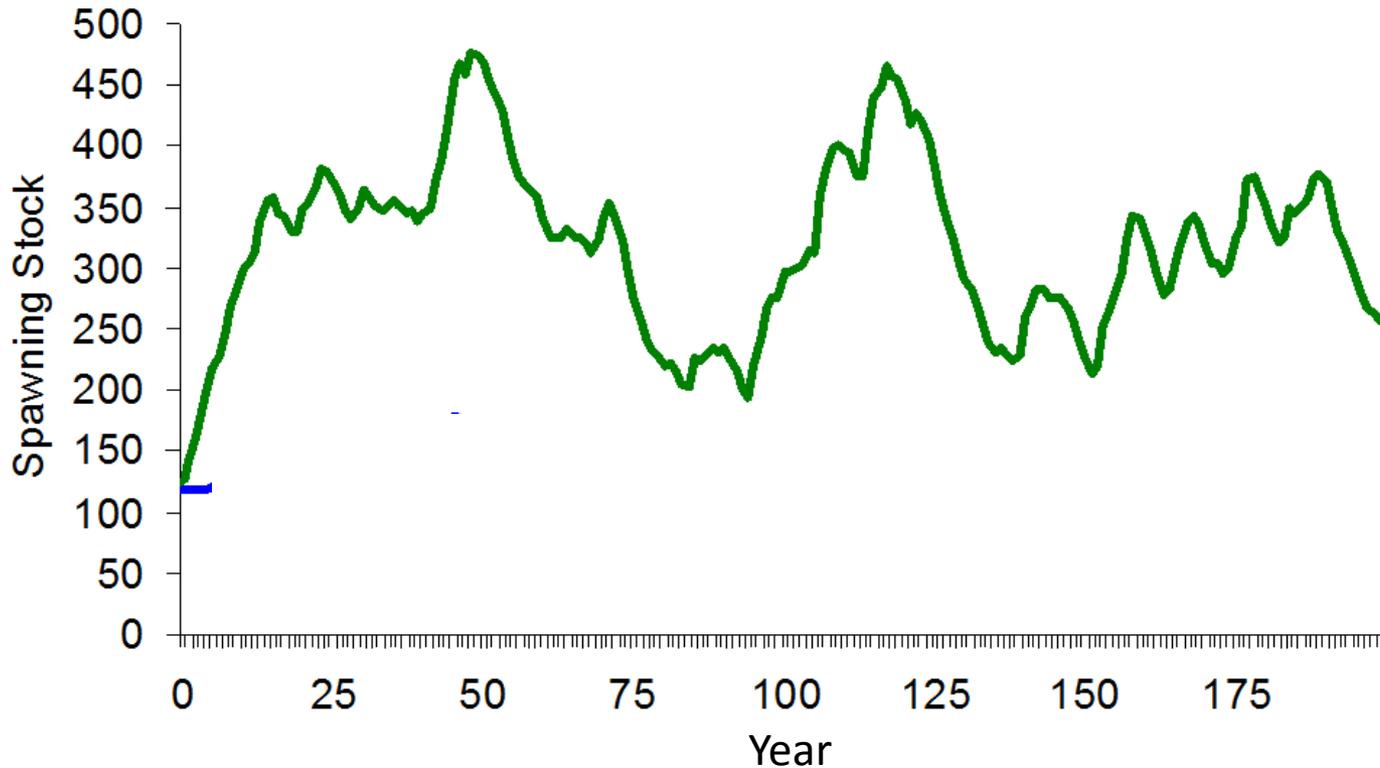


- Fish Populations and Fisheries
- Data
 - Fishery Monitoring
 - Resource Surveys
- Models
 - Estimating stock size and fishing mortality
 - Estimating overfishing and rebuilding reference points
- Management Advice
 - Stock Status
 - Catch Projections

Fish Populations



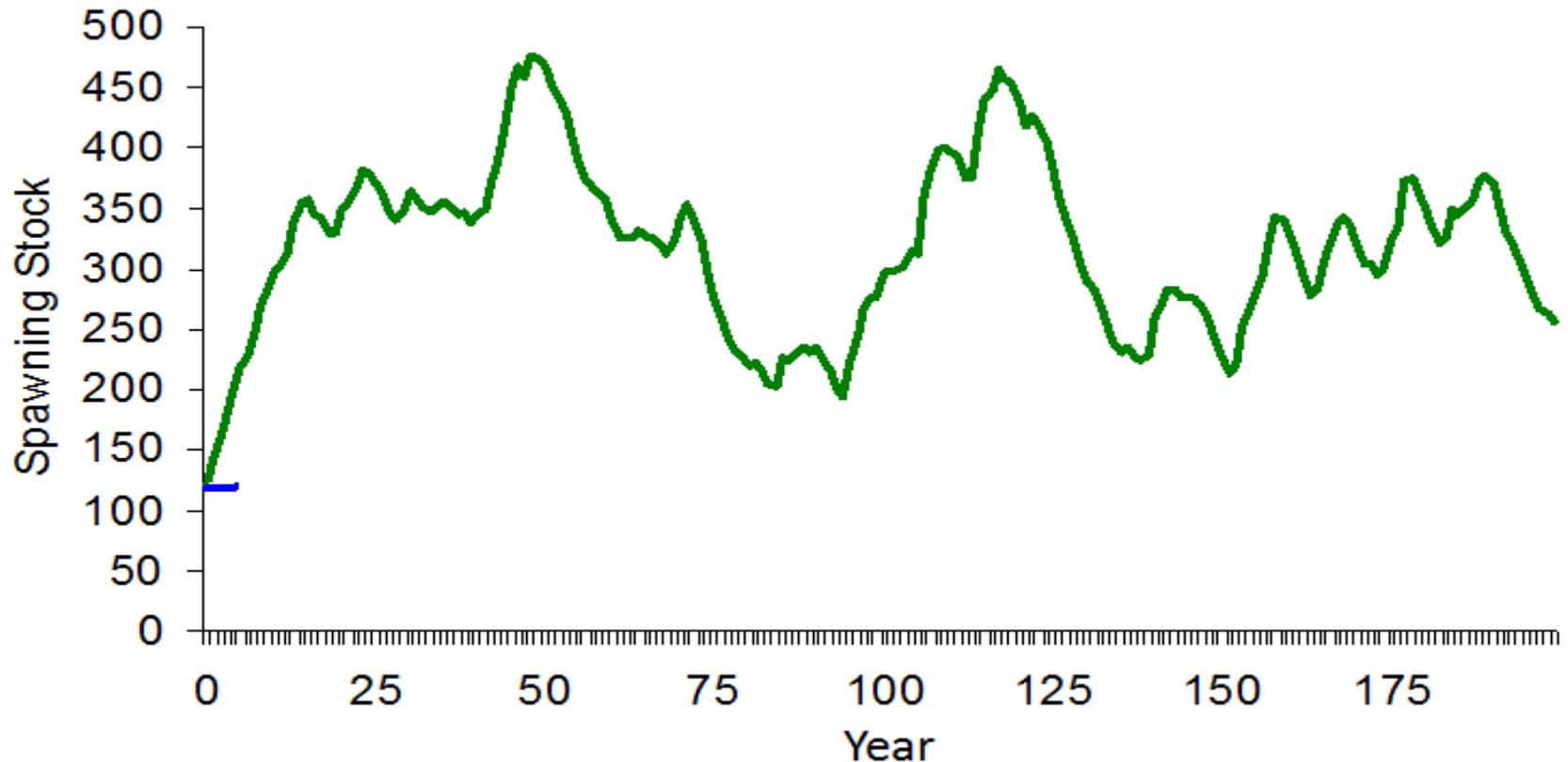
- Fish stocks increase and decrease from natural fluctuations (and fishing).



Fish Populations



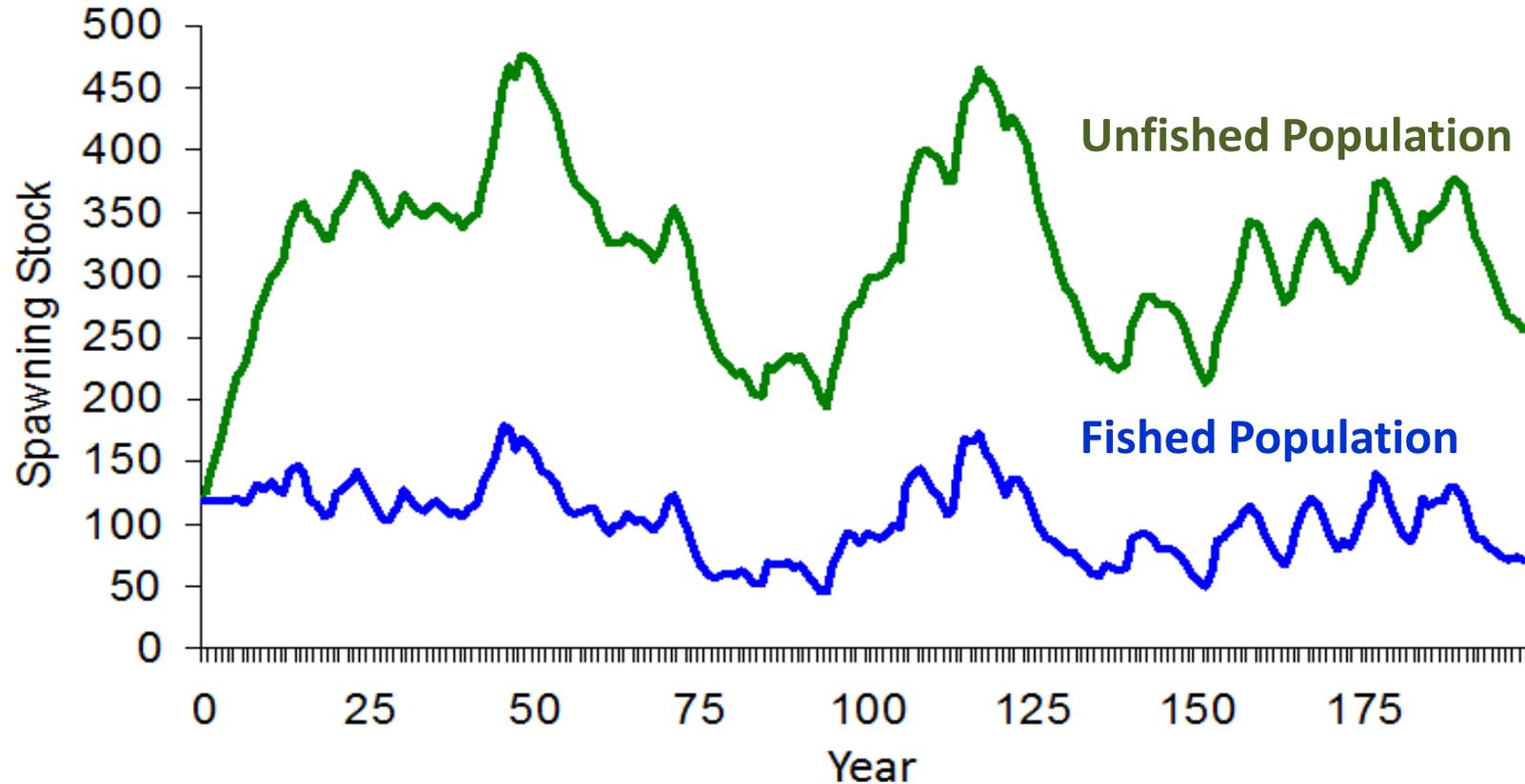
- Fish stocks change over time from mortality, growth of individual fish, and reproduction ('recruitment').



Fished Populations



- Fisheries remove some fish, leaving fewer survivors.



Fishery Monitoring



- Annual catch of fish is an important source of information for stock assessments:
 - Commercial landings (total census from dealer reports)
 - Commercial discards (samples from at-sea observers)
 - Recreational catch (samples from intercepts and phone surveys)
 - Size and age composition of catch (port and at-sea samples)



Resource Surveys



- Fish populations are sampled with research surveys
 - Relative trends in stock abundance or biomass
 - Size and age composition
 - Biological information (maturity, stomach contents, ...)
 - Environmental information (bottom temperature, salinity, ...)

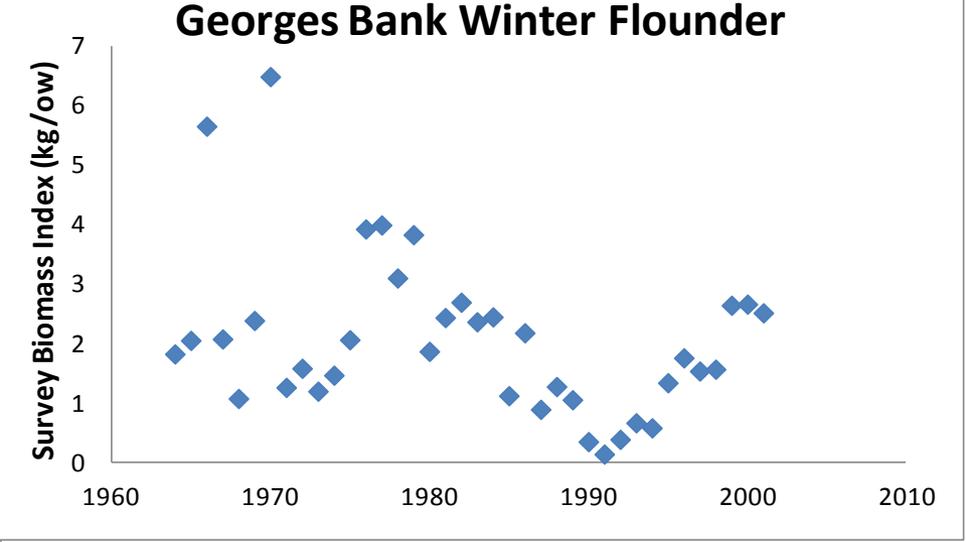
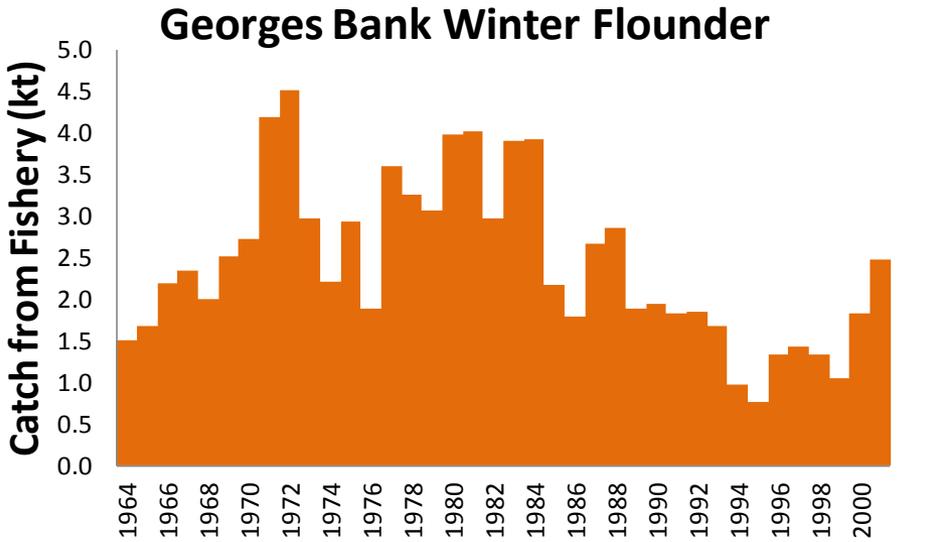


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Stock Assessment Data



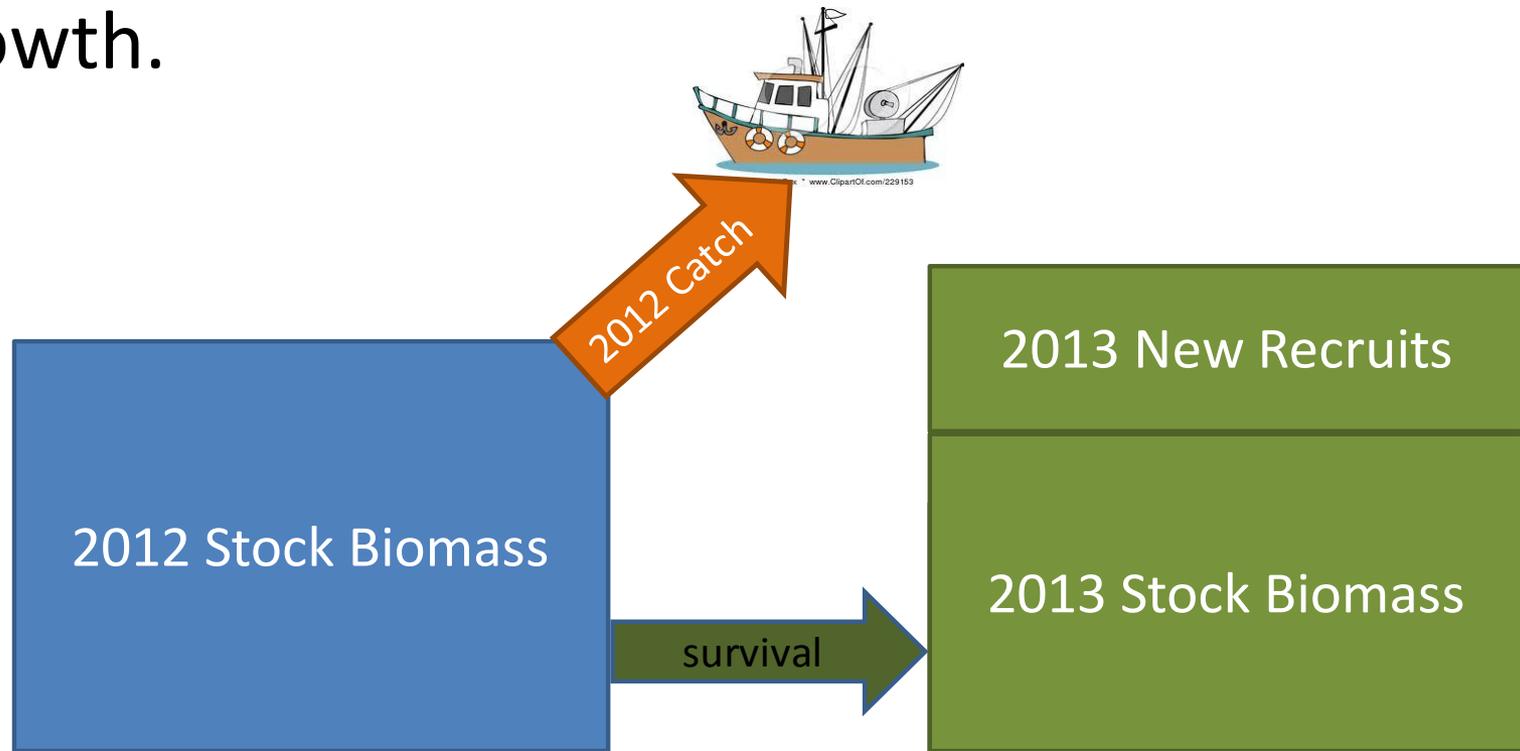
- Input data are fishery removals and relative trends from surveys.



Stock Assessment Model



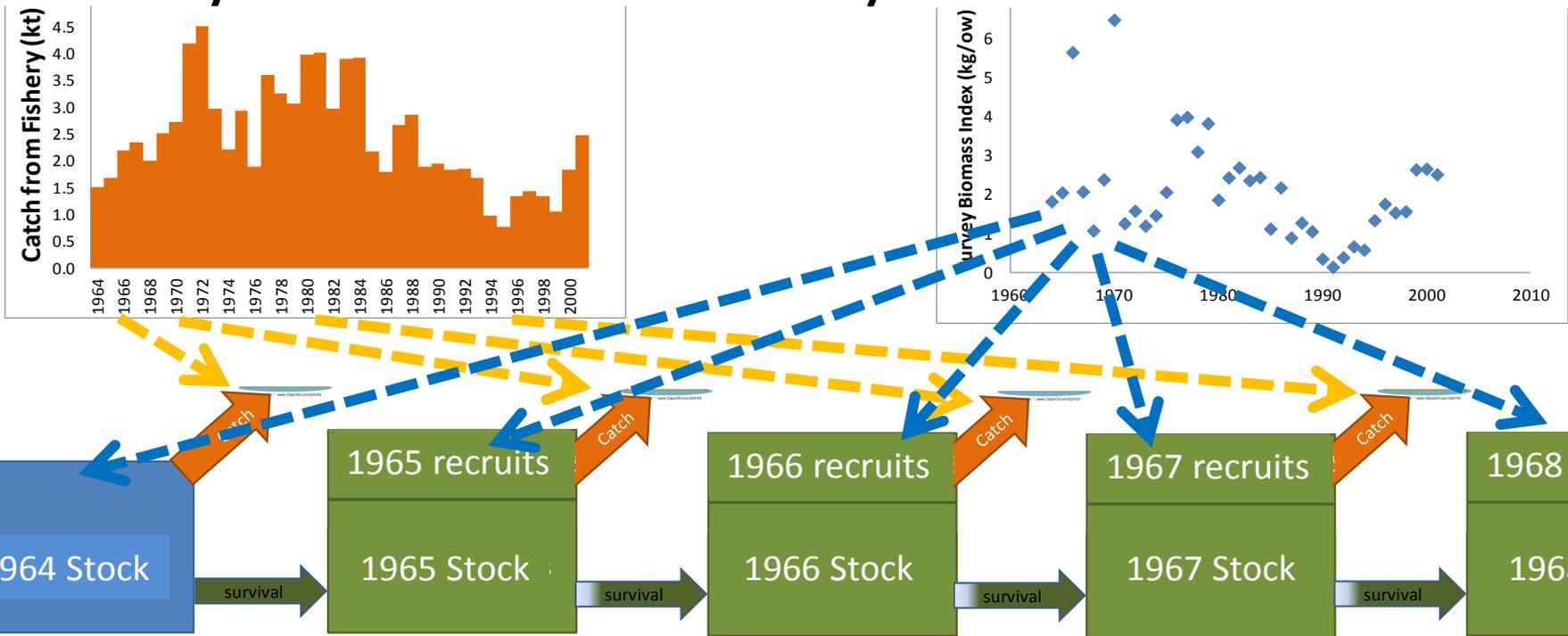
- A population model is developed to represent the stock accounting for all components of population growth.



Population Estimates



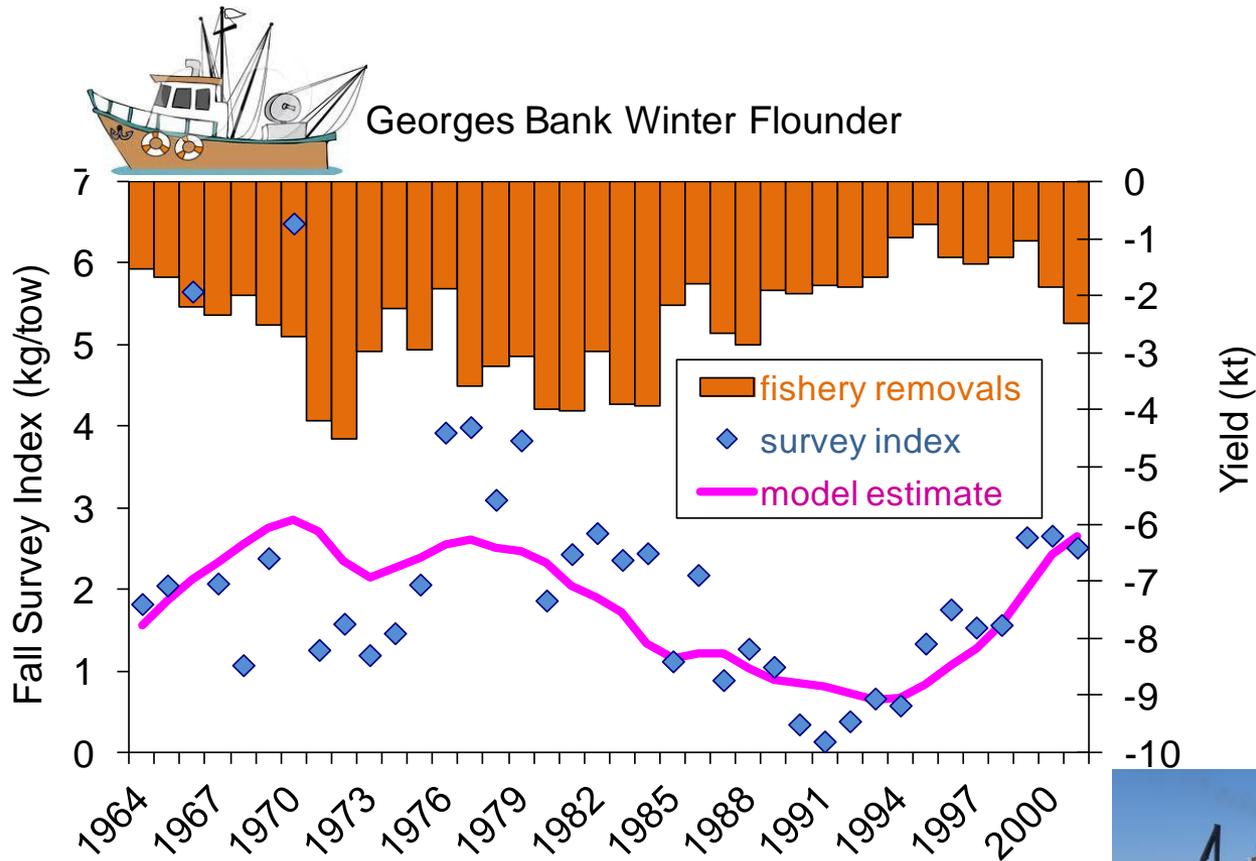
- Unknown population growth components are estimated by fitting the population model to the fishery removals and survey trends.



Population Estimates



- Population model doesn't fit data exactly, but smoothes variability in surveys.



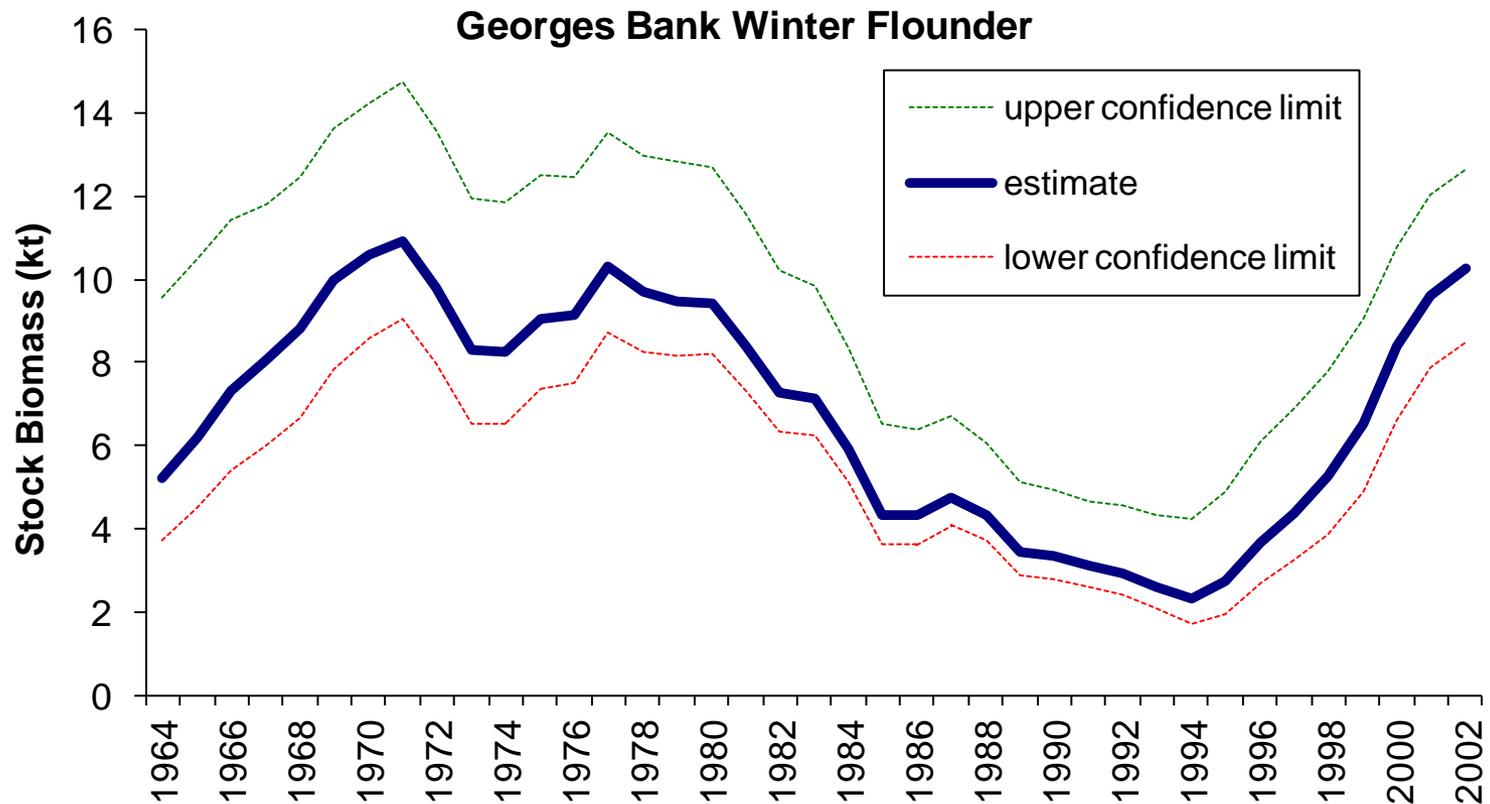
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Population Estimates



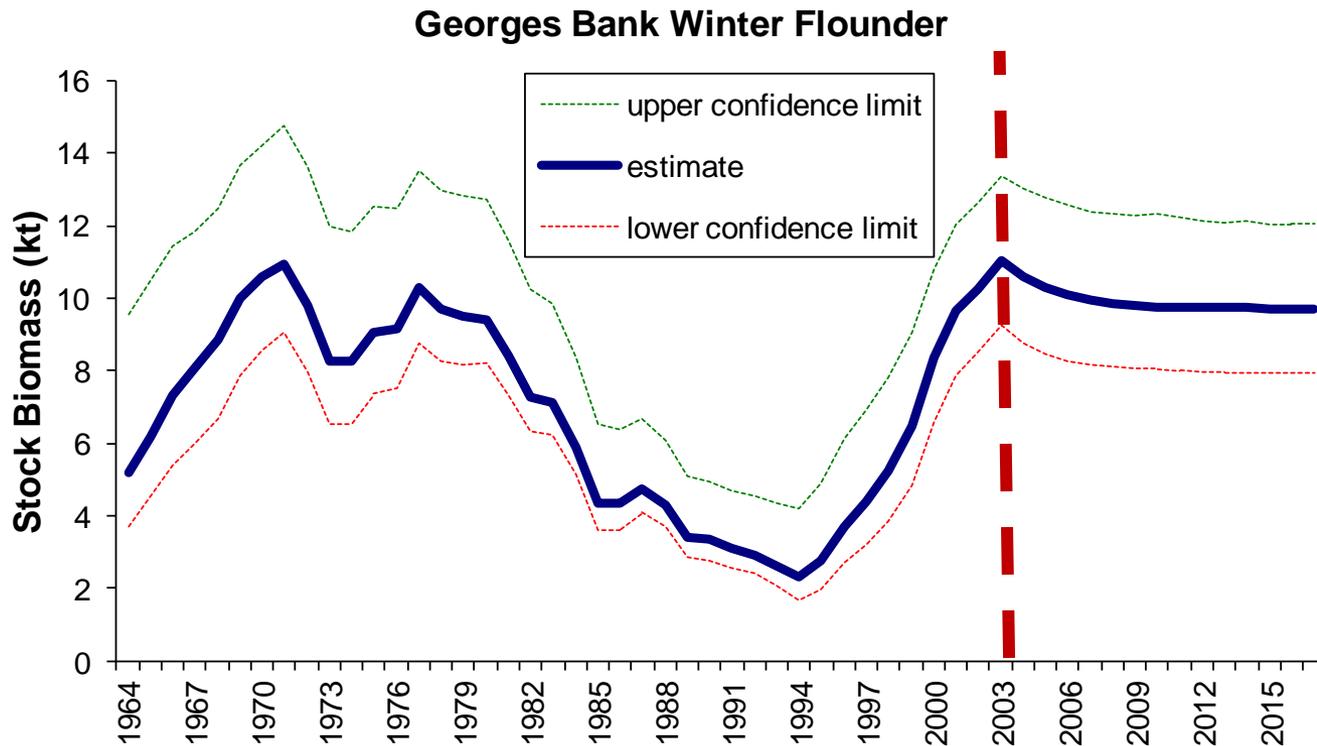
- Uncertainty in population estimates can be evaluated from how well the model fits the data.



Population Projections



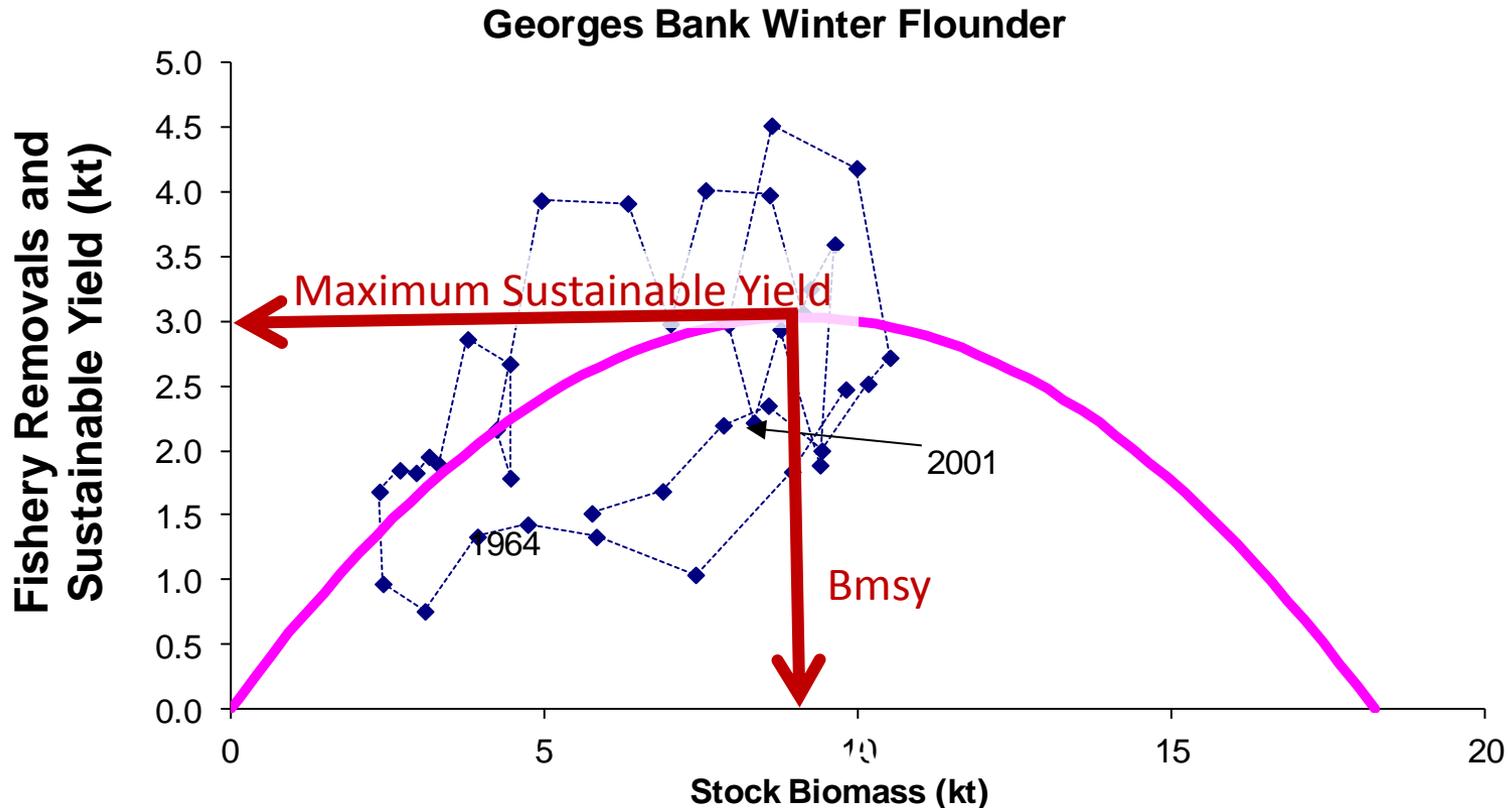
- With estimates of stock size, past population growth and uncertainty, the stock can be projected forward to evaluate alternative management scenarios.



Biological Reference Points



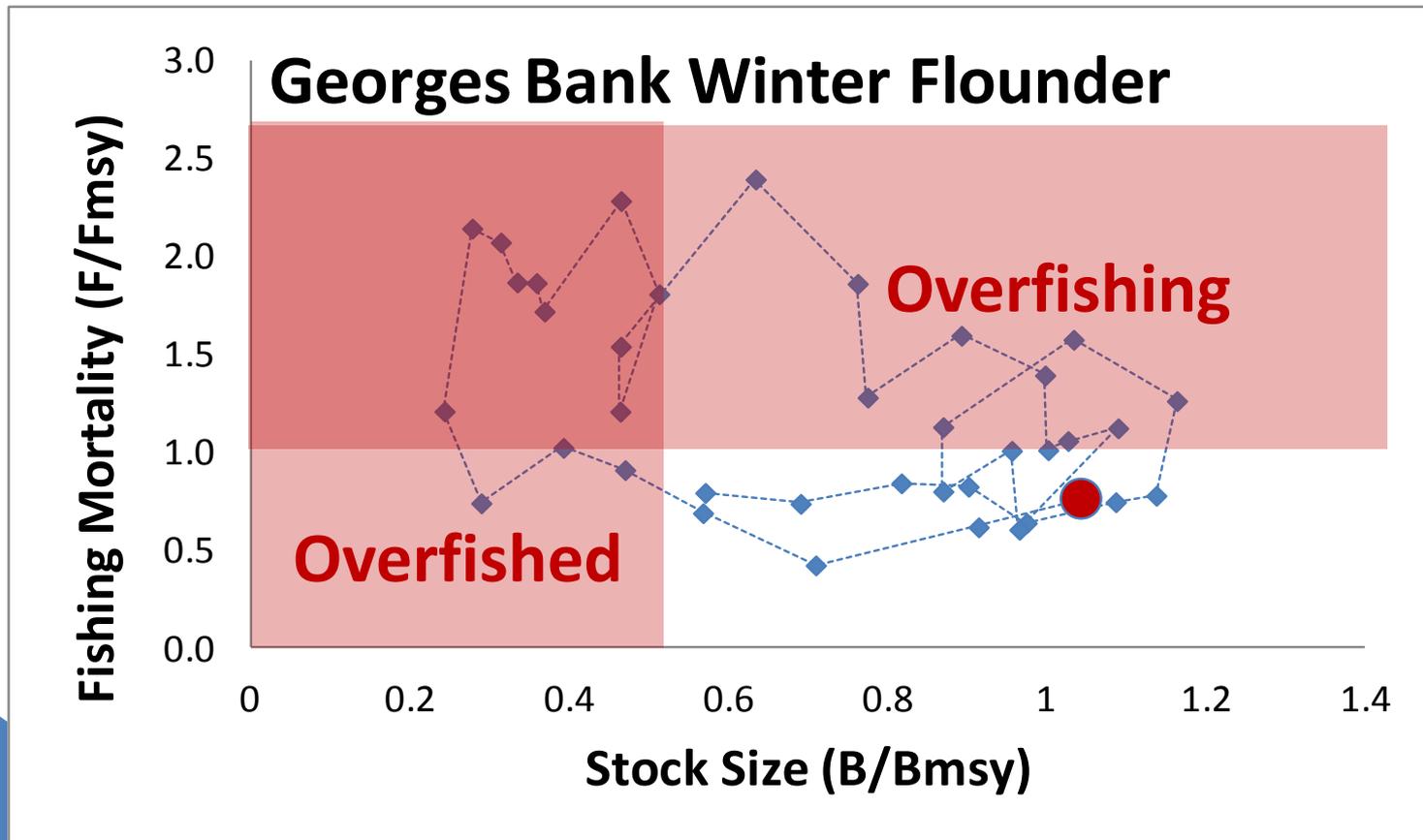
- Estimates of population growth can be used to determine the harvest rate (fishing mortality; F_{msy}) and stock size that produce maximum sustainable yield (B_{msy}).



Biological Reference Points



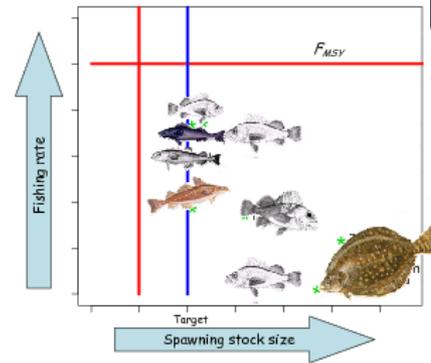
- Estimates of stock size and fishing mortality can be compared to estimates of B_{msy} and F_{msy} to determine stock status.



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- **Stock Assessment Process**
- Groundfish Stock Status
- My Perspectives
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The Stock Assessment Process



- National Standard 2 of the Magnuson-Stevens Fishery Conservation and Management Act mandates that *“Conservation and management measures shall be based upon the **best scientific information available.**”*
- Several initiatives have led to principles for evaluating best scientific information available:
 - Relevance
 - Inclusiveness
 - Objectivity
 - Transparency
 - Timeliness
 - Verification
 - Validation
 - Peer review

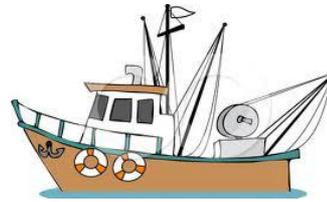
The Stock Assessment Process



- Northeast Regional Coordinating Committee
- Northeast Stock Assessment Workshop

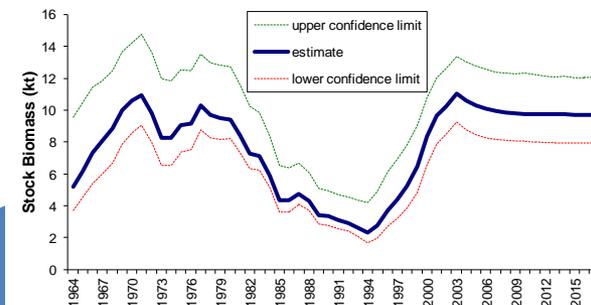
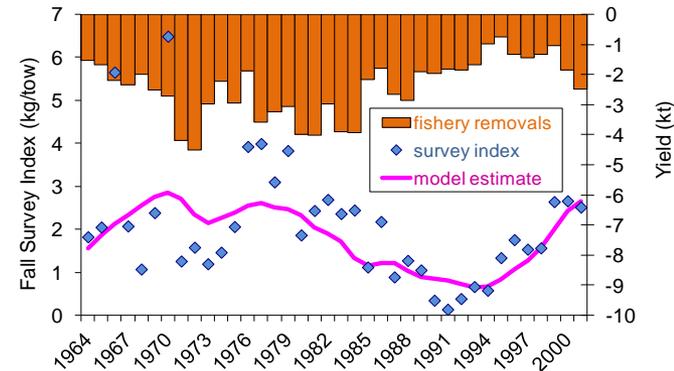
– Working Group

- (Fishermen's Meeting)
- Data Meeting
- Model Meeting
- (Reference Point Meeting)



– Stock Assessment Review Committee

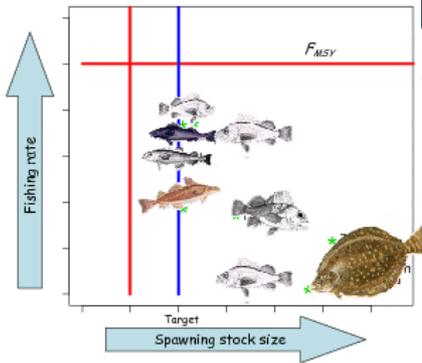
- Management processes vary



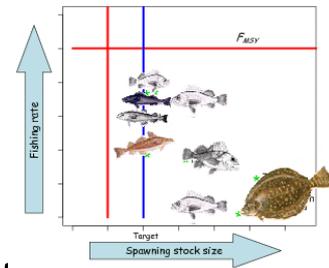
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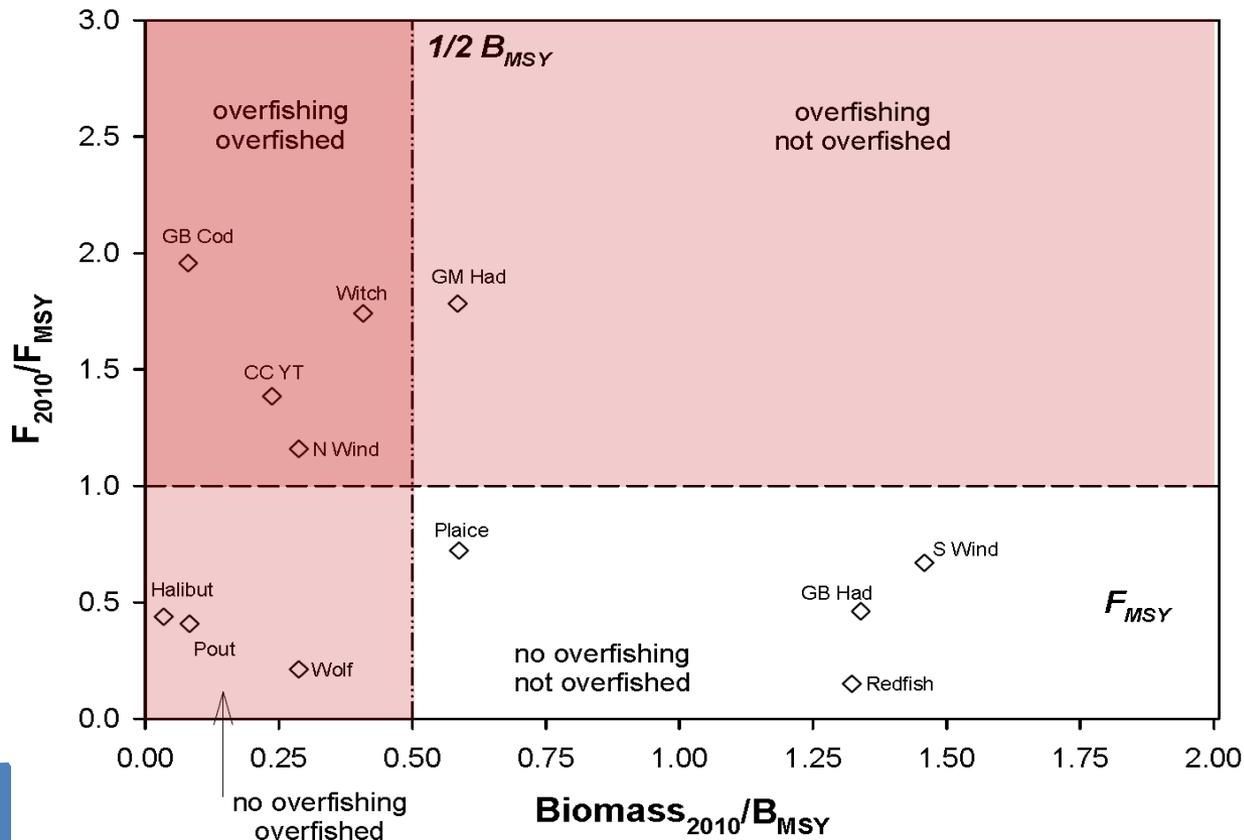


Groundfish Stock Status

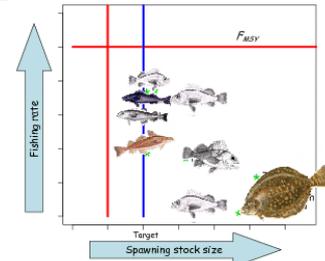


- In 2012 all groundfish assessments were updated.
- Seven stocks are overfished and five stocks are experiencing overfishing.

2010 Groundfish Stock Status



Overfished Stocks (44) – as of June 30, 2012



North Pacific:

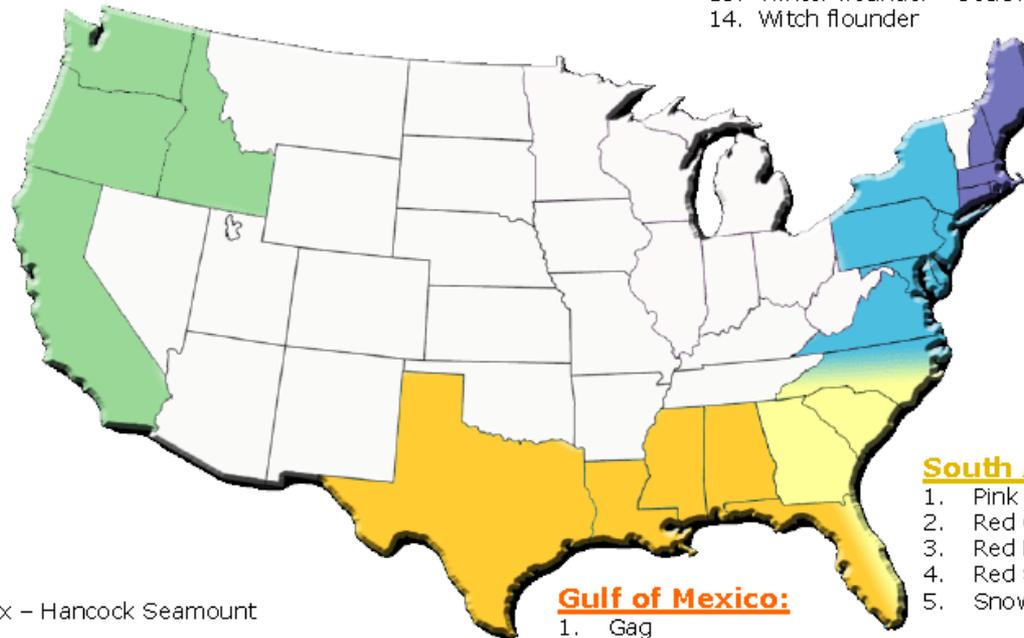
1. Blue king crab – Pribilof Islands
2. Southern Tanner crab - Bering Sea

New England:

1. Atlantic cod – Georges Bank
2. Atlantic cod – Gulf of Maine
3. Atlantic halibut
4. Atlantic salmon¹
5. Atlantic wolffish¹
6. Ocean pout
7. Thorny skate
8. White hake
9. Yellowtail flounder – Georges Bank
10. Yellowtail flounder – Southern New England/Mid-Atlantic
11. Yellowtail flounder – Cape Cod/Gulf of Maine
12. Windowpane – Gulf of Maine/Georges Bank
13. Winter flounder - Southern New England/Mid-Atlantic
14. Witch flounder

Pacific:

1. Canary rockfish
2. Cowcod
3. Pacific ocean perch
4. Chinook salmon - California Central Valley; Sacramento (fall)¹
5. Yelloweye rockfish



Highly Migratory Species:

1. Albacore – North Atlantic²
2. Blacknose shark
3. Blue marlin – Atlantic²
4. Bluefin tuna – West Atlantic²
5. Dusky shark
6. Porbeagle shark
7. Sandbar shark
8. White marlin – Atlantic²
9. Scalloped hammerhead – Atlantic¹

Western Pacific

1. Seamount Groundfish Complex – Hancock Seamount

Gulf of Mexico:

1. Gag
2. Gray triggerfish
3. Greater amberjack
4. Red snapper

South Atlantic:

1. Pink Shrimp
2. Red Grouper
3. Red Porgy
4. Red Snapper
5. Snowy Grouper

Caribbean:

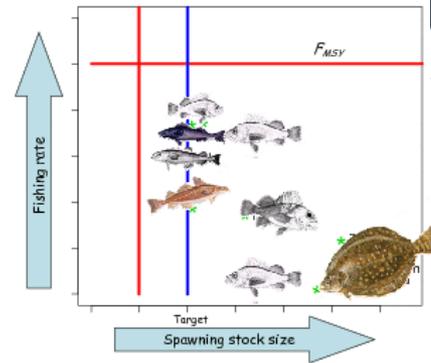
1. Grouper Unit 1
2. Grouper Unit 2
3. Grouper Unit 4
4. Queen conch



Outline



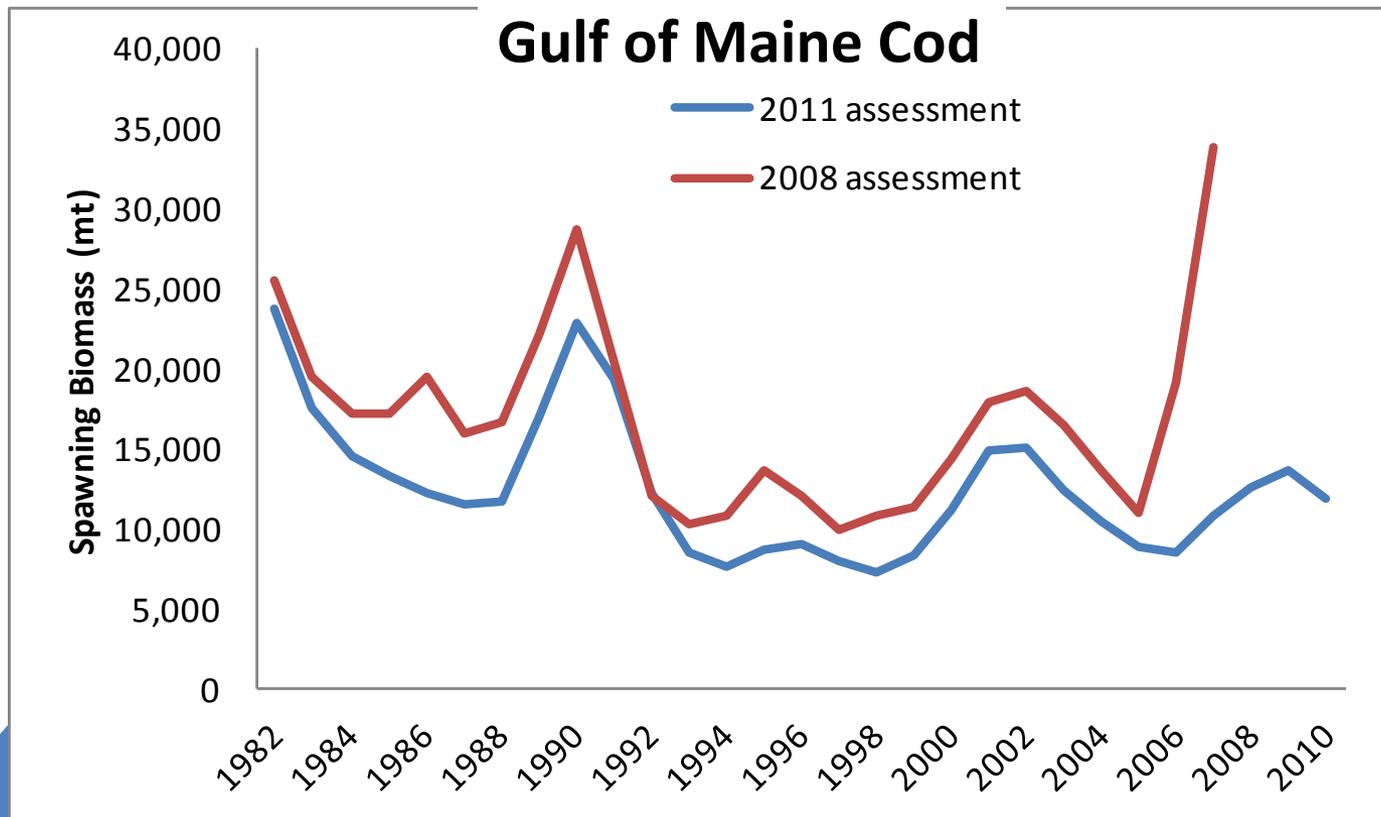
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My Perspectives



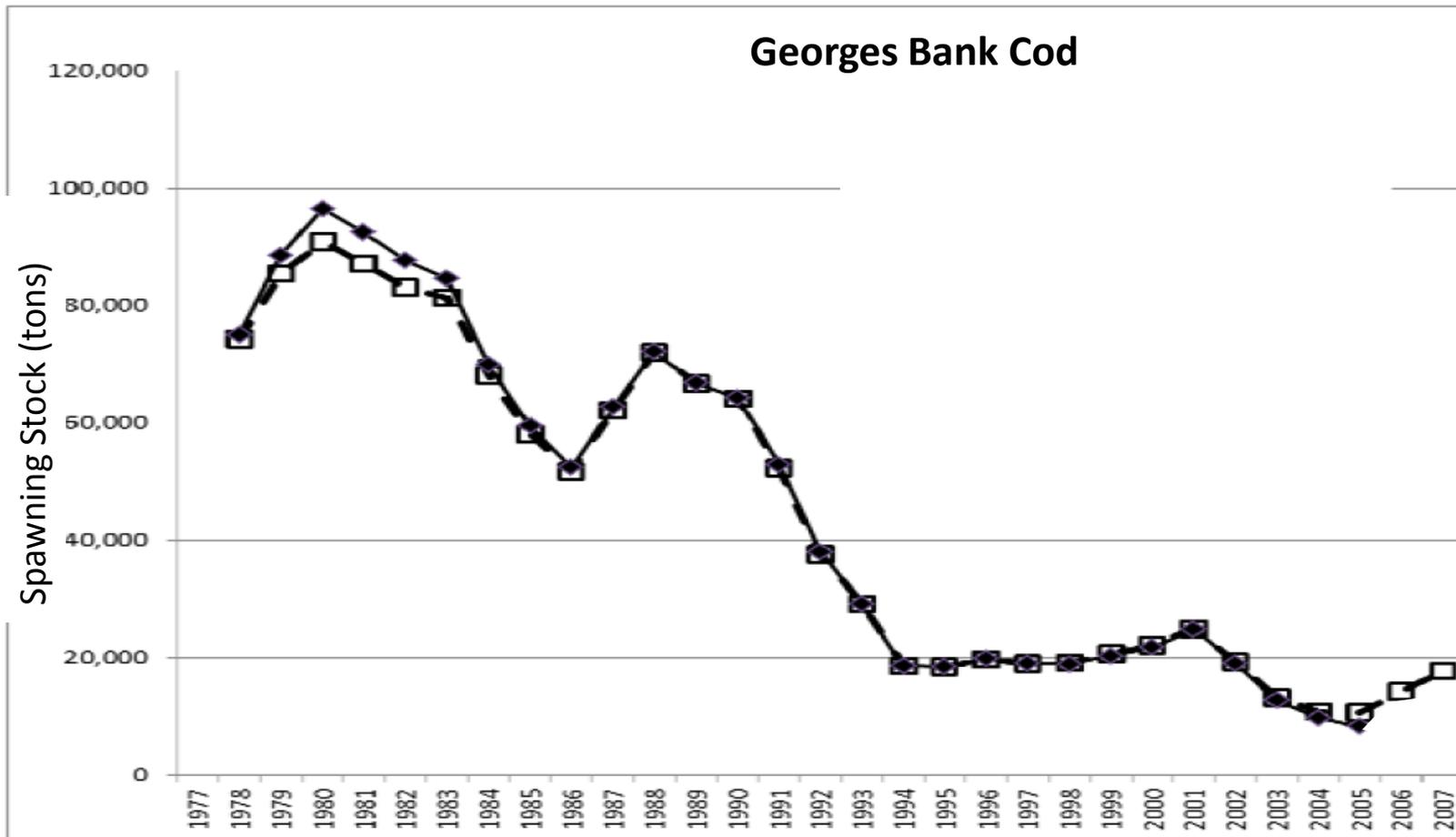
- Continued overfishing is not from improper fishery management nor from irresponsible fishing – it results from changes in estimates of stock size.



My Perspectives



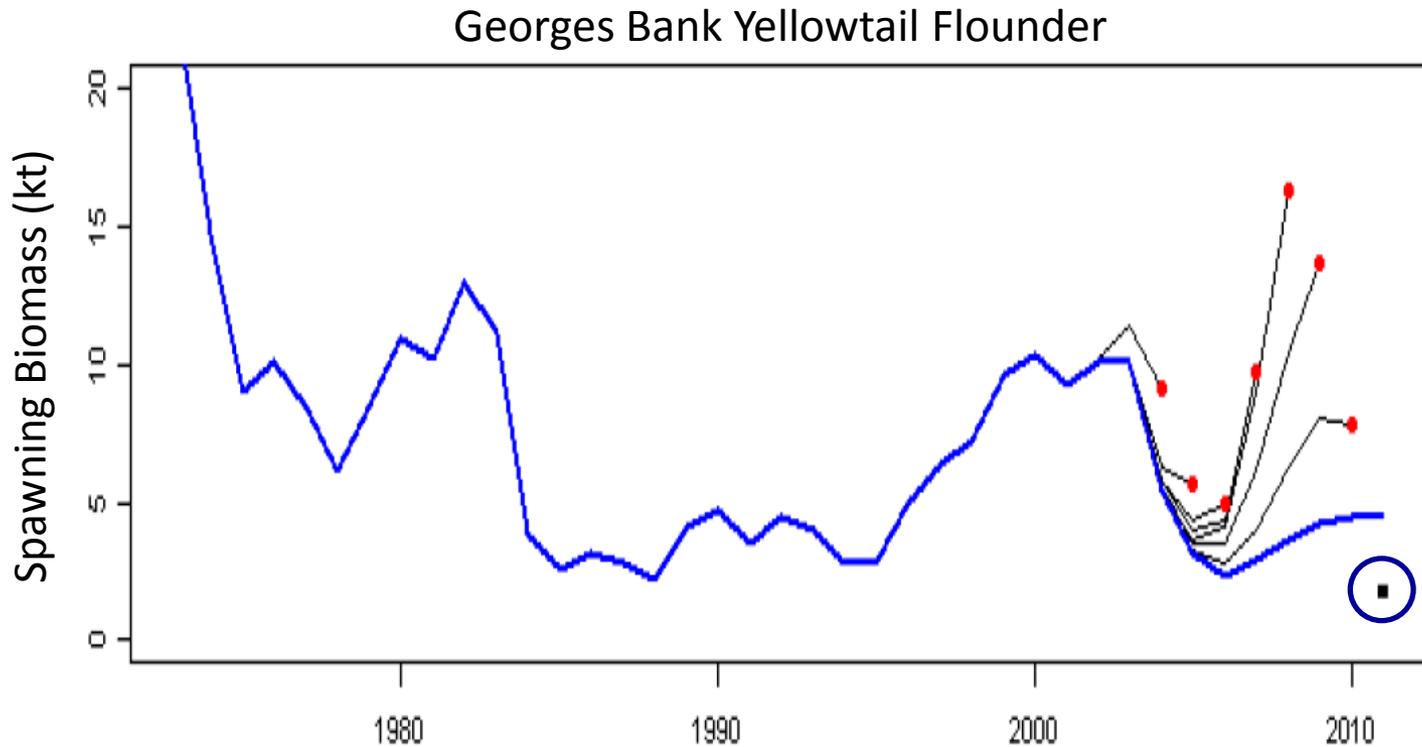
- Nearly all catch projections made in 2008 were found to be substantially wrong.



My Perspectives



- Retrospective patterns and scientific uncertainty lead to conservative catch limits.



My Perspectives



- Many New England stock assessments have severe ‘retrospective patterns’ (stock size is not what we thought it was).
- The cause of abrupt shifts in stock perceptions is unknown.
- The current stock assessment workshop process focuses on one stock at a time.
- **A systematic review of all aspects of stock assessment is critically needed.**

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