NOAA FISHERIES SERVICE

SAW/SARC-50 Summary

Presentation: August, 2010

SAW/SARC Process

1. **SAW Working Groups (WG): S. Demersal; Invert.; N. Demersal**

2. **External Peer Review Panel: Center of Independent Experts (CIE) + SSC.**

   - Emphasis on reviewing just the science/assessment.

3. **Products: (Reviewer's Reports) + (2 Science Reports)**
   http://www.nefsc.noaa.gov/nefsc/saw/ (see SAW50)
   http://www.nefsc.noaa.gov/publications/ (see Ref. Docs.)

4. **Management advice:**
   - **SAW/SARC reports support SSC in making ABC recommendation.**
   - **Management Advice developed by Tech. Committees, PDTs, SSC.**

The 50th Northeast Regional Stock Assessment Review Committee (50th SARC)

Stephen H. Clark Conference Room – Northeast Fisheries Science Center
Woods Hole, Massachusetts
June 1-6, 2010

SARC Chairman:
Mr. Robert O'Boyle
(BetaSci.; NEFMC SSC)

SARC Panelists:
Dr. Patrick Sullivan
(Cornell U., NEFMC SSC)

Dr. Michael Bell
(Heriot-Watt U., UK; CIE)

Dr. Kurtis Trzcinski
(Nova Scotia, CA, CIE)

Mr. John Wheeler
(Newfoundland, CA; CIE)

A. Monkfish
B. Sea scallop
C. Pollock

Monkfish

Photo: Mark Dixon, NOAA NOS

Monkfish

TORs (1)

1. **Characterize the commercial catch including landings, effort, LPUE and discards. Describe the uncertainty in these sources of data.**

2. **Report results of 2009 cooperative monkfish survey and describe sources of uncertainty in the data and results.**

3. **Characterize other survey data that are being used in the assessment (e.g., regional indices of abundance, recruitment, length data, state surveys). Describe the uncertainty in these sources of data.**

4. **Estimate annual fishing mortality, recruitment and stock biomass (both total and spawning stock) for the time series, and characterize the uncertainty of those estimates.**

5. **Update or redefine biological reference points (BRPs; estimates or proxies for B_{MSY}, $B_{THRESHOLD}$, and $F_{MSY;}$ and estimates of their uncertainty). Comment on the scientific adequacy of existing and redefined BRPs.**

6. **Evaluate stock status with respect to the existing BRPs, as well as with respect to updated or redefined BRPs (from TOR 5).**

Monkfish — TORs (2)

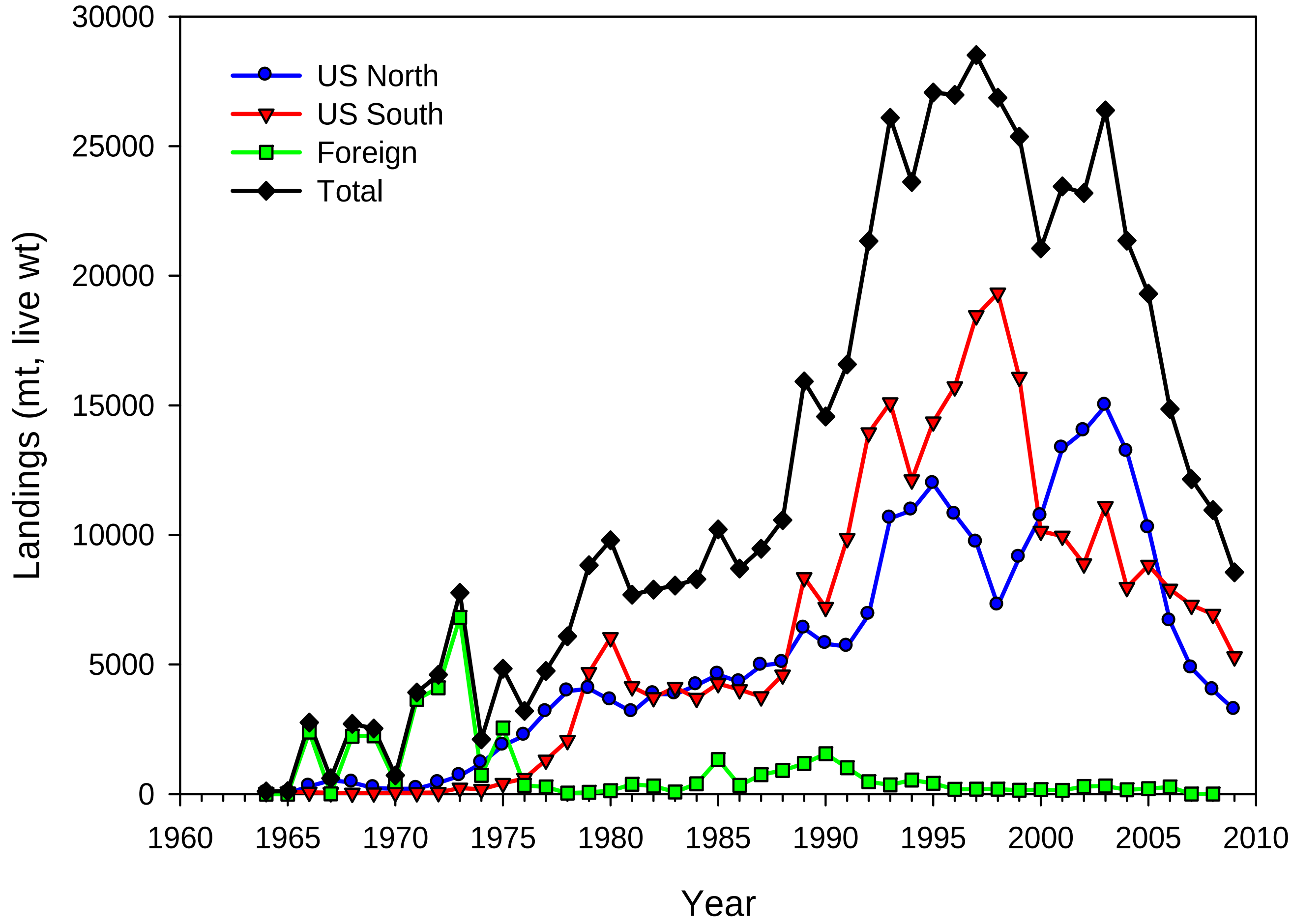
7. Evaluate monkfish diet composition data and its implications for population level consumption by monkfish.

8. Develop and apply analytical approaches and data that can be used for conducting single and multi-year stock projections and for computing candidate ABCs (Acceptable Biological Catch; see Appendix to the TORs).
   a. Provide numerical short-term projections (through 2016). Each projection should estimate and report annual probabilities of exceeding threshold BRPs for F, and probabilities of falling below threshold BRPs for biomass. In carrying out projections, consider a range of assumptions to examine important sources of uncertainty in the assessment.
   b. Comment on which projections seem most realistic, taking into consideration uncertainties in the assessment.
   c. Describe this stock's vulnerability to becoming overfished, and how this could affect the choice of ABC.

9. Review, evaluate and report on the status of the SARC and Working Group research recommendations listed in recent SARC reviewed assessments and review panel reports. Identify new research recommendations.

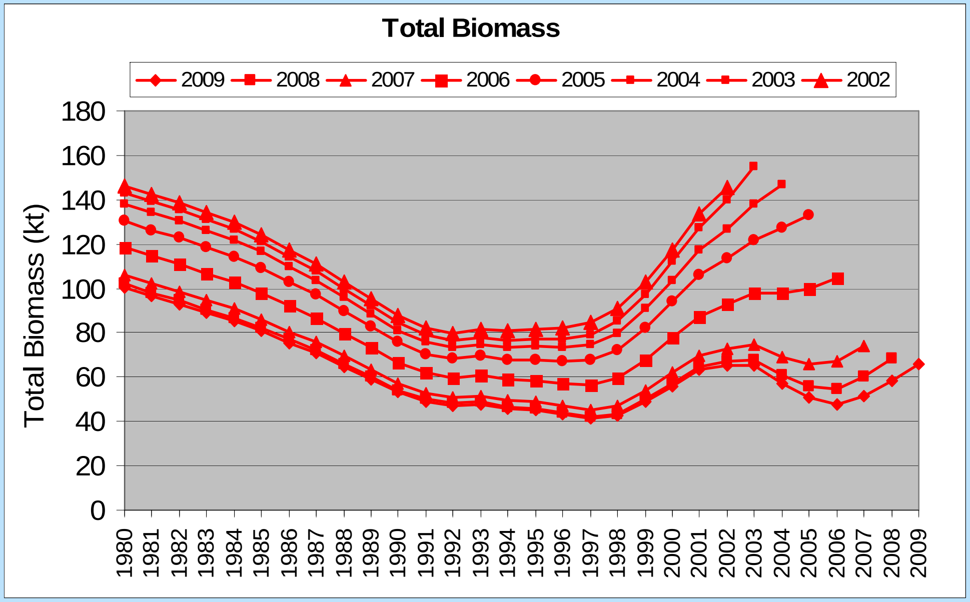
Monkfish

Landings ('64-'09)



Monkfish (N)

B



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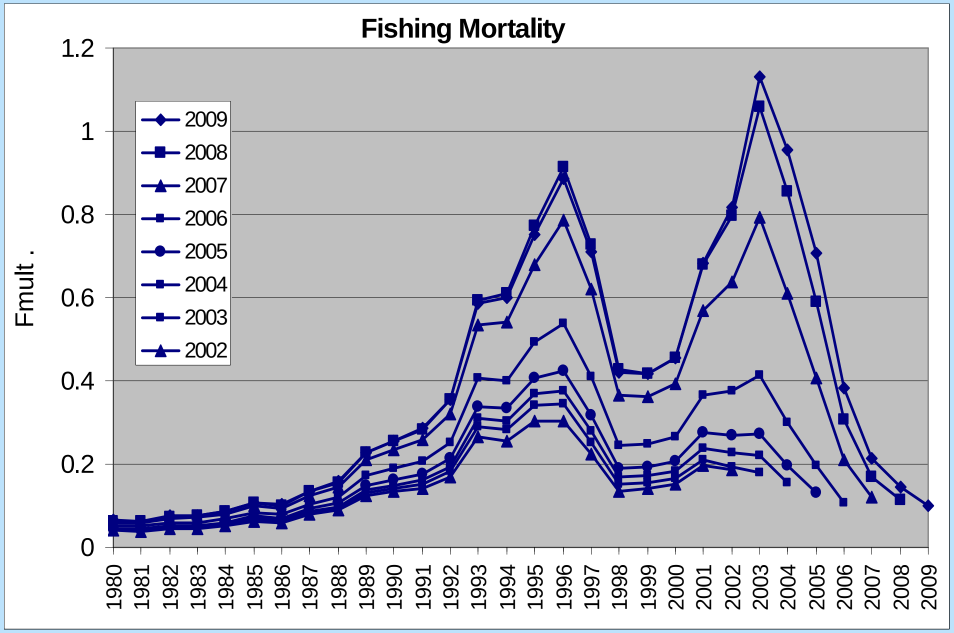
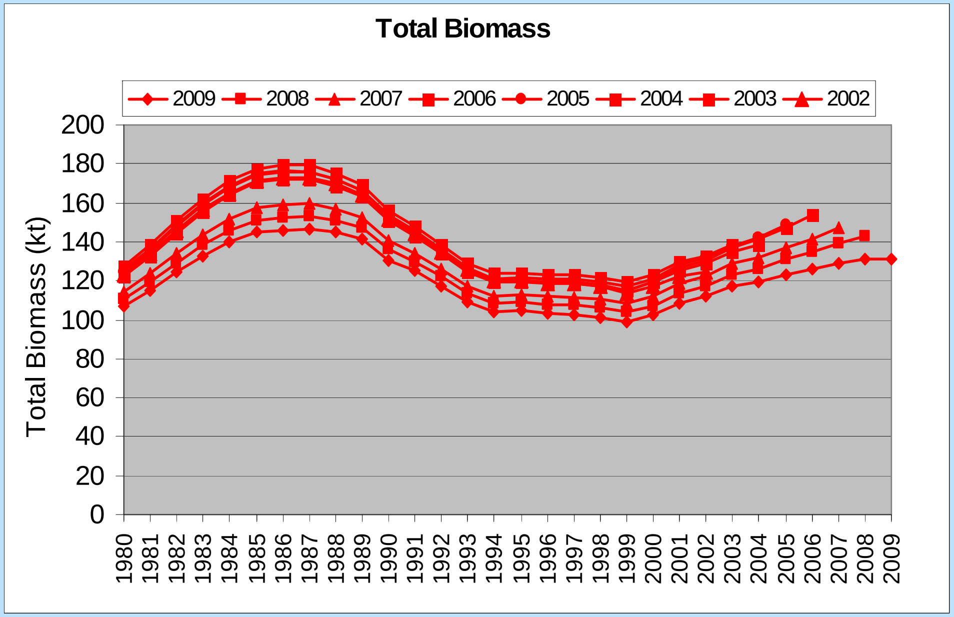


The Northern Area (SCALE)model has a very large retrospective pattern.

Monkfish (S)

B



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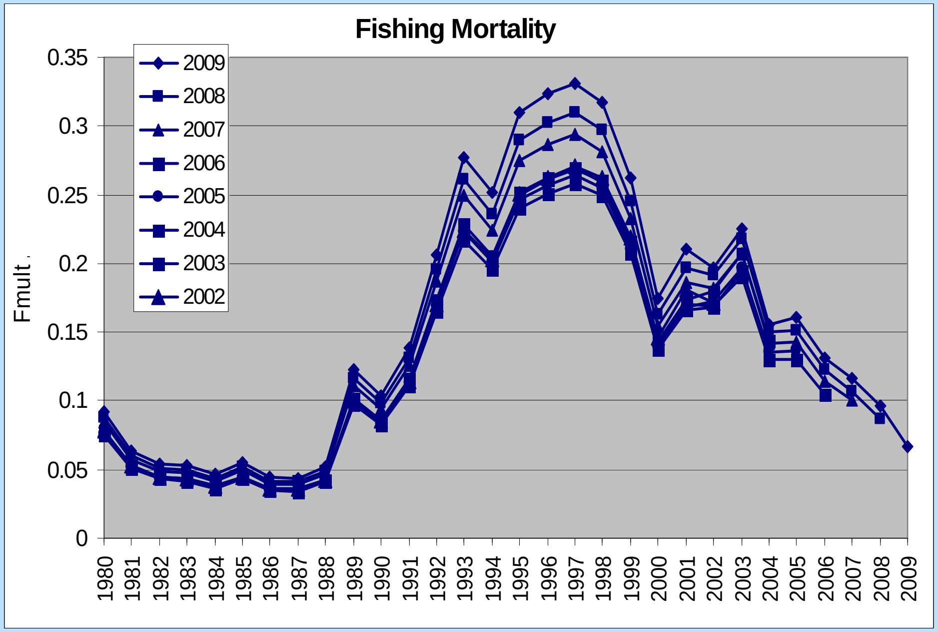


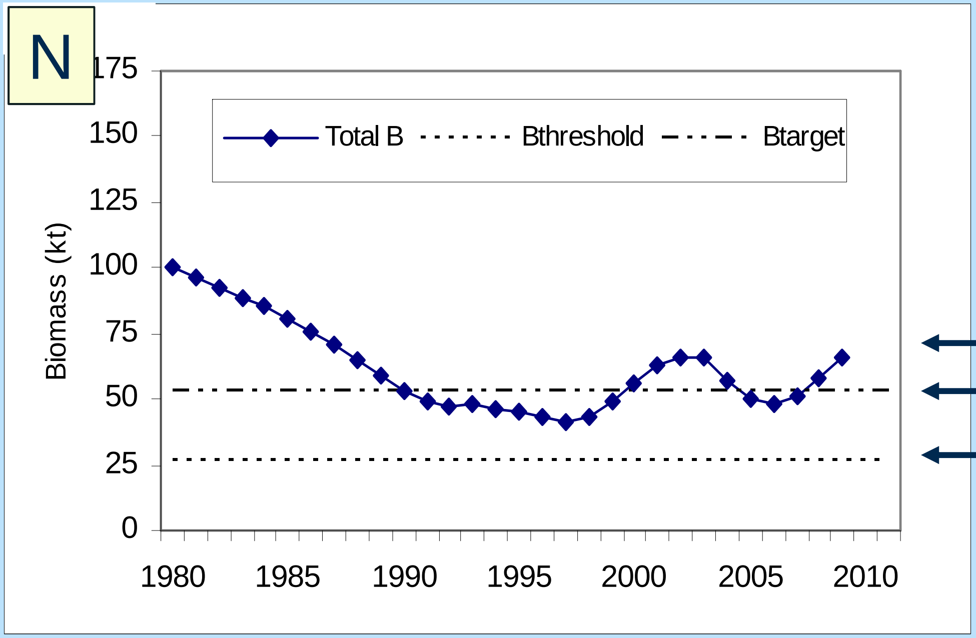
The Southern Area (SCALE) model has a smaller retrospective pattern.

Monkfish

Biological Ref. Pnts.

Management Area	BRP	Basis (Kmt)	NEFSC 2007	SAW-2010
Northern				
	Fmax	YPR	0.31	0.43
	Bthreshold	Bloss 1998-2006	65,200	
		0.5*Bmax Projected		26,465
	Btarget	Bavg 1998-2006	92,200	
		Bmax Projected		52,930
Southern				
	Fmax	YPR	0.4	0.46
	Bthreshold	Bloss 1998-2006	96,400	
		0.5*Bmax Projected		37,245
	Btarget	Bavg 1998-2006	122,500	
		Bmax Projected		74,490

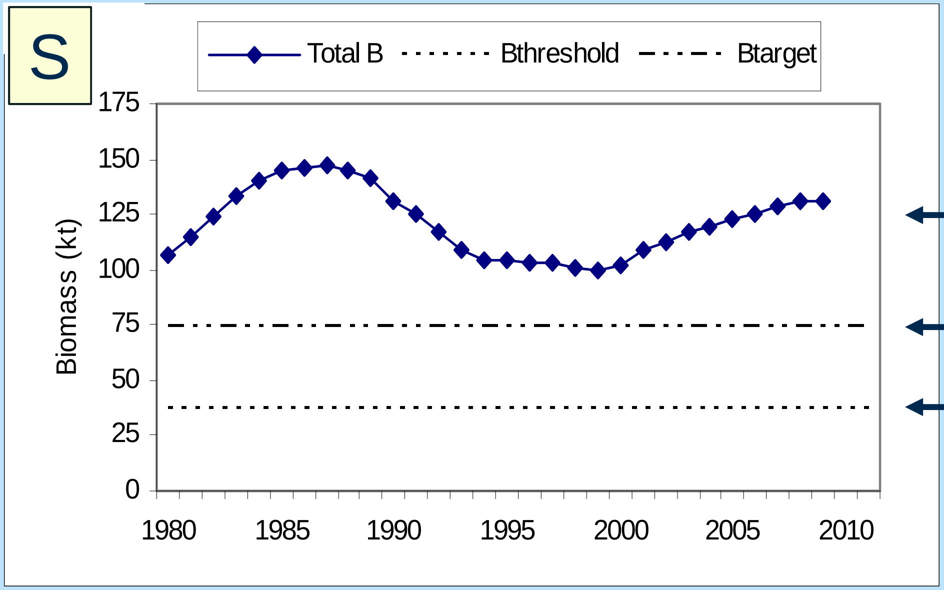
Monkfish	Stock Status – Not Overfished



B'09 = 66.1 kmt

Btarget = 52.9 kmt

Bthreshold = 26.4kmt



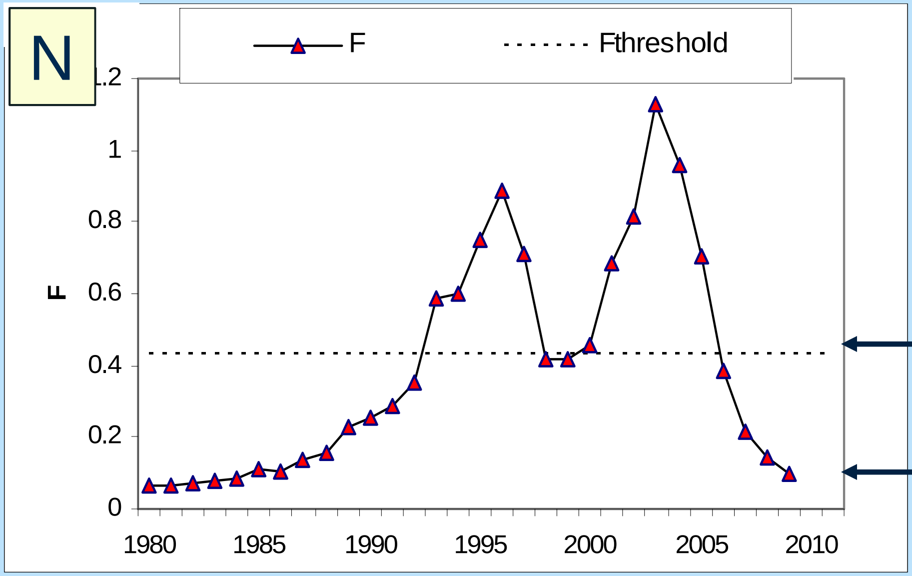
B'09 = 131.2 kmt

Btarget = 74.5 kmt

Bthreshold = 37.2 kmt

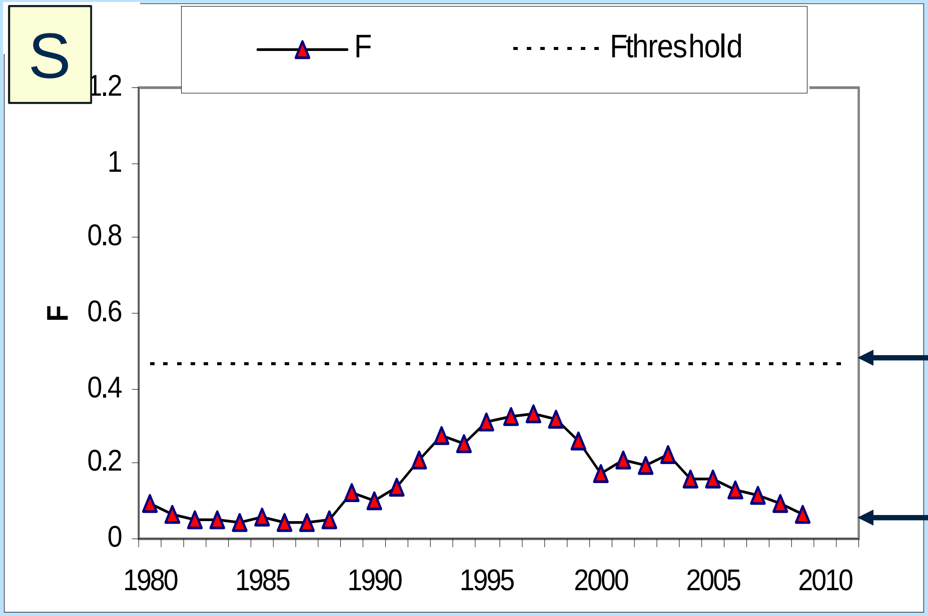
Monkfish

Status: NOT Overfishing



F-threshold, Proxy=0.43

F'09 = 0.10



F-threshold, Proxy=0.46

F'09 = 0.07

Monkfish Projections

Uncertainty in the current state of the northern management area makes it difficult to predict stock dynamics in that area.

Monkfish Consumption

Monkfish prey on mackerel, herring, squid, silver hake, and skates.

Monkfish	SARC Panel Comments (1)

+

- SCALE assessment model is superior to previously used survey-based approach.
- Future assessments should benefit from increased catchability of monkfish by *RV Bigelow*.
- Serious concerns about this assessment. High levels of uncertainty throughout. Not well characterized/documented.
- Aging and assumed natural mortality rate (M) uncertain.
- Catch has decreased in recent years, but length distribution has not expanded.

Monkfish

SARC Panel Comments (2)

- **Large retrospective pattern in northern management area model.**
- **2009 cooperative survey estimate is consistent with SCALE model adjusted for retrospective in northern management area.**
- **Recent retro patterns in “negative” direction. Indicates potential risks to resource. If retro is real, fishing at proposed NMA ACT likely to drive B below Bthreshold by 2016.**
- **Uncertainties in the assessment carry through into the BRPs, creating high uncertainty and low confidence in the latter.**
- **High level in projection uncertainty translates into high level of risk in using these projections.**
- **Cooperative surveys not used to the fullest, and deep sampling fell short.**

Monkfish	SARC Panel Recommendations

- **Take more systematic approach to examine and communicate uncertainty in model and consequences.**

- **SCALE model indicates increasing trend in abundance recently. BUT, this is not apparent in survey indices or fishery length frequencies. Panel is concerned. Confirming this trend through data exploration is needed as reality check on model results.**

- **Give priority to reducing uncertainties in age, growth and natural mortality of monkfish.**

Sea Scallops

Sea Scallop

TORs (1)

1. **Characterize the commercial catch including landings, effort, LPUE and discards. Describe the uncertainty in these sources of data.**

2. **Characterize the survey data that are being used in the assessment (e.g., regional indices of abundance, recruitment, state surveys, length data, etc.). Describe the uncertainty in these sources of data. Document the transition between the survey vessels and their calibration. If other survey data are used in the assessment, describe those data as they relate to the current assessment (Exclude consideration of future survey designs and methods).**

3. **Estimate annual fishing mortality, recruitment and stock biomass (both total and spawning stock) for the time series, and characterize the uncertainty of those estimates.**

4. **Update or redefine biological reference points (BRPs; estimates or proxies for B_{MSY}, $B_{THRESHOLD}$, and $F_{MSY;}$ and estimates of their uncertainty). Comment on the scientific adequacy of existing and redefined BRPs.**

5. **Evaluate stock status with respect to the existing BRPs, as well as with respect to updated or redefined BRPs (from TOR 4).**

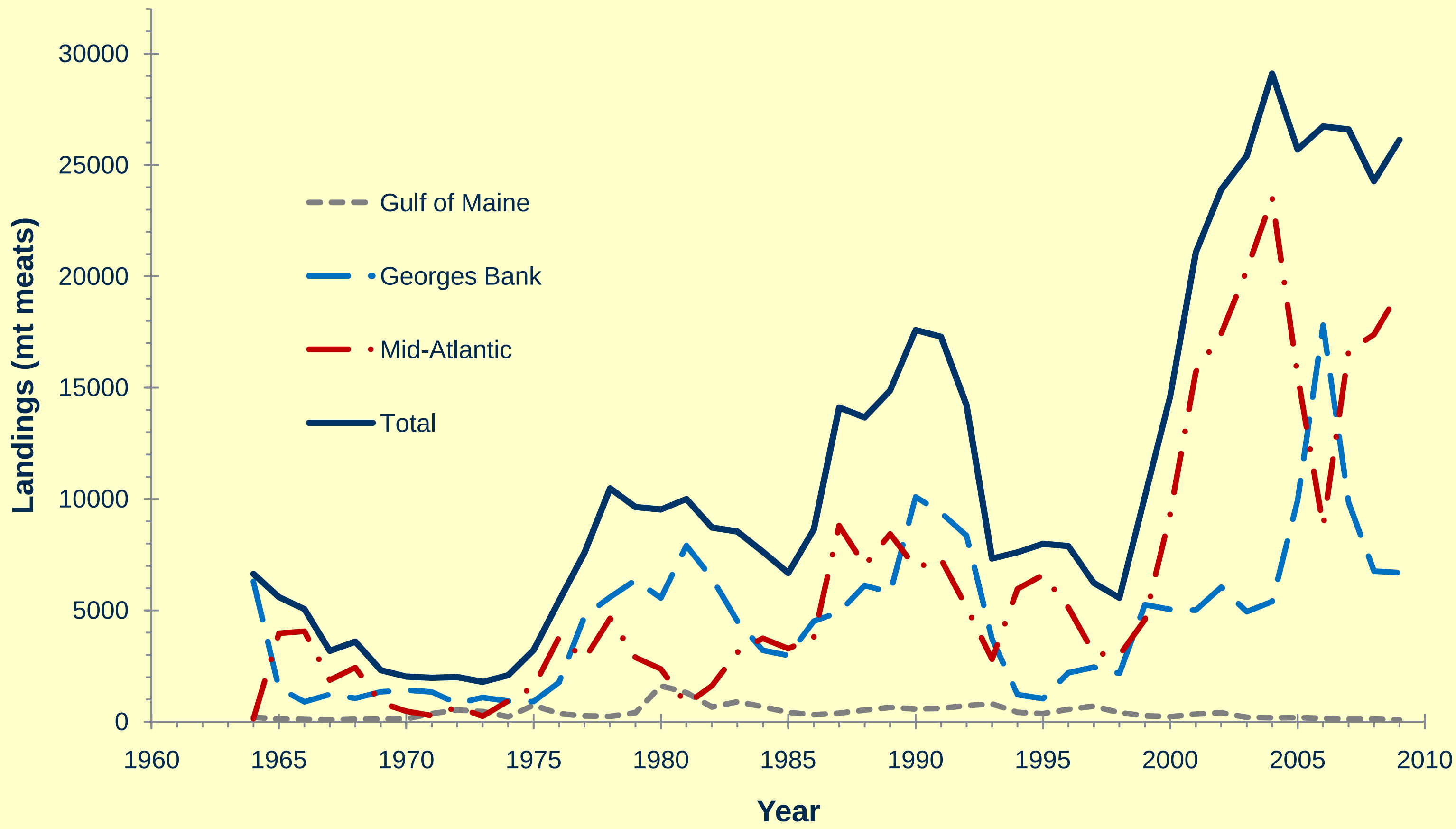
Sea Scallop

TORs (2)

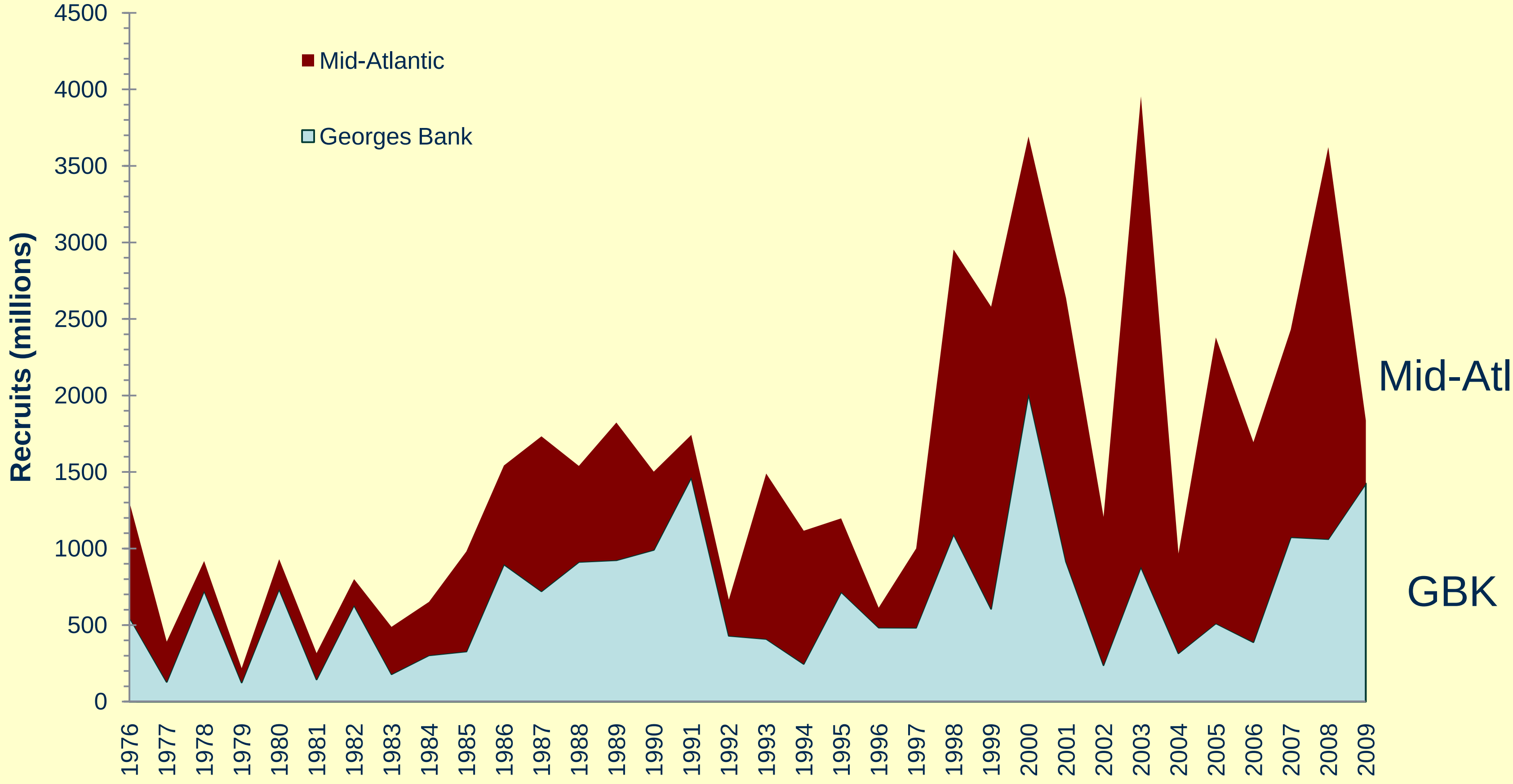
6. Develop and apply analytical approaches and data that can be used for conducting single and multi-year stock projections and for computing candidate ABCs (Acceptable Biological Catch; see Appendix to the TORs).
    a. Provide numerical short-term projections (through 2014). Each projection should estimate and report annual probabilities of exceeding threshold BRPs for F, and probabilities of falling below threshold BRPs for biomass. In carrying out projections, consider a range of assumptions to examine important sources of uncertainty in the assessment.
    b. Comment on which projections seem most realistic, taking into consideration uncertainties in the assessment.
    c. Describe this stock's vulnerability to becoming overfished, and how this could affect the choice of ABC.

7. Review, evaluate and report on the status of the SARC and Working Group research recommendations listed in recent SARC reviewed assessments and review panel reports. Identify new research recommendations.

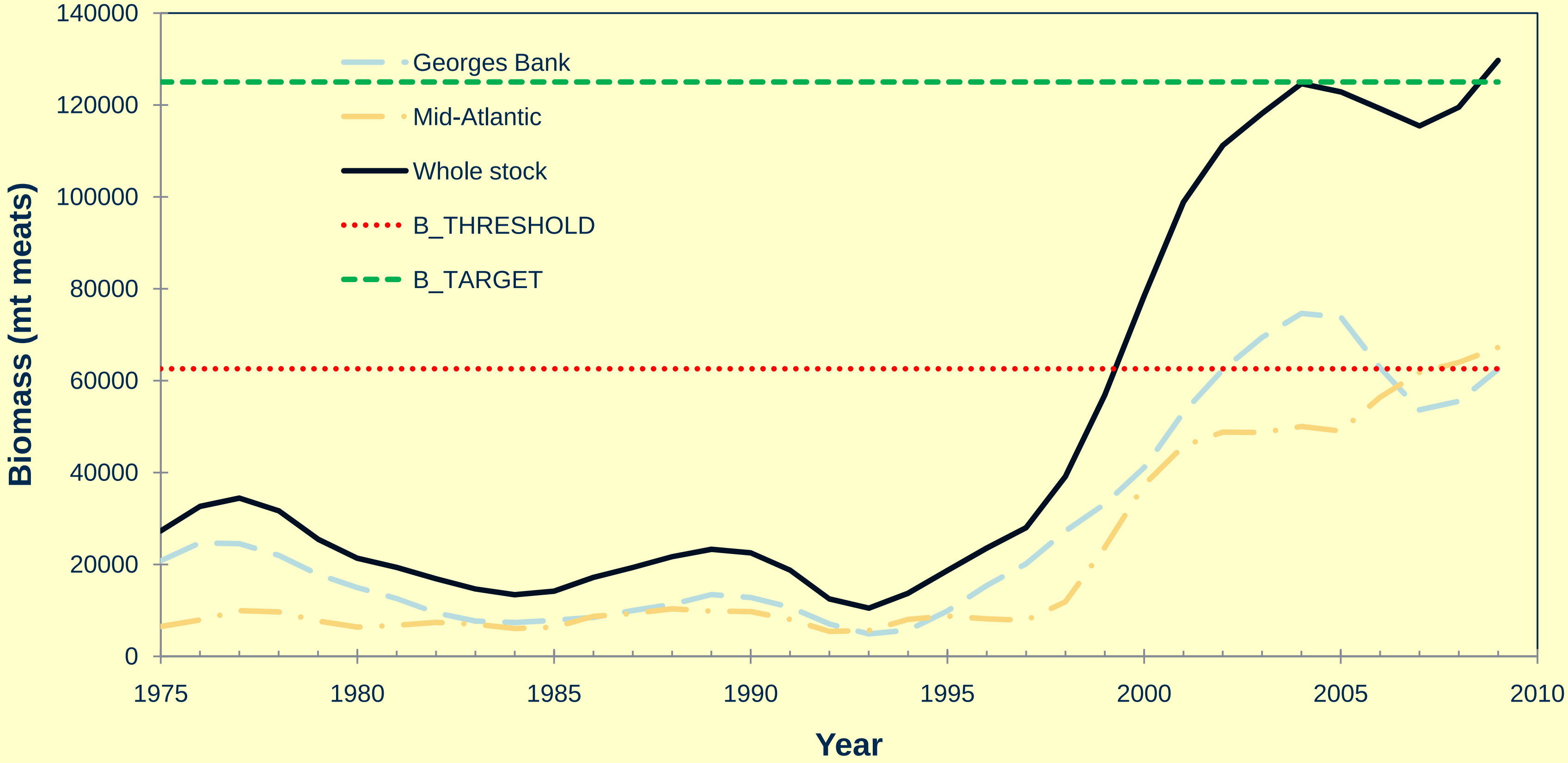
Scallop: Landings, 1975-2009



Scallop: Recruitment, 1976-2009



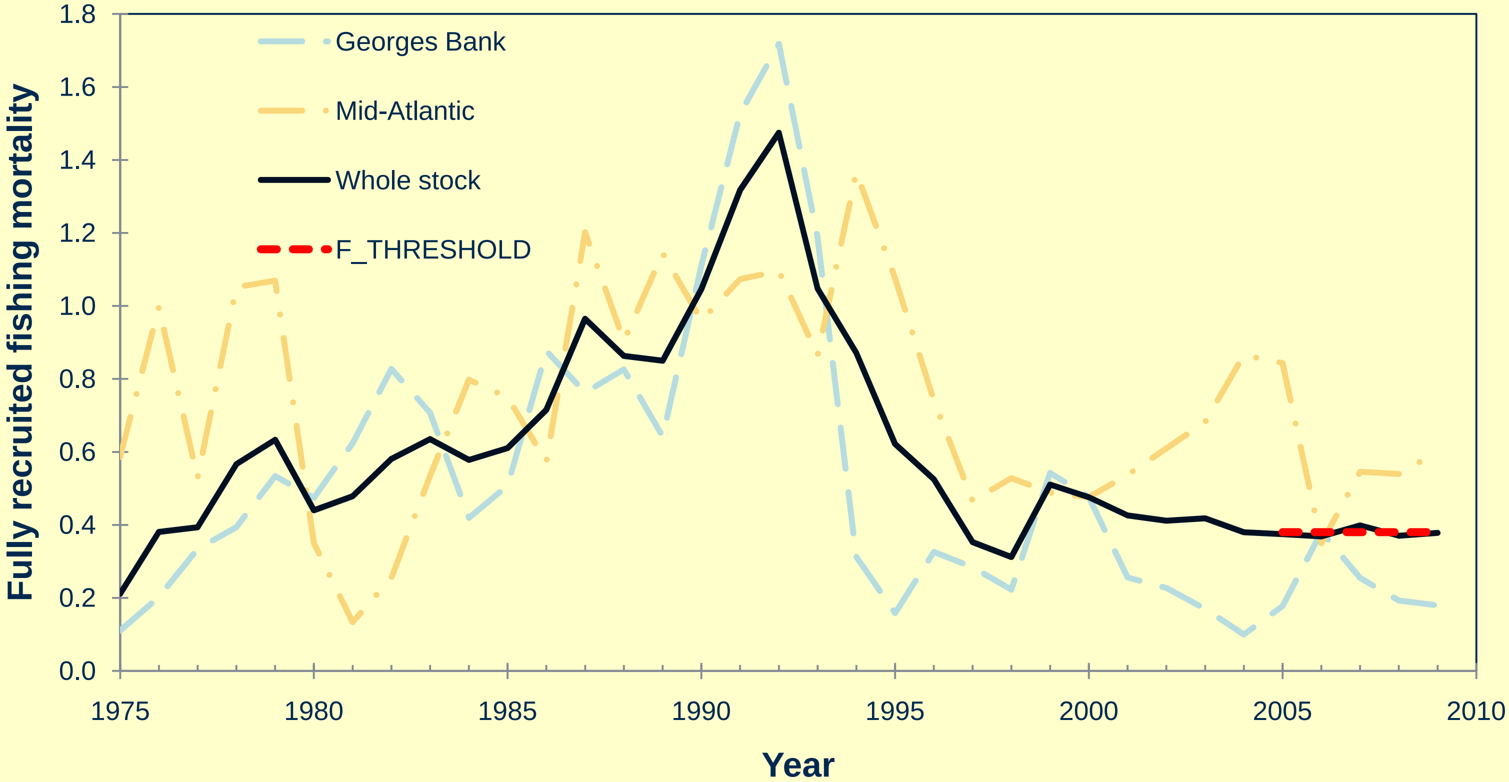
Scallop: Biomass (40+ mm SH), 1975-2009



Status: Not Overfished.

$B_{'09}$=129.7 kmt; $B_{THRESHOLD}$=62.6 kmt

Scallop: Fishing Mortality Rate, 1975-2009

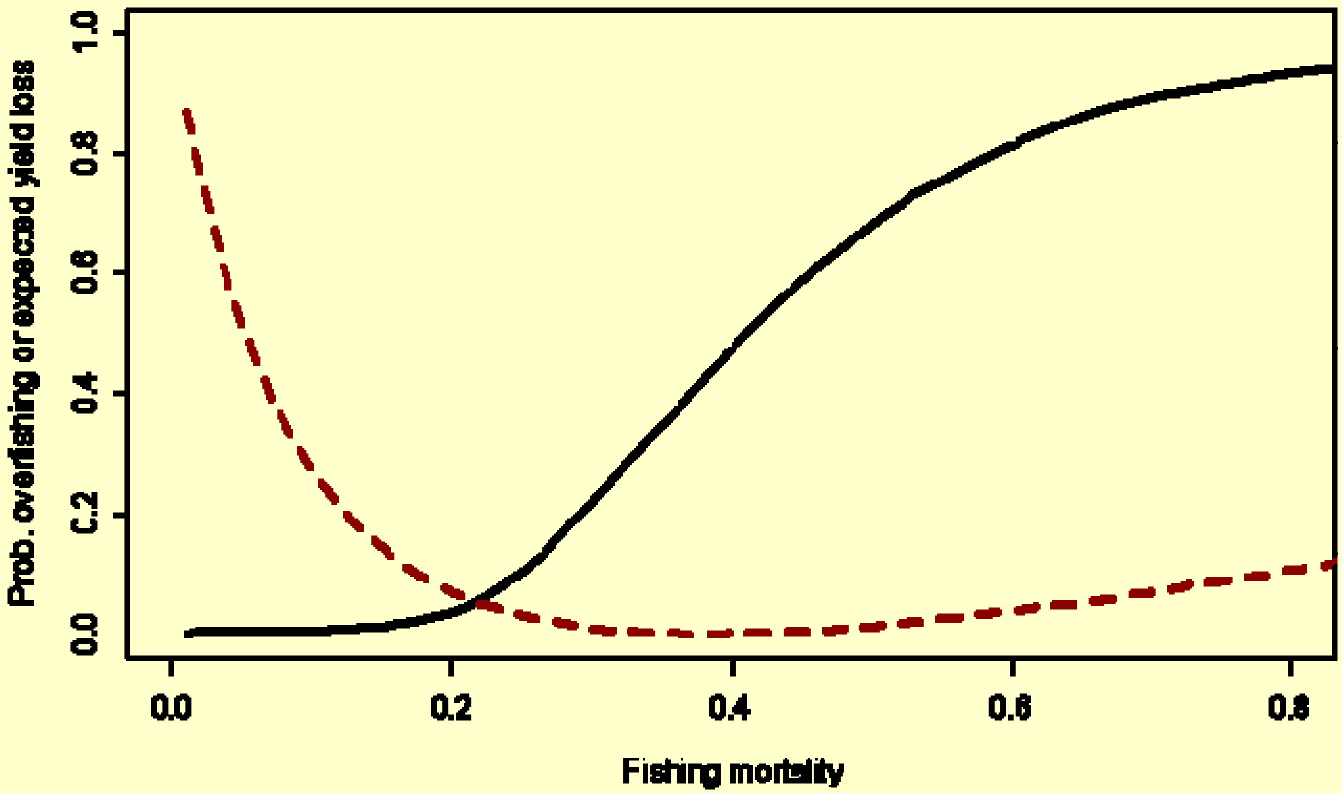


Status: Not Overfishing (but very close).

$F_{'09} = 0.378$; $F_{THRESHOLD} = 0.380$

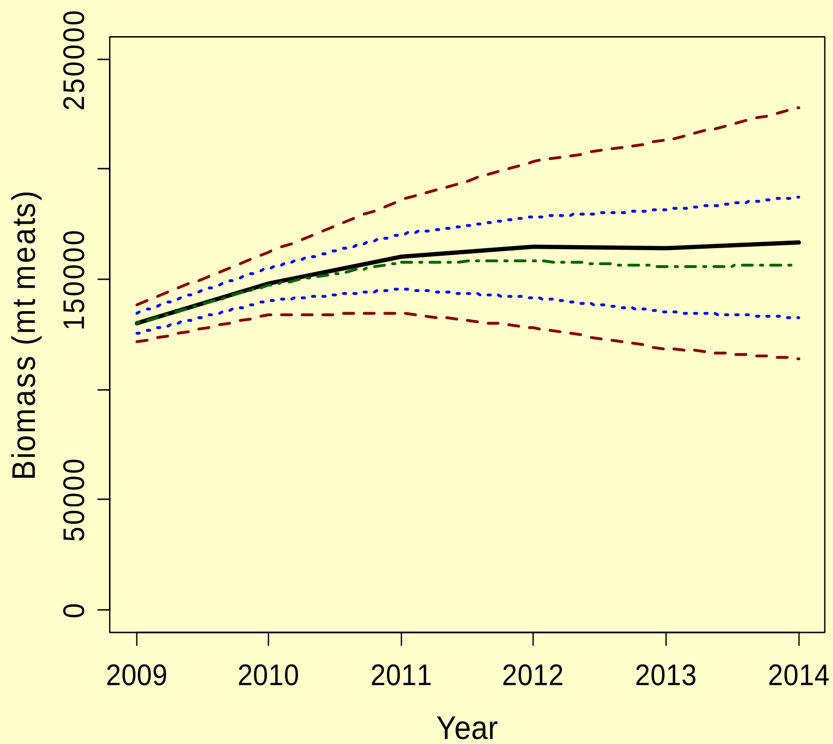
Scallop:

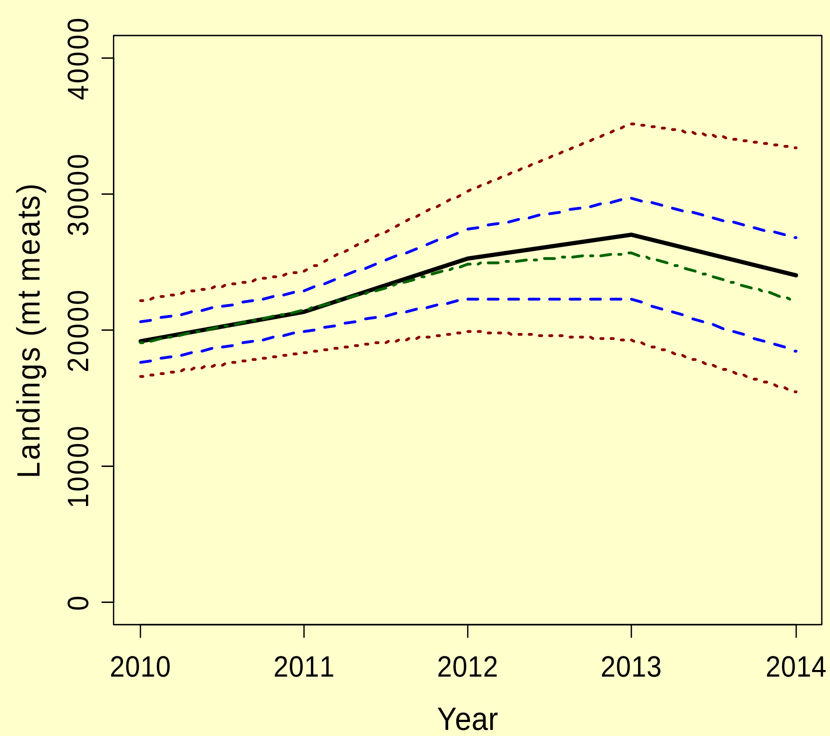
Tradeoff between Pr{overfishing} (solid line) and Loss of Yield to Fishery (dashed line) relative to F_{MSY}.



Scallop:

Example Whole Stock Projection, through 2014





Note: The projection model is complex and used for area management.

Sea Scallop: SARC Panel Comments

- **Assessment was rigorous. Assessment outcomes well supported by available information. Panel endorses use of CASA model and refinements.**
- **New approach for quantifying uncertainties around BRPs relative to exploitation levels is innovative. Will facilitate incorporation of risk assessment into management decisions.**
- **Projection methods are complex, but necessary to accommodate spatial fishery management of sedentary species.**
- **Moderate retrospective patterns, most evident for the MAB. Some concern expressed over risk to stock.**
- **MSY estimate depends on assumption that increased recent recruitment in MAB due to increased biomass levels (i.e. stock-recruitment relationship). MSY is overestimated if this results from temporary environmental factors.**

Sea Scallop: SARC Panel Recommendations

- **Principal uncertainty concerns current high productivity levels. Establish whether current productivity depends on temporary environmental factors.**
- **There are conflicting signals in the MAB data (SMAST large camera survey abundance declines in 2009; NEFSC dredge survey abundance increasing). Sort out this conflict as new data become available in future.**
- **Develop consistent metric of fishing mortality that accounts for changes in selectivity over time.**
- **Current fishing mortality is close to F_{MSY} and deserves careful monitoring.**

Pollock

Photo: Ralph Mayo

Pollock

TORs (1)

1. Characterize the commercial and recreational catch including landings, effort, LPUE and discards. Describe the uncertainty in these sources of data, including consideration of stock definition.

2. Characterize the survey data that are being used in the assessment (e.g., regional indices of abundance, recruitment, state surveys, age-length data, etc.). Describe the uncertainty in these sources of data, including consideration of stock definition.

3. Estimate annual fishing mortality, recruitment and stock biomass (both total and spawning stock) for the time series, and characterize the uncertainty of those estimates.

4. Update or redefine biological reference points (BRPs; estimates or proxies for B_{MSY}, $B_{THRESHOLD}$, and F_{MSY}; and estimates of their uncertainty). Comment on the scientific adequacy of existing and redefined BRPs.

5. Evaluate stock status with respect to the existing BRPs, as well as with respect to updated or redefined BRPs (from TOR 4).

6. Evaluate pollock diet composition data and its implications for population level consumption by pollock.

Pollock

TORs (2)

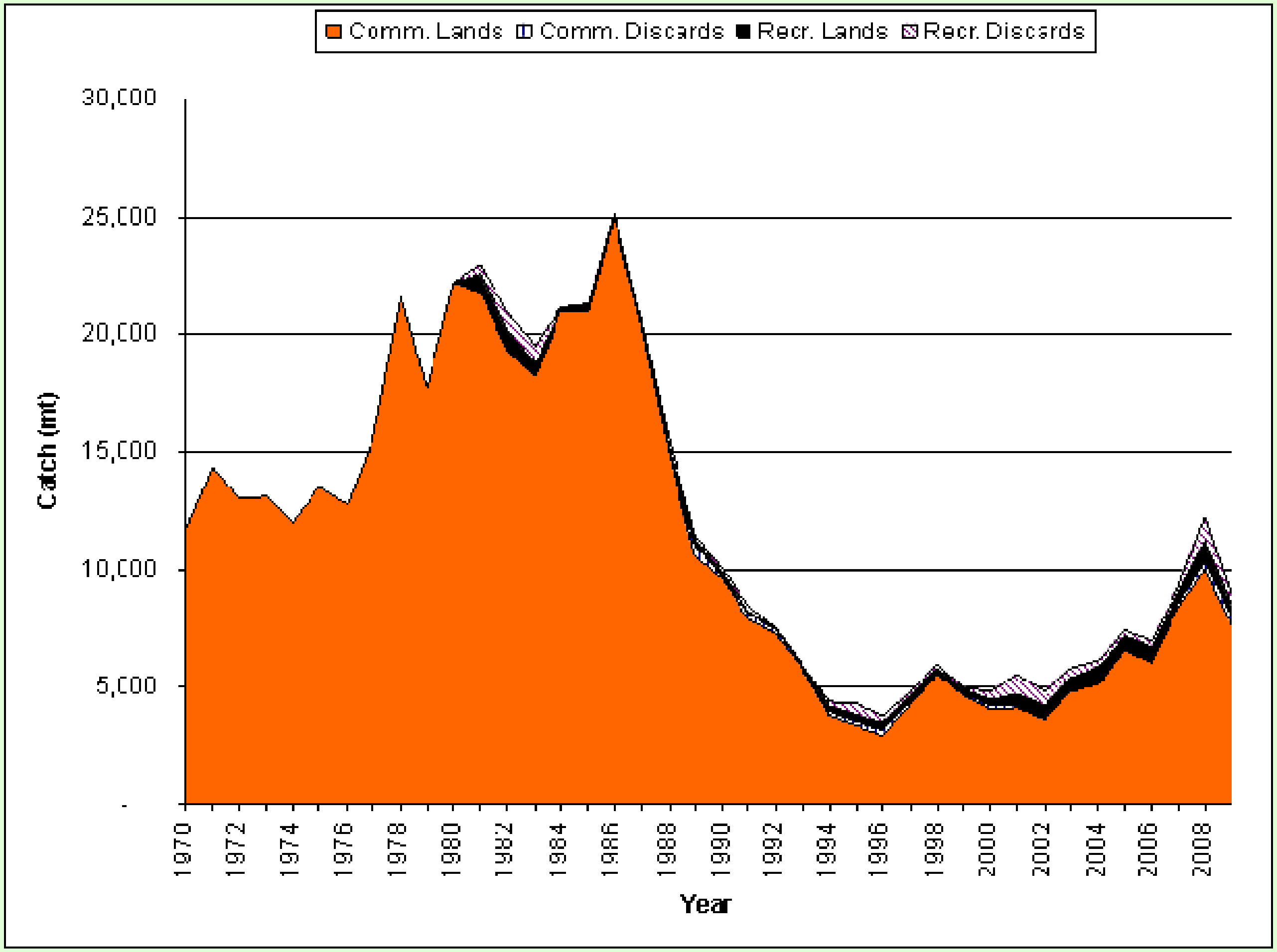
7. Develop and apply analytical approaches and data that can be used for conducting single and multi-year stock projections and for computing candidate ABCs (Acceptable Biological Catch; see Appendix to the TORs).
    a. Provide numerical short-term projections (through 2017). Each projection should estimate and report annual probabilities of exceeding threshold BRPs for F, and probabilities of falling below threshold BRPs for biomass. In carrying out projections, consider a range of assumptions to examine important sources of uncertainty in the assessment.
    b. Comment on which projections seem most realistic, taking into consideration uncertainties in the assessment.
    c. For a range of candidate ABC scenarios, compute probabilities of rebuilding the stock by 2017.
    d. Describe this stock's vulnerability to becoming overfished, and how this could affect the choice of ABC.

8. Review, evaluate and report on the status of the SARC and Working Group research recommendations listed in recent SARC reviewed assessments and review panel reports. Identify new research recommendations.

Pollock: Assessment Comparison

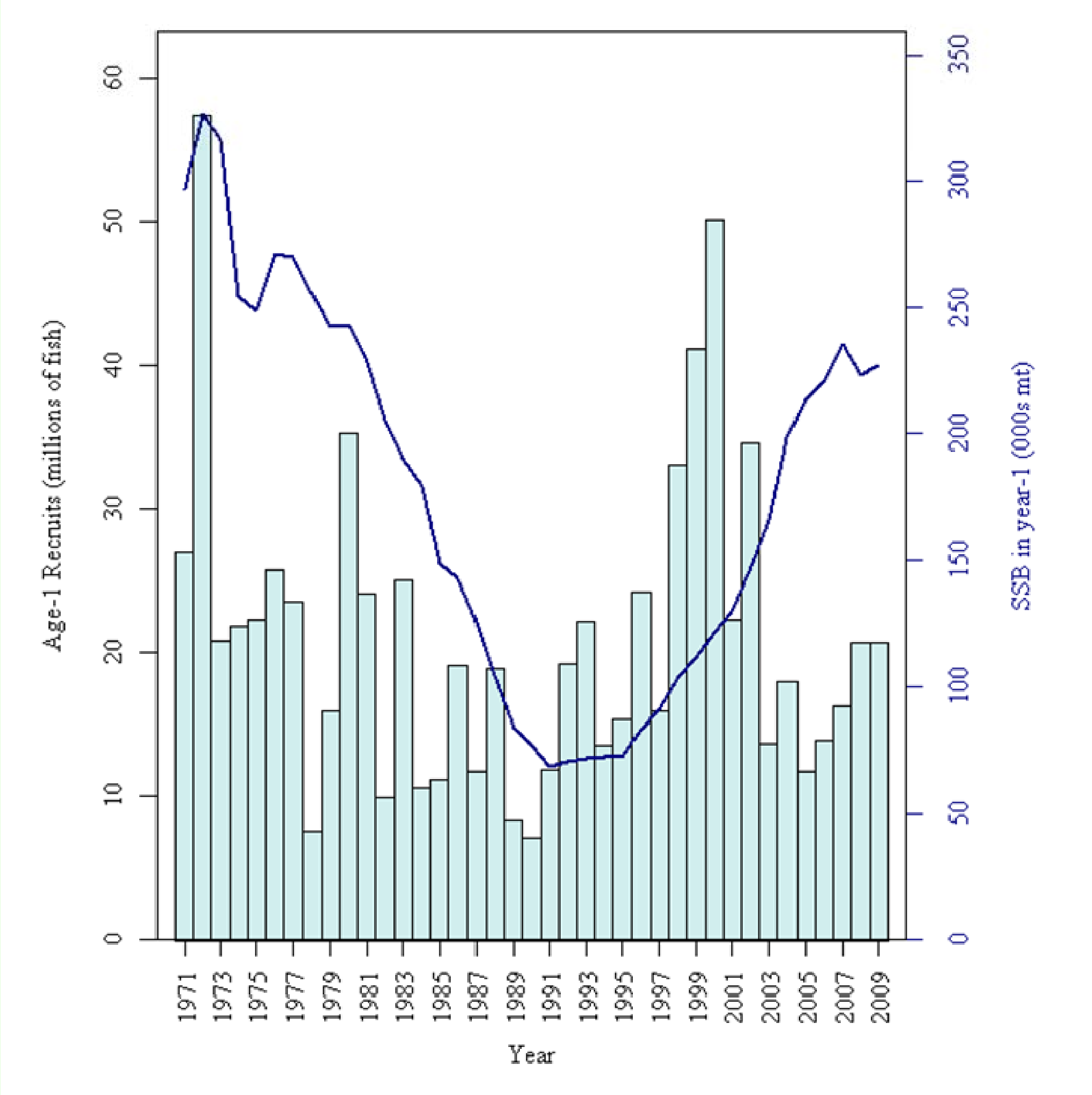
GARM-III (2008)	SAW-50 (2010)
Data: NEFSC Fall survey tow data, and total comercial landings	**Data:** Age-structure, additional surveys, additional years of data, more comprehensive catch info, changes in selectivity, uncertainty in input data
Model: AIM (index-based)	**Model:** ASAP (Age-structured, forward-projecting, assessment program)
Status Conclusion: Overfished, Overfishing	**Status Conclusion:** Not Overfished, Not Overfishing

Pollock: Landings & Discards 1970-2009



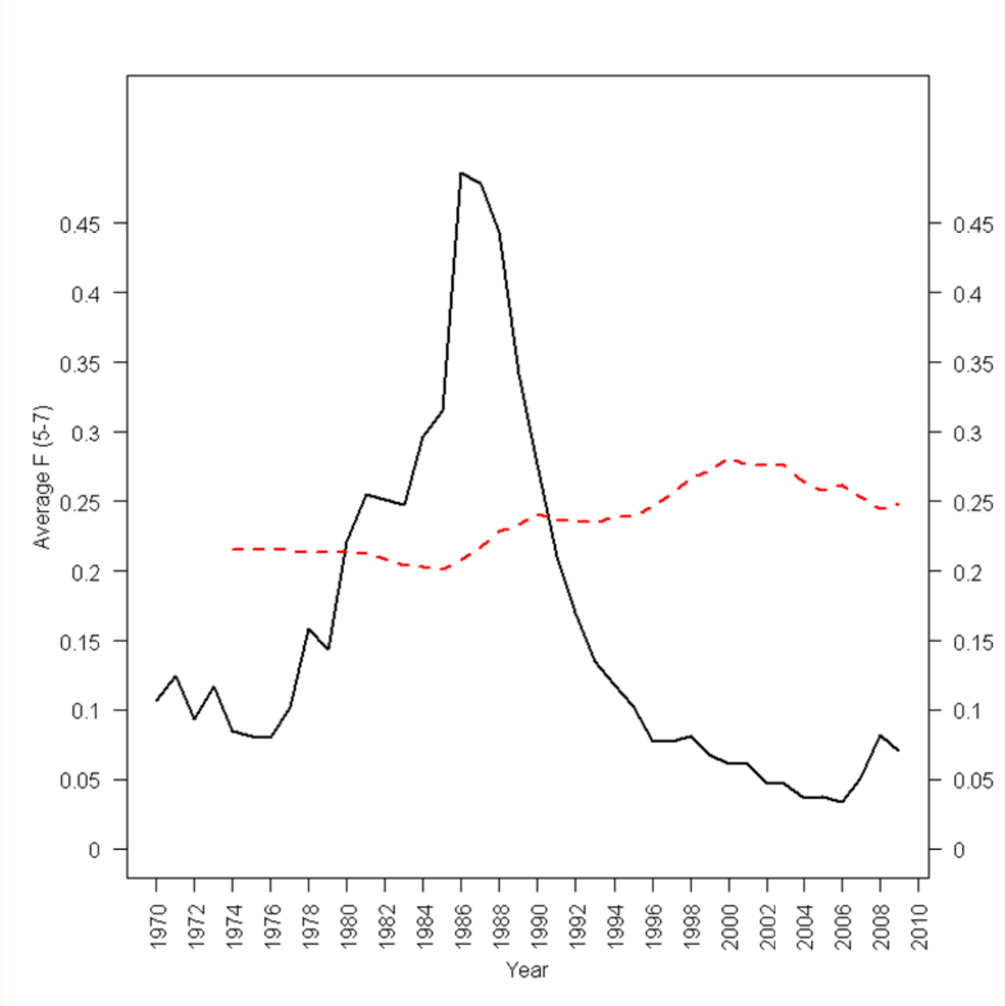
Pollock:

Recruitment (bars), Spawning Stock Biomass (line), 1971-2009 (basis: ASAP model)



Pollock:

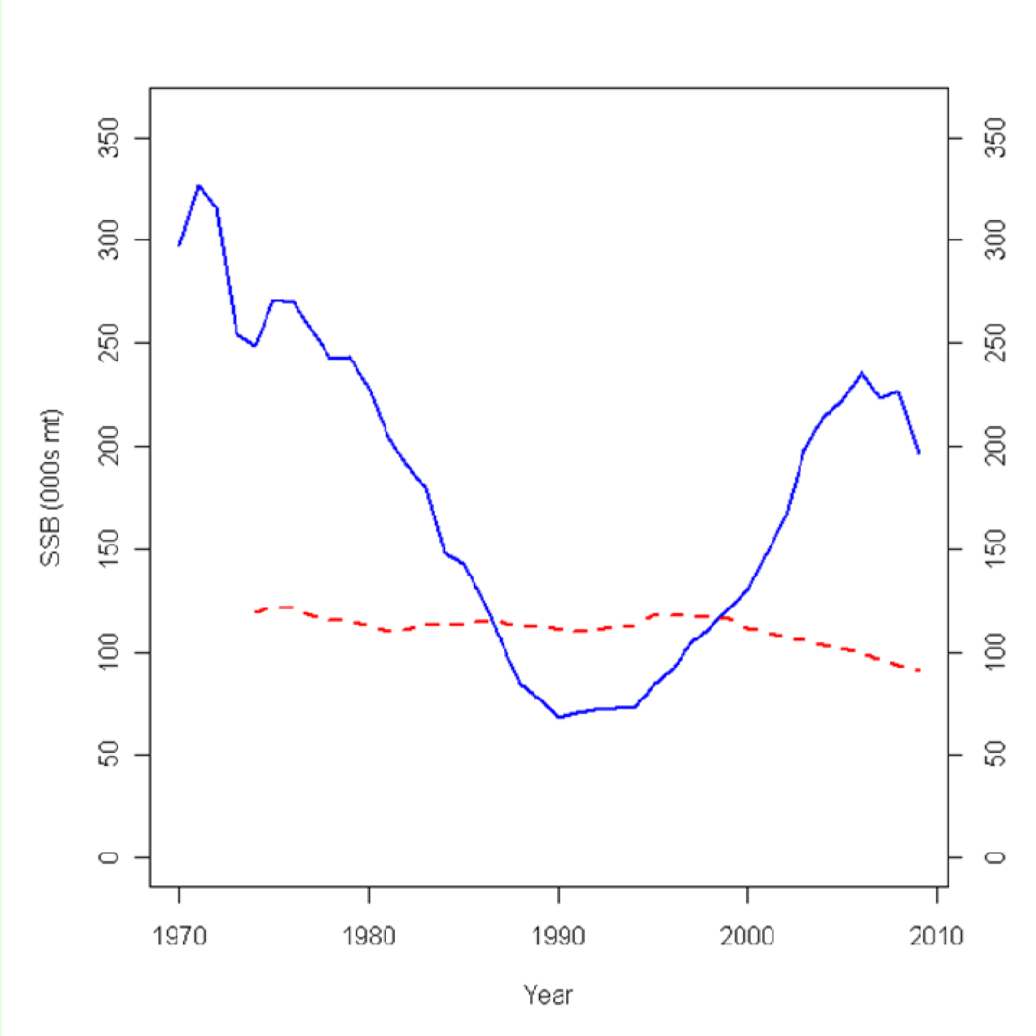
Fishing Mortality Rate & $F_{THRESHOLD}$ (dashed line); 1970-2009



Current Status: Not Overfishing ($F_{'09,5\text{-}7}$=0.07; $F_{'09,THRESHOLD}$=0.25)

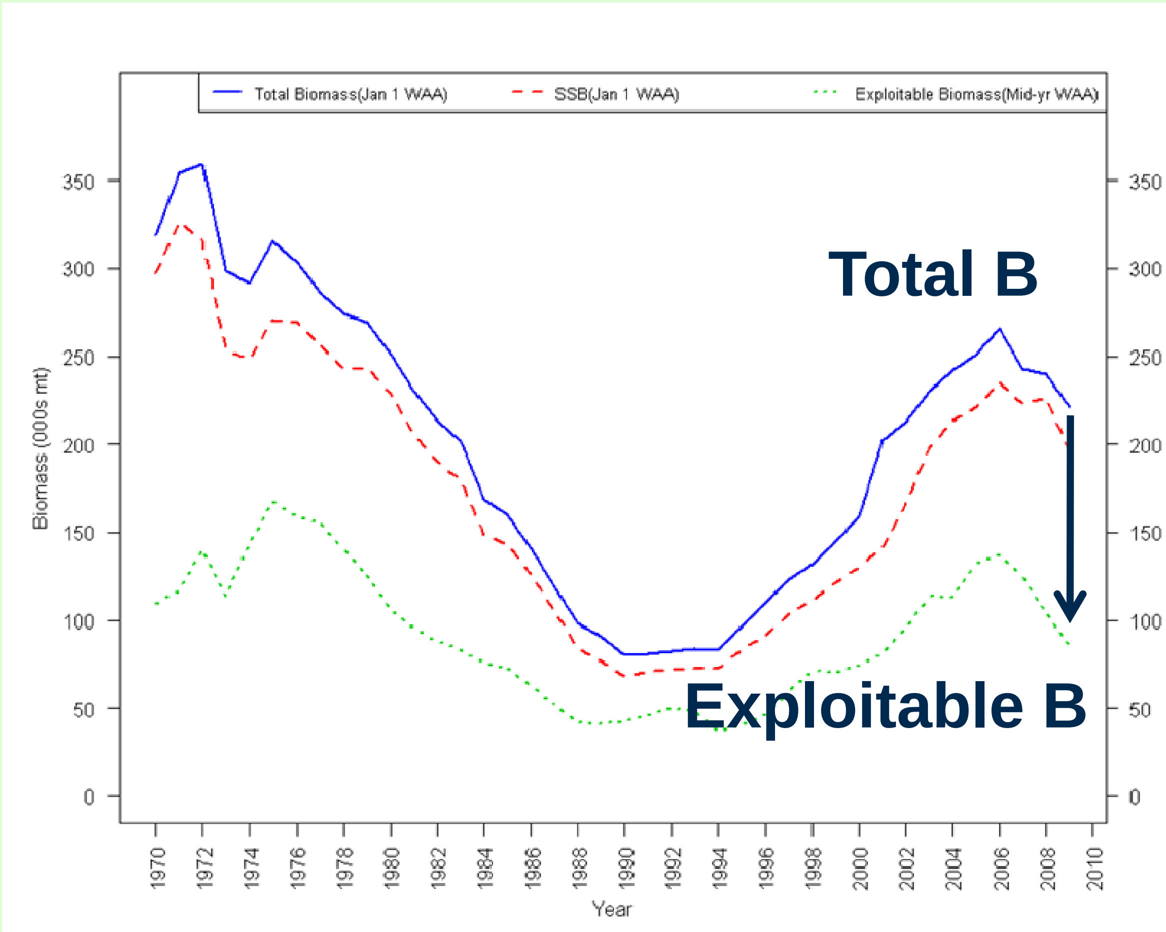
Pollock:

Spawning Stock Biomass & B_{TARGET} (dashed line) 1970-2009



Current Status: Not Overfished
($SSB_{'09}$= 196 kmt; $SSB_{THRESHOLD}$= 45.5 kmt)

Pollock: Biomass Estimates (1970-2009)



Substantial B difference (i.e., cryptic biomass") is due to the "dome" modeling assumption.

Pollock:

SARC Panel Comments:

- **Pollock assessment accepted. New assessment method (ASAP) a significant improvement over previous one (AIM). Compared to AIM, ASAP uses more sources of info and makes better use of available data.**
- **BRPs derived from AIM would have given different stock status (overfished and overfishing occurring).**
- **Panel expressed strong concern about presumed large and unobserved adult biomass (i.e. "cryptic" biomass associated with "dome" assumption) and its implications for management.**
- **BRPs were redefined with stronger scientific basis (F_{MSY} proxy of $F_{40\%}$). However, projections are uncertain because model is sensitive to the "dome" assumption, which leads to higher stock biomass estimates.**
- **Pollock catch rates may be lower using the *RV Bigelow* due to lower tow speeds. Could negatively impact survey time series for assessing pollock.**
- **Comparison of ASAP with alternative model (Statistical Catch at Age, SCAA) gave similar results for relative stock trends.**

Pollock: SARC Panel Recommendations

- Conduct research to confirm (or not) existence of cryptic biomass. A special survey, tagging or other monitoring study.
- The assumption that large, faster swimming pollock can avoid capture by the NMFS survey needs to be tested empirically.
- Apply risk analysis approach to evaluate consequences to management of the “dome” modeling assumption.
- Ensure that catch-age sampling is adequate to support the ASAP assessment model. Adjust sampling designs to respond to changes in fishery management (e.g. sectors).
- Make fine adjustments to account for the US-CA transboundary catch prior to 1985.
- US-CA collaborative research might be fruitful in characterizing the nature of this stock and its movements (e.g. systematic tagging studies).
- Consider incorporating Maine / New Hampshire survey as recruitment index.