NOAA FISHERIES SERVICE

#5

SAW/SARC-52 Summary
(NEFSC CRD#11-11)

Presentations: Aug. Sept., 2011

SAW/SARC Process

1. **SAW Working Groups (WG): SDWG WG**

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 SAW52)
   http://www.nefsc.noaa.gov/publications/ (see Ref. Docs.)

4. **Management advice:**
   - **Some in the SAW/SARC reports to support SSC in making ABC recommendation.**
   - **Developed by Tech. Committees, PDTs, SSC.**

The 52st Northeast Regional Stock Assessment Review Committee (51th SARC)

Stephen H. Clark Conference Room – Northeast Fisheries Science Center
Woods Hole, Massachusetts
June 6-10, 2011

SARC Chairman:
Dr. Pat Sullivan
(Cornell Univ.; NEFMC SSC)

SARC Panelists:
Dr. Cynthia Jones
(Old Dominion Univ; CIE)

Dr. John Casey
(CEFAS, UK; CIE)

Dr. Noel Cadigan
(Fisheries & Oceans Canada; CIE)

Winter flounder

A. SNE/MA
B. GBK
C. GOM

Winter flounder

Assessment TORs (1)

1. Estimate catch from all sources including landings and discards. Characterize the uncertainty in these sources of data.

2. Present survey data being considered and/or used in the assessment (e.g., regional indices of abundance, recruitment, state and other surveys, age-length data, etc.). Characterize uncertainty in these sources of data.

3. Estimate annual fishing mortality, recruitment and stock biomass (both total and spawning stock) for the time series (integrating results from TOR-5), and estimate their uncertainty. Include area-swept biomass estimates. Investigate if implied survey gear or catchability estimates are reasonable. Include a historical retrospective analysis to allow a comparison with previous assessment results.

4. Perform a sensitivity analysis which examines the impact of allocation of catch to stock areas on model performance (in TOR-3).

5. Examine the effects of incorporating environmental factors in models of population dynamics (e.g., spring water temperatures in an environmentally-explicit stock recruitment function).

6. State the existing stock status definitions for "overfished" and "overfishing". Then update or redefine biological reference points (BRPs; point estimates or proxies for B_{MSY}, $B_{THRESHOLD}$, and F_{MSY}) and provide estimates of their uncertainty. If analytic model-based estimates are unavailable, consider recommending alternative measurable proxies for BRPs. Comment on the scientific adequacy of existing BRPs and the "new" (i.e., updated, redefined, or alternative) BRPs.

Winter flounder

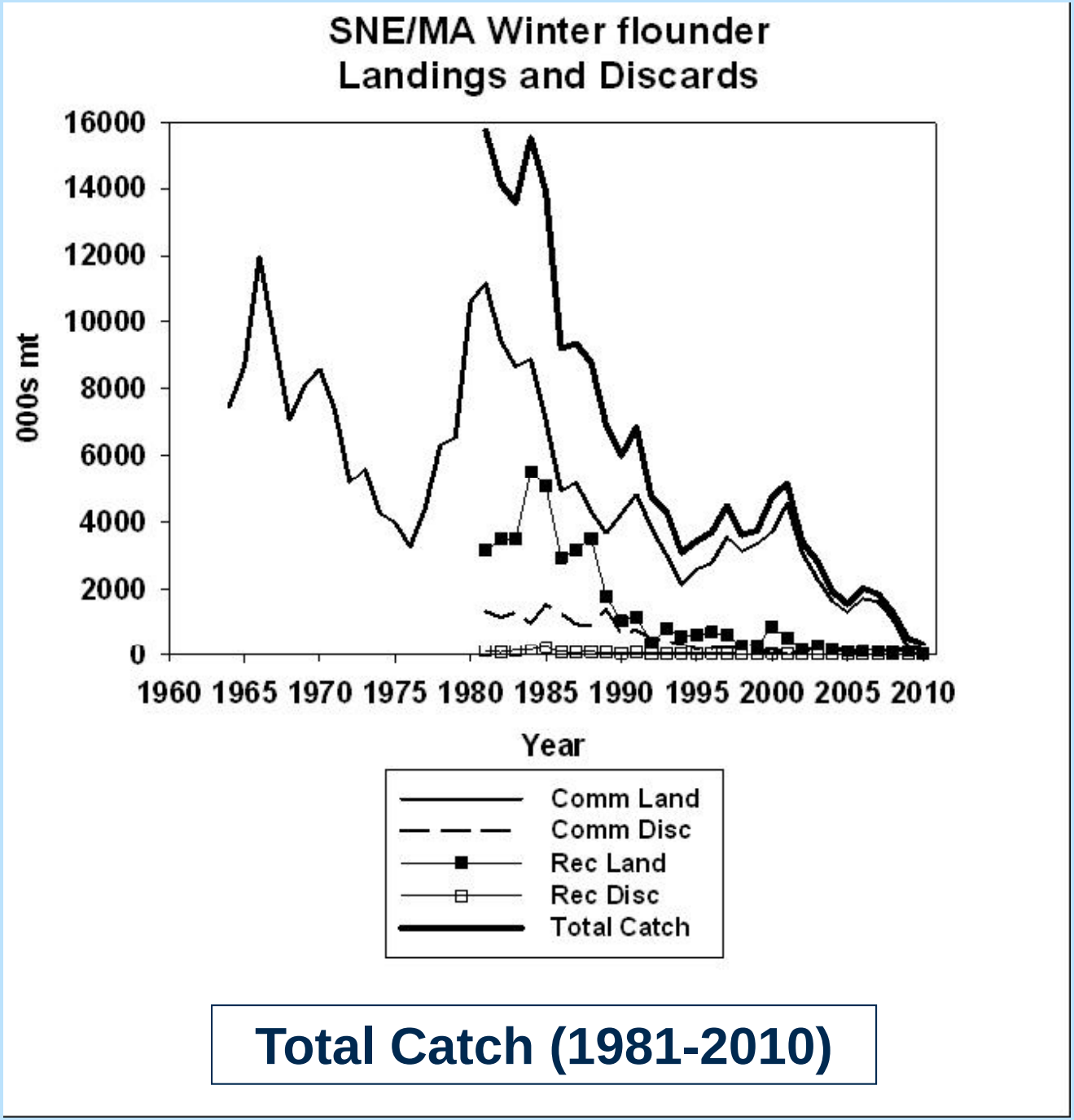
Assessment TORs (2)

7. Evaluate stock status (overfished and overfishing) with respect to the "new" BRPs (from TOR 6), and with respect to the existing BRPs (from a previous accepted peer review) whose values have been updated.

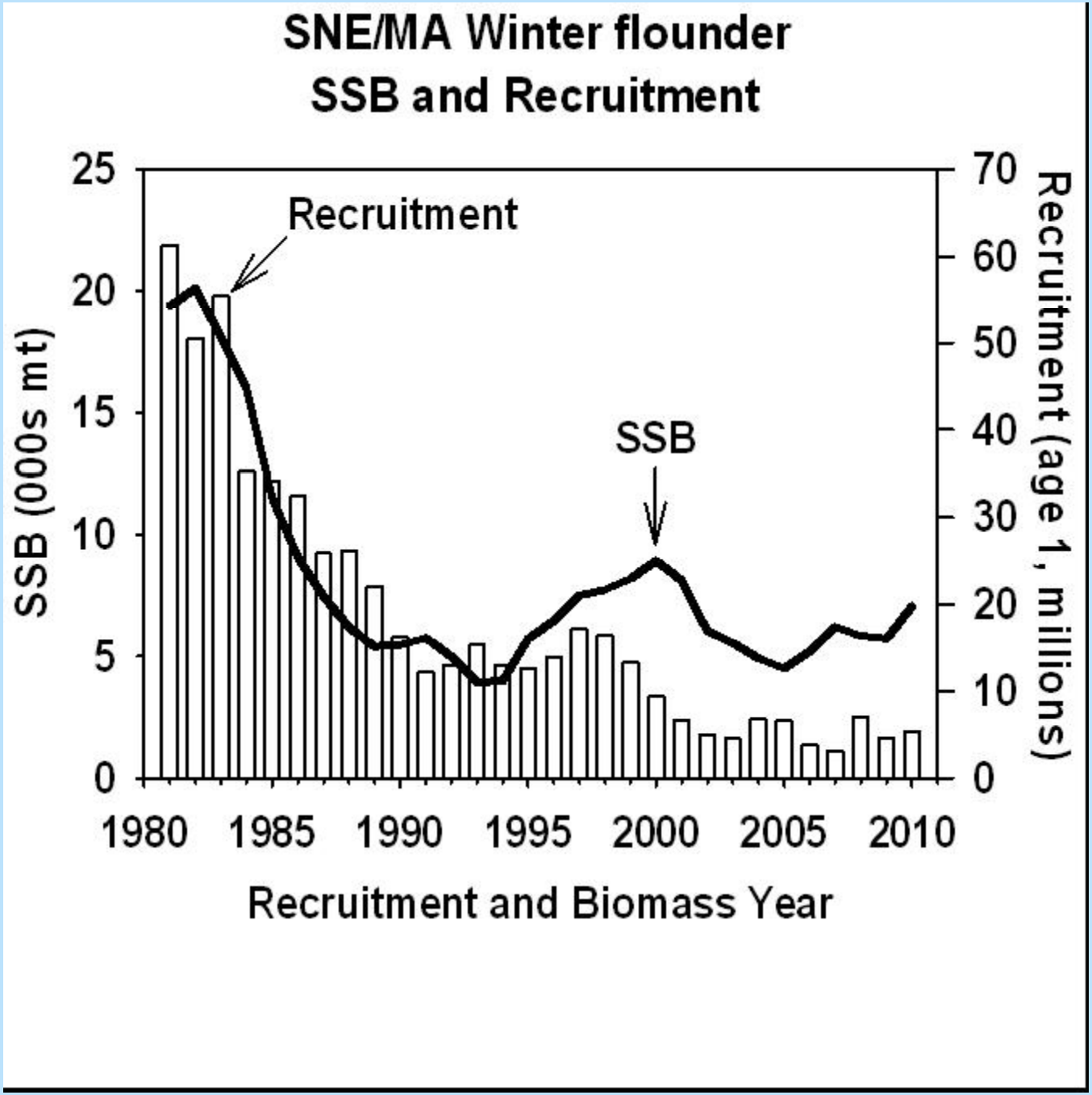
8. Develop and apply analytical approaches and data that can be used for conducting single and multi-year stock projections and for computing candidate ABCs (Acceptable Biological Catch; see Appendix to the TORs) under a set of alternative harvest scenarios. If the stock needs to be rebuilt, take that into account in these projections.
    a. Provide numerical short-term projections (3-5 yrs, or through the end of the rebuilding period, as appropriate). 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 about the most important uncertainties in the assessment (e.g., terminal year abundance, variability in recruitment).
    b. Take into consideration uncertainties in the assessment and the species biology to describe this stock's vulnerability (see "Appendix to the SAW TORs") to becoming or remaining overfished, and how this could affect the choice of ABC.
    c. Develop plausible hypotheses (e.g., mixing among the three stocks) which might explain any conflicting trends in the data and undertake scenario analyses to evaluate the consequences of these alternate hypotheses on ABC determination.

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.

(A.) SNE/MA Winter flounder



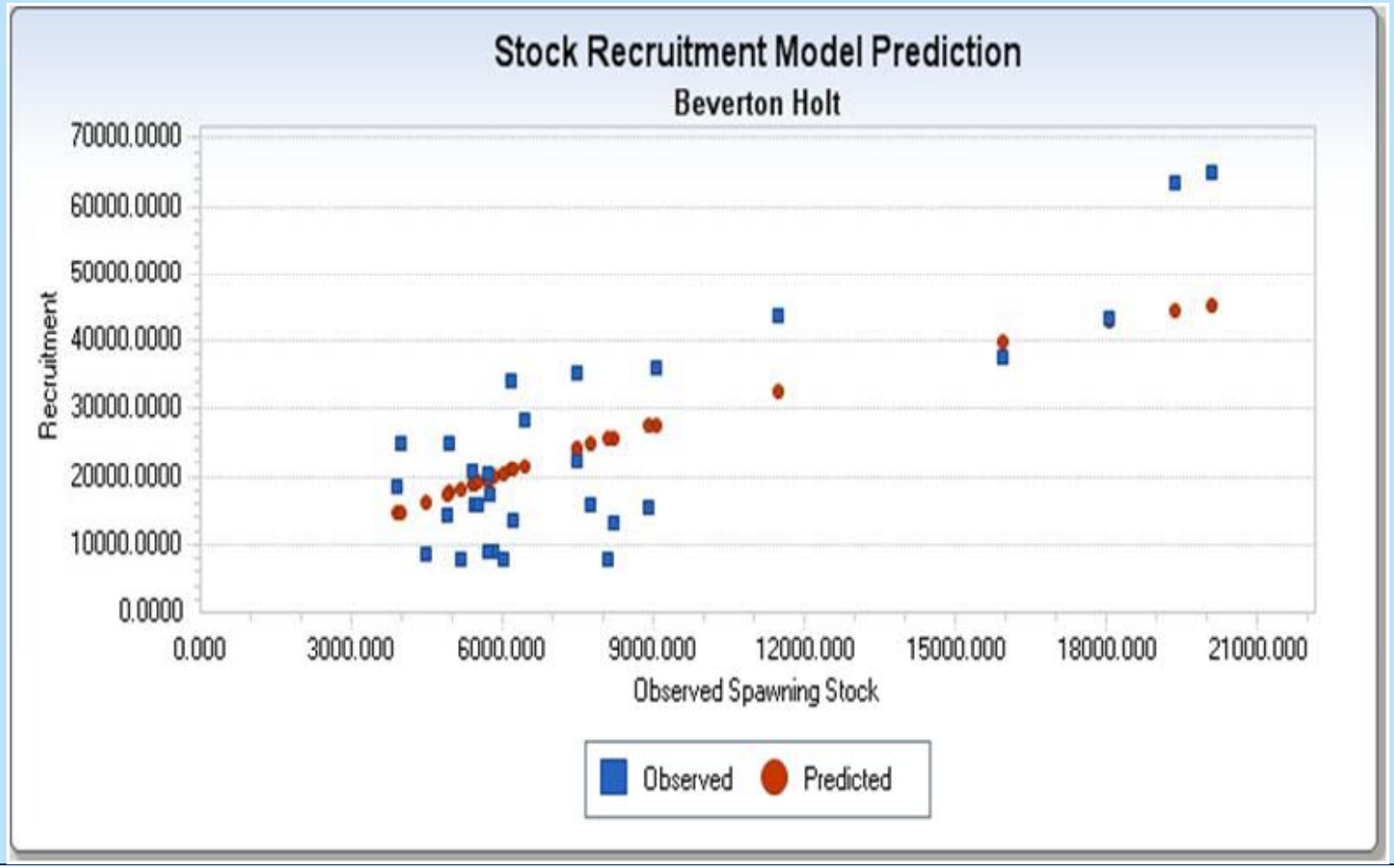
Total Catch (1981-2010)



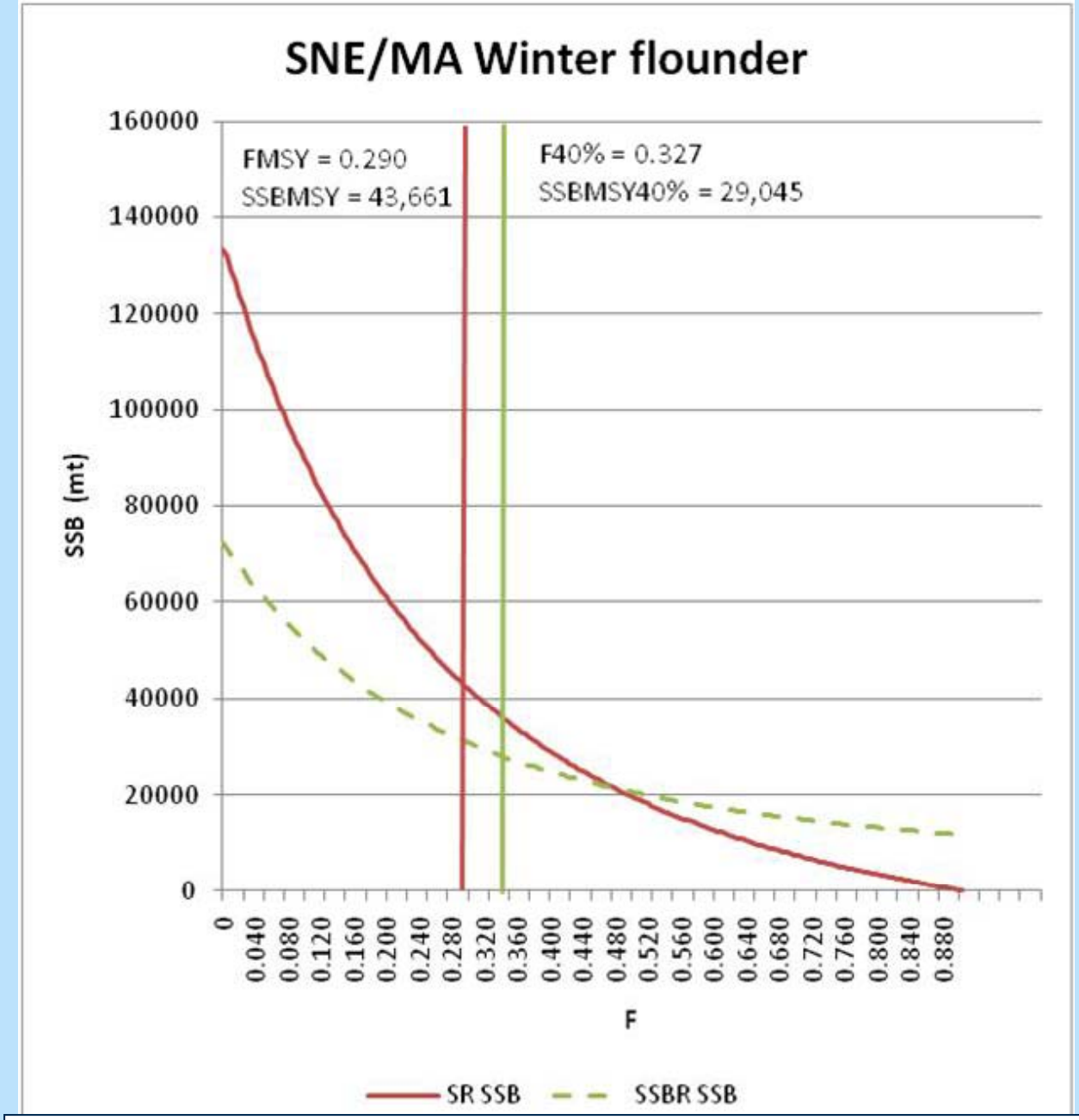
Recruitment (1 yr olds):

Has decreased continuosly since 1980s

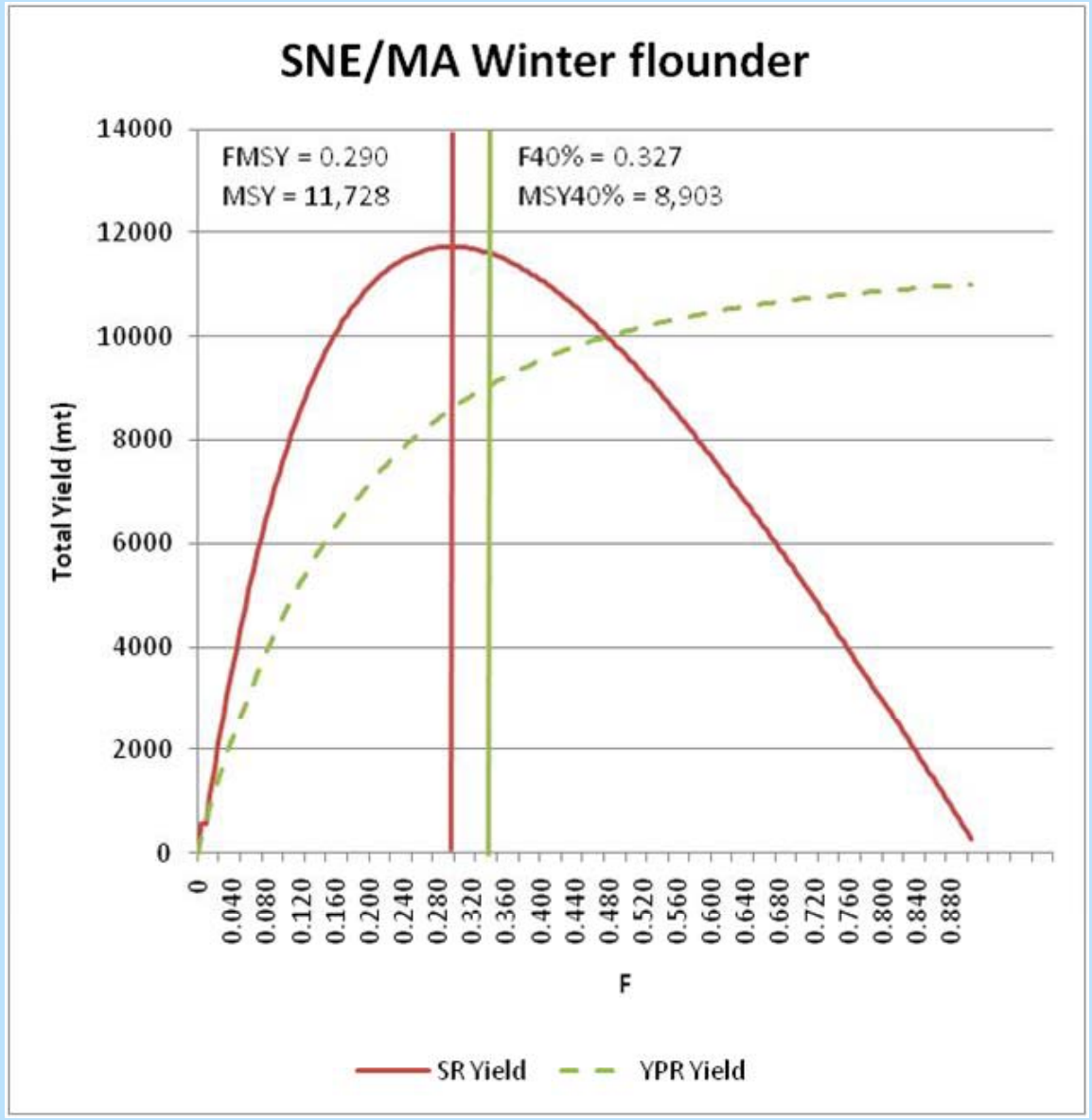
SNE/MA Winter flounder



1. There is a “spawner recruit” relationship.
2. Recent years have low R and S values.
3. Need to incr. SSB to increase R.
4. Warmer winter Temps correlated with low R.

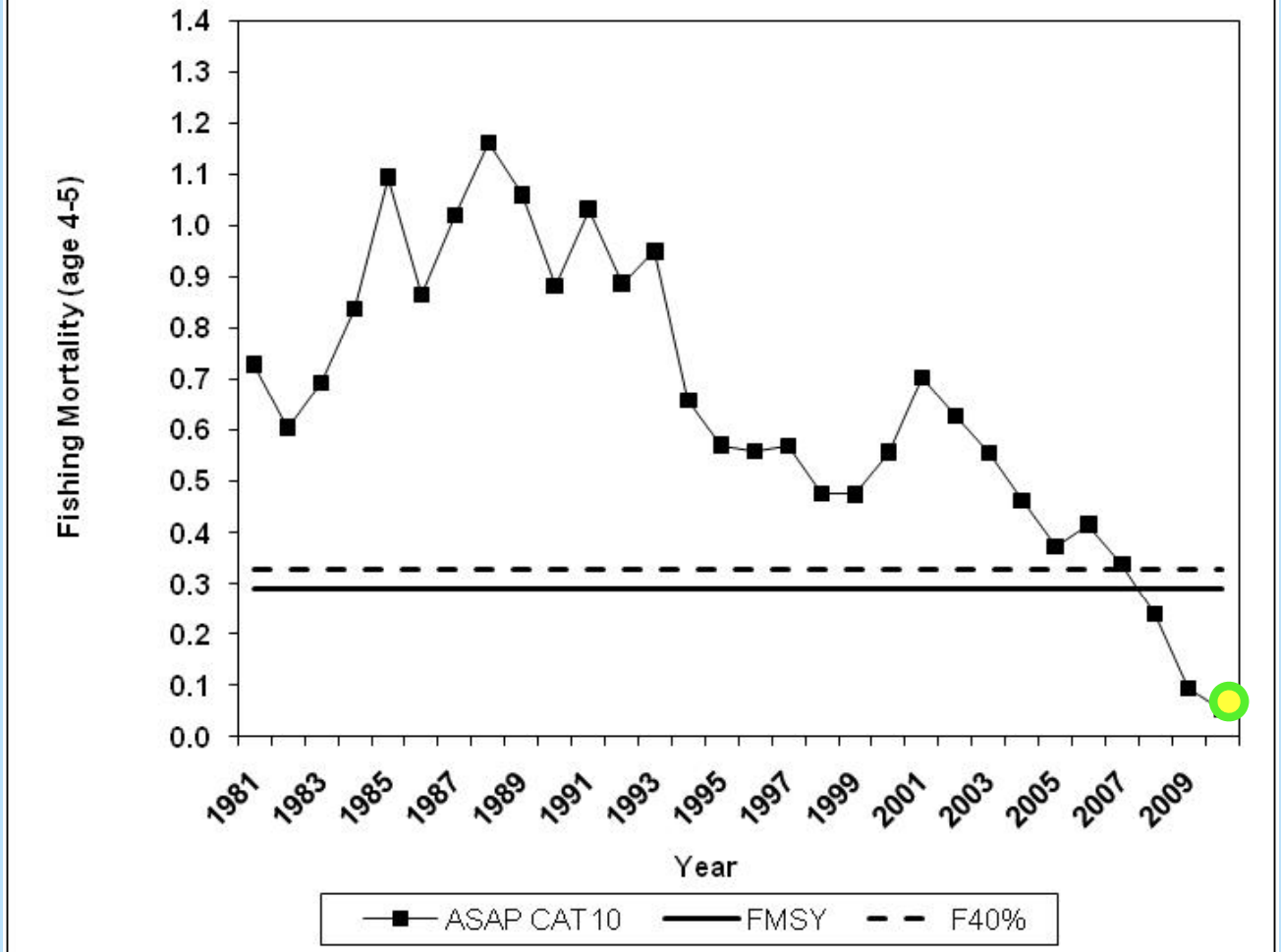


Adopted MSY-based Biol. Ref. Points



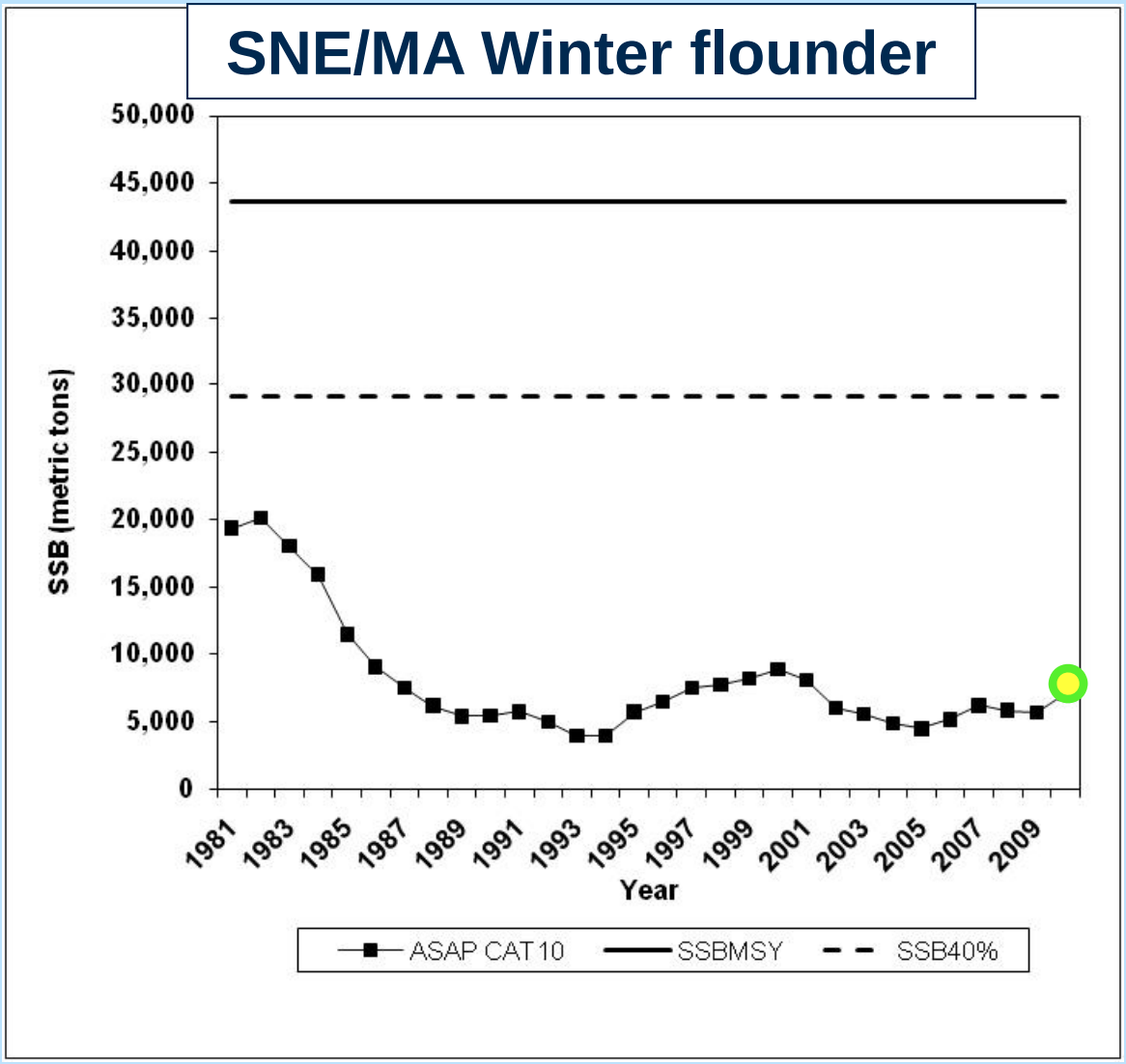
Adopted MSY-based Biol. Ref. Points

SNE/MA Winter flounder



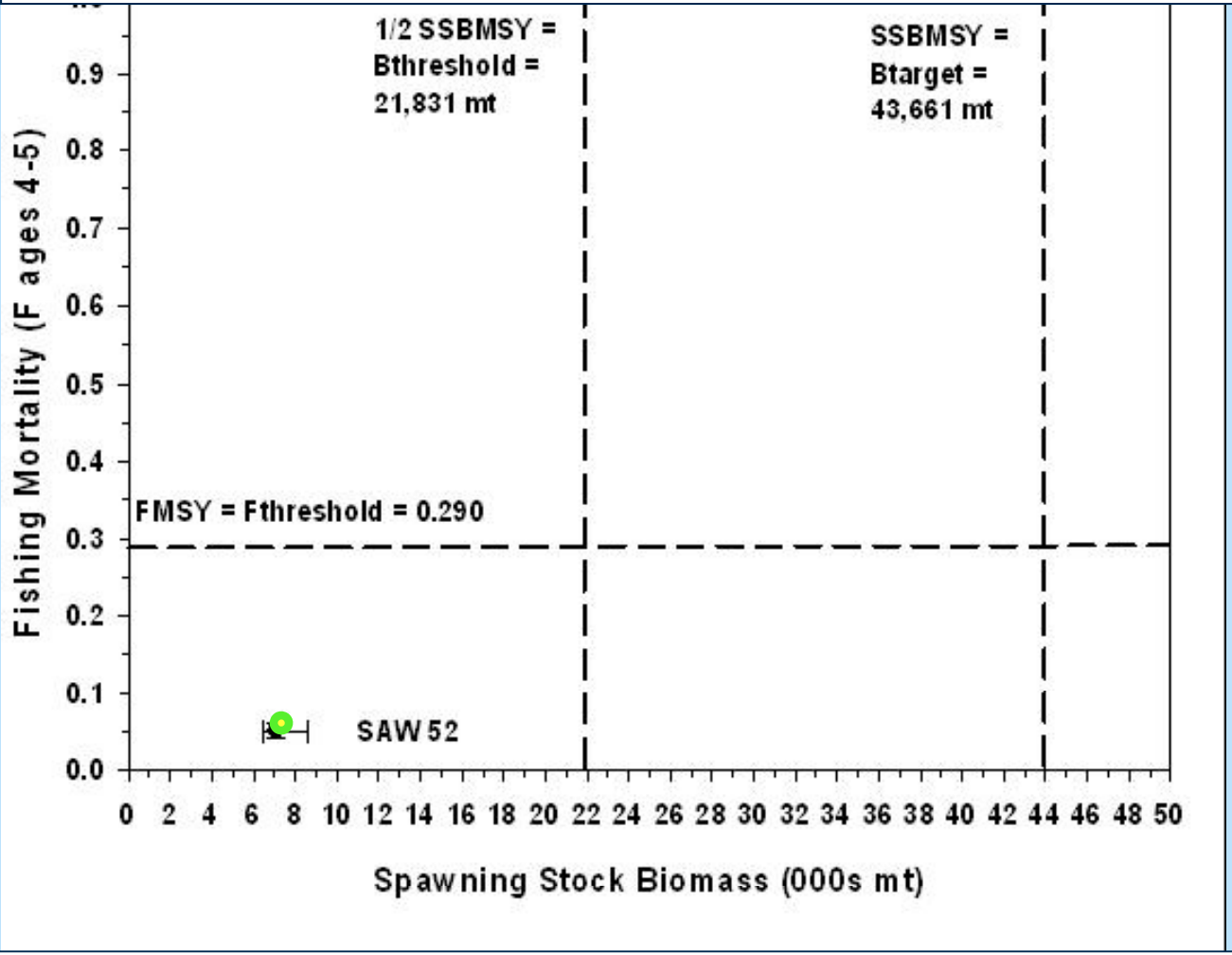
1. Overfishing was occurring before 2008.
2. F rate is now very low (0.05).

SNE/MA Winter flounder



1. Stock declined in 1980s.
2. Stock size has remained low (7 kmt in 2010; only at 16% of B_{TARGET}.

SNE/MA Winter flounder: Stock Status



1. Overfishing is no longer occurring.
2. Stock remains overfished (same conclusion drawn at GARM-III in 2008).
3. Chance of rebuilding by 2014 is <1% (even with F=0).

SNE/MA Winter Fl.	SARC Panel Comments (1)

- **Assessment Terms of Reference were satisfactorily addressed.**
- **The Review Committee agreed with the SDWG that in 2010 the SNE/MA winter flounder stock was overfished, and that overfishing was no longer occurring.**
- **The statistical catch-age model is a scientifically credible approach… a reasonable basis for fisheries management advice.**
- **The survey age-aggregated indices are declining faster than the preferred model would predict in the last decade for the SNE/MA stock, which may point to a time varying M.**

SARC Panel Comments (2)

- **A concern: Exploitable biomass estimates might be biased high. (weights at age are derived from the catch and thus the size at age may be conflated with selectivity).**
- **Results not overly sensitive to reasonable alternative catch allocation decisions.**
- **While there appeared to be higher recruitment rates at lower temperatures, predicting future recruitment not straightforward.**
- **Description of stock vulnerability should have focused more on biology (e.g., life history, productivity, resilience to impact from fishing environmental conditions) and less on statistical diagnostics.**

SARC Panel Recommendations (1)

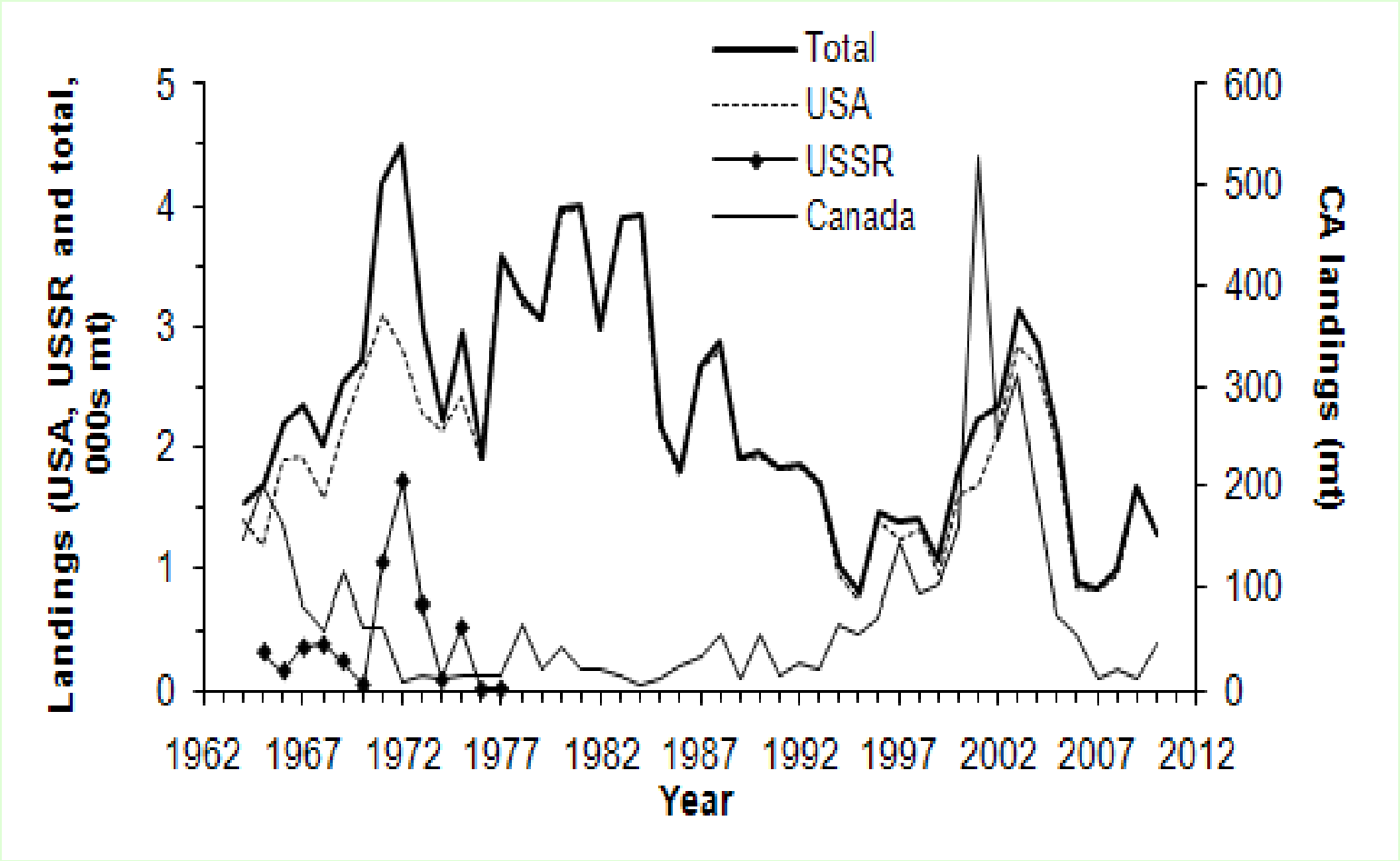
- **Examine sensitivity of catch estimate and assessment results to assumed discard mortality rate.**
- **Construct PSEs to better reflect overall uncertainty of the statistical catch at age model. Consider partitioning PSE into components (e.g., catch allocation vs discard sampling).**
- **Additional consideration should be given as to how or whether surveys should be combined in the model.**
- **Length-based net calibrations between vessels were informative and appeared appropriate. Method might be considered for additional peer review.**
- **Rather than basing it on a point estimate, evaluate the probability of being overfished or overfishing taking place.**

SARC Panel Recommendations (2)

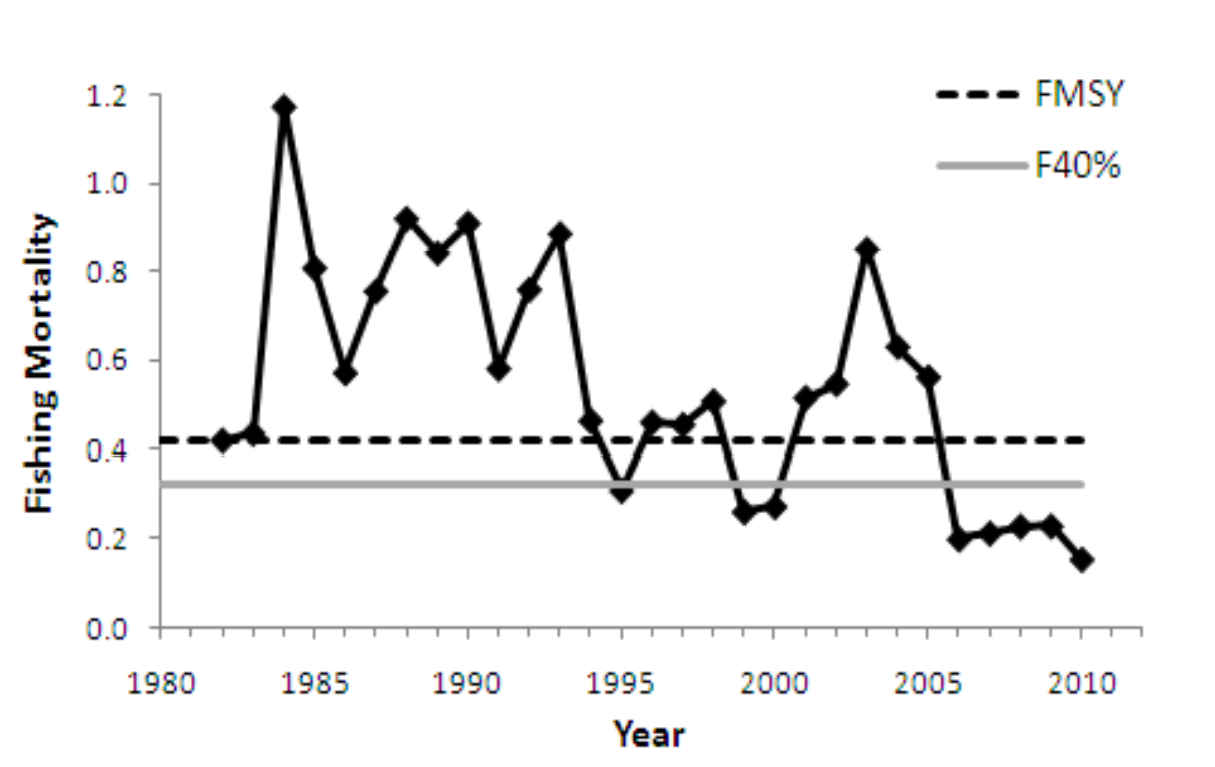
- **Further explore the magnitude of M (i.e., natural mortality rate) in the model, and consider whether it should be "time varying"**
- **Consider presenting relative survey Zs (i.e. relative total mortalities) for each survey to examine trends in exploitation rates independent of the assessment model.**
- **The work conducted on environmental factors was fruitful and efforts in this area should be continued.**
- **The effect of changing survey vessels and its impact on strata used in models could be explored further. Consider whether portions of the population shift into and out of certain zones.**

(B.) Georges Bank Winter flounder

GBK Winter flounder: Landings (1964-present)

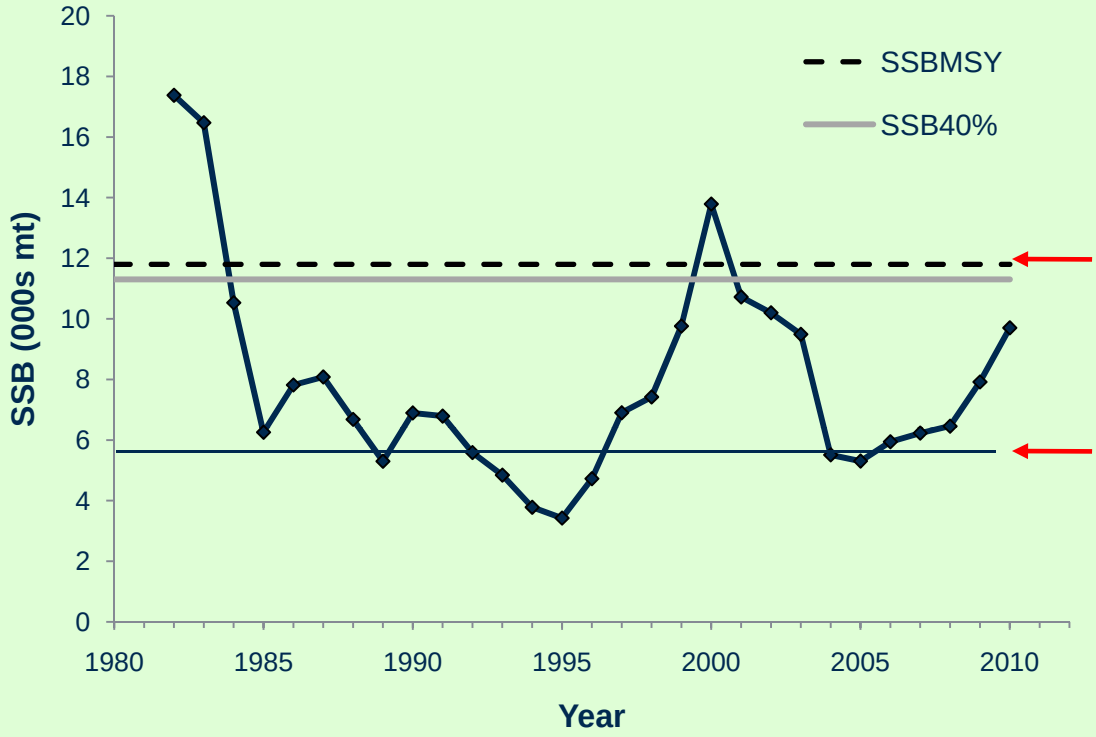


GBK Winter flounder: F (1982-present)



Trends in average fishing mortality rates (ages 4-6) for Georges Bank winter flounder during 1982-2010 (VPA). The MSY-based BRP is recommended for stock status determination. Overfishing has not occurred since 2005.

GBK Winter flounder: SSB (1982-present)

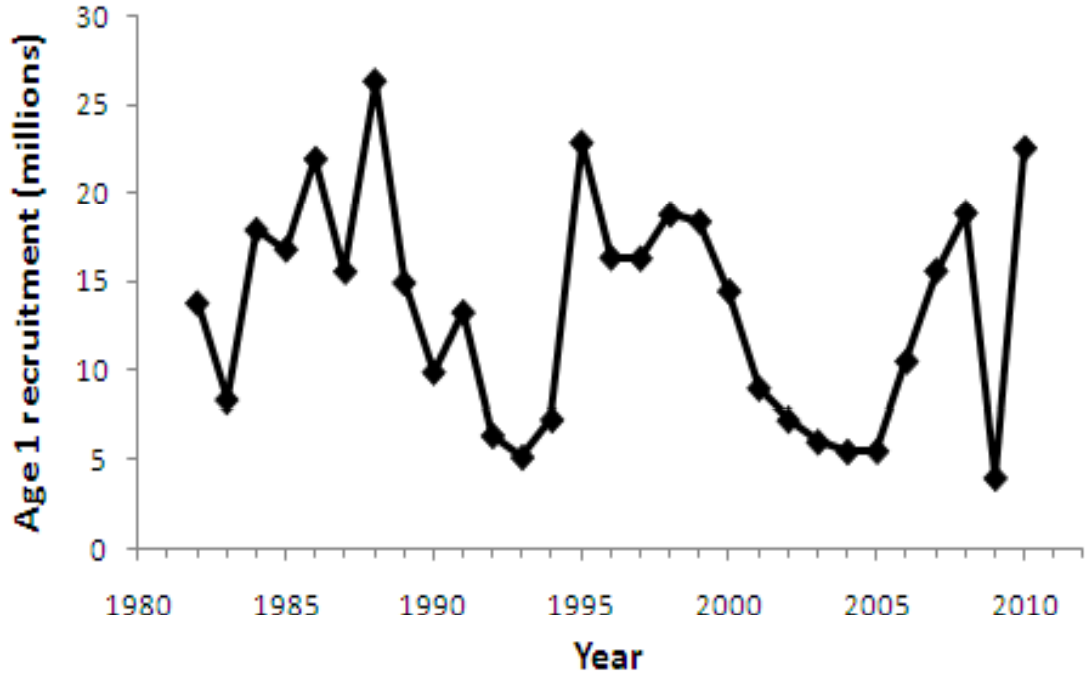


SSB_{MSY} = 11.8 kmt

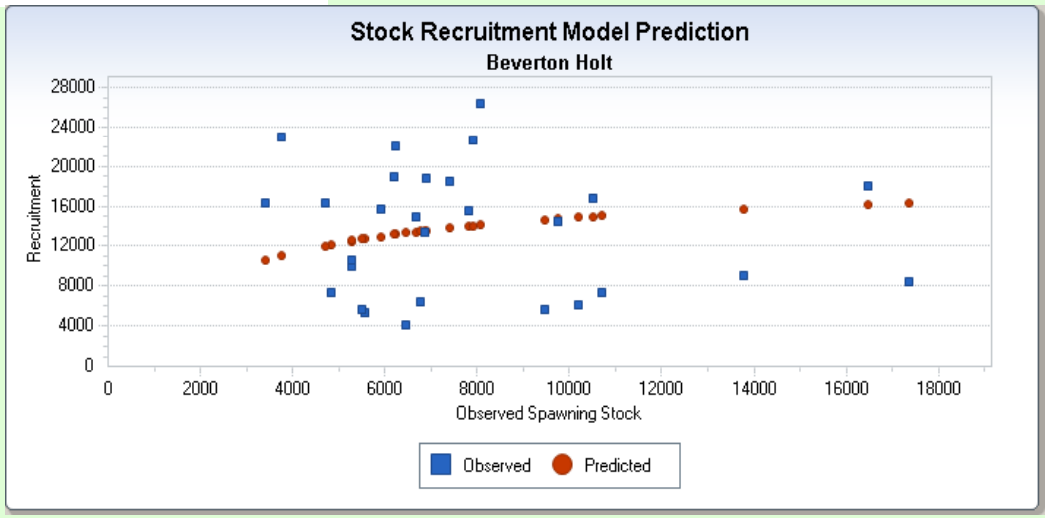
½ SSB_{MSY} = 5.9 kmt

Trends in spawning stock biomass (SSB, 000s mt) ,1982-2010. The MSY-based BRP is recommended for stock status determination.

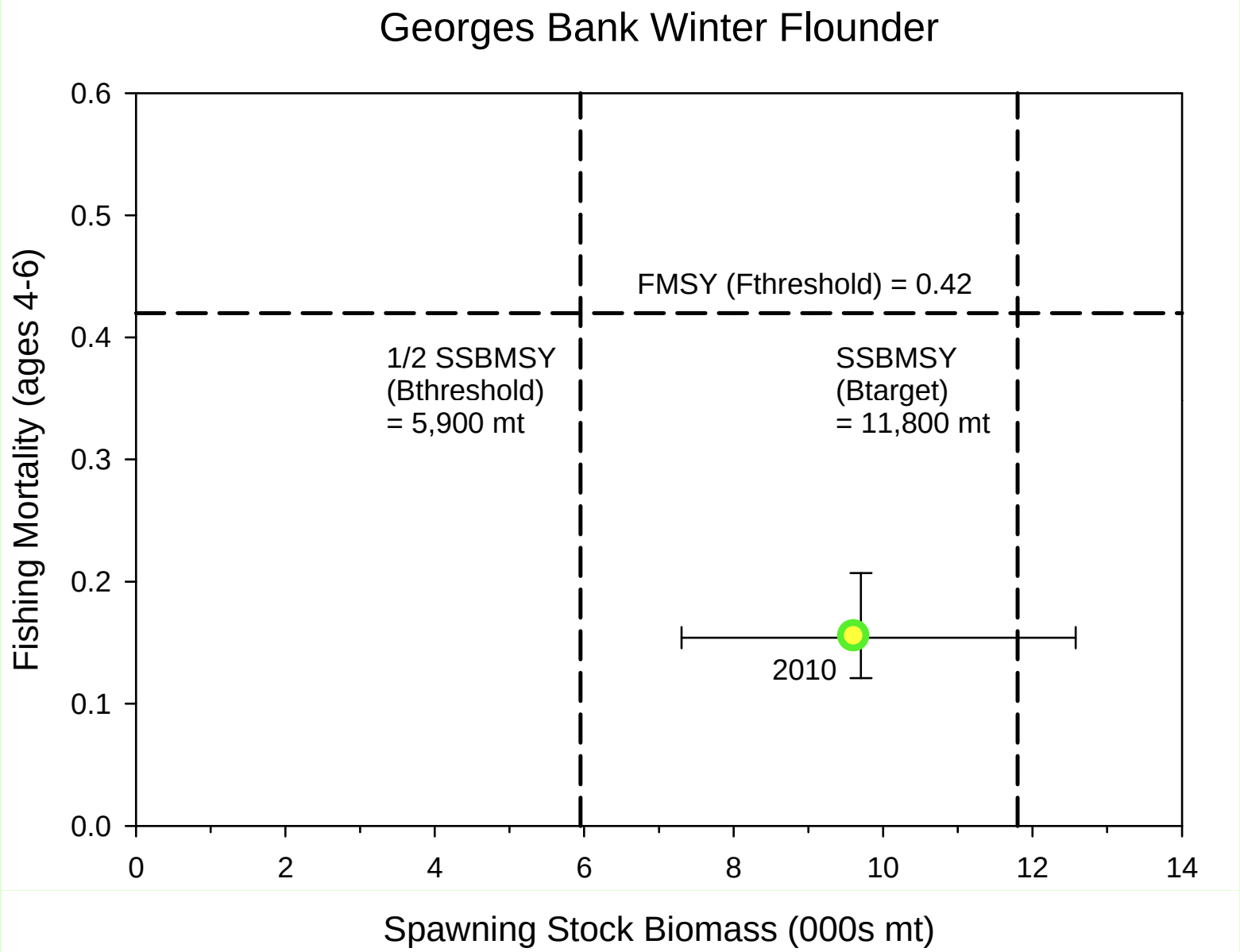
GBK Winter flounder: Recruitment (1982-present)



Trends in age 1 recruitment (Jan. 1 stock numbers in millions) for Georges Bank winter flounder during 1982-2011.



GBK Winter flounder: 2010 Stock Status



GBK Wint. Fl.:

SARC Panel Comments

- **Assessment Terms of Reference were satisfactorily addressed.**
- **The Review Committee agreed with the SDWG that in 2010 the GBK winter flounder stock was not overfished, and that overfishing was not occurring.**
- **The VPA model is a scientifically credible approach… a reasonable basis for fisheries management advice.**
- **A concern: Spawning biomass estimates might be biased. (weights- at-age are derived from the catch and thus the size at age may be conflated with selectivity).**
- **Results not overly sensitive to reasonable alternative catch allocation decisions.**
- **Description of stock vulnerability should have focused more on biology (e.g., life history, productivity, resilience to impact from fishing environmental conditions) and less on statistical diagnostics.**

GBK Wint. Fl.: SARC Panel Recommendations

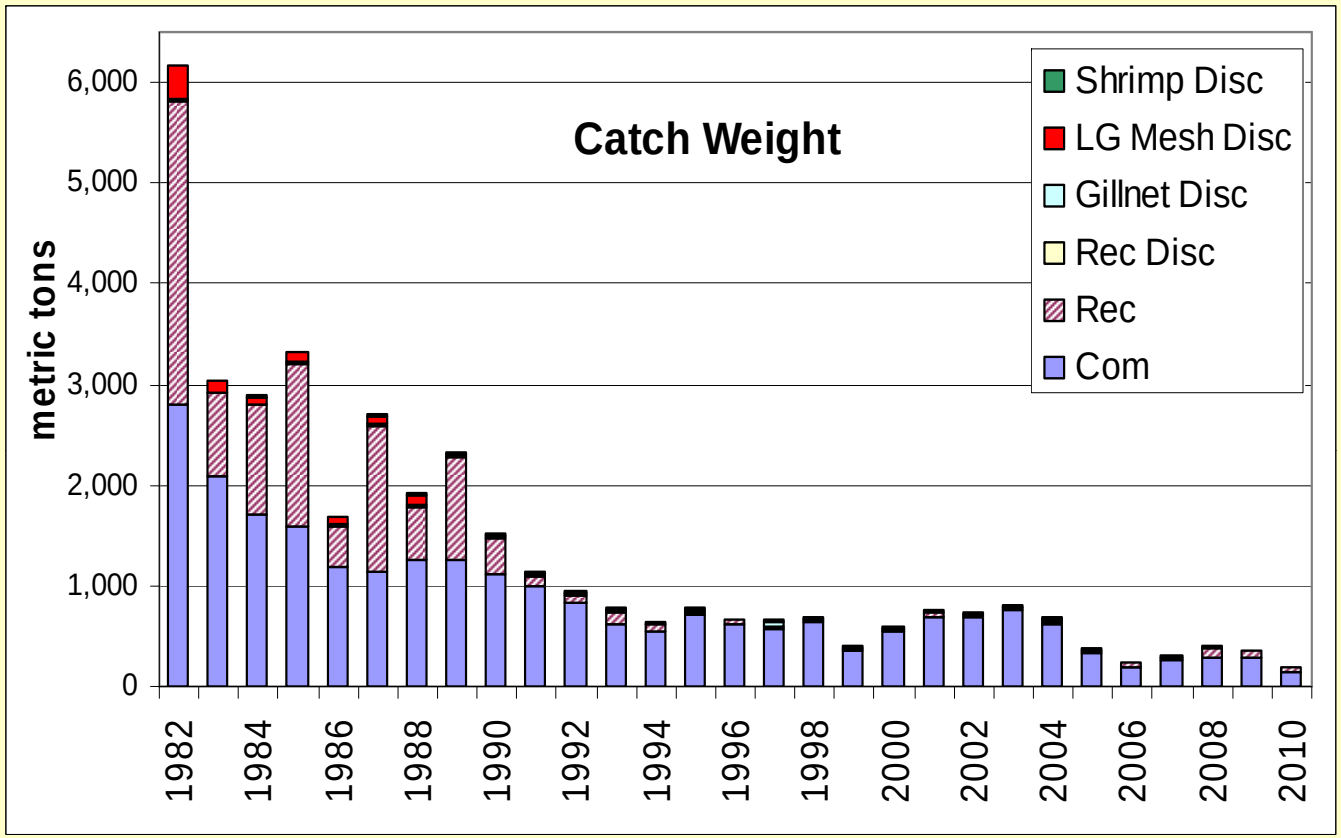
- Consider Statistical catch-age model (SCAA) in future. May be better than VPA for treatment of catch and discard uncertainty.
- Additional consideration should be given as to how or whether surveys should be weighted in the model.
- Catch calibrations between survey vessels were informative and appeared appropriate. Consider additional peer review.
- Rather than giving a point estimate, evaluate the probability of being overfished or overfishing taking place.
- Consider relative survey Zs (i.e. total mortalities) for each survey. An alternative approach to examine exploitation rates.
- Consider whether portions of the population shift into and out of certain zones.
- Could reexamine assumptions about sizes of fish discarded prior to 2002.
- Consider temporal/spatial resource changes.
- Consider developing a GBK larval retention index.

(C.) Gulf of Maine Winter flounder

Background: In 2008 an analytic assessment was not accepted in GARM III (NEFSC 2008). That resulted in the status of the stock being unknown in 2008.

GOM Wint. Fl.:

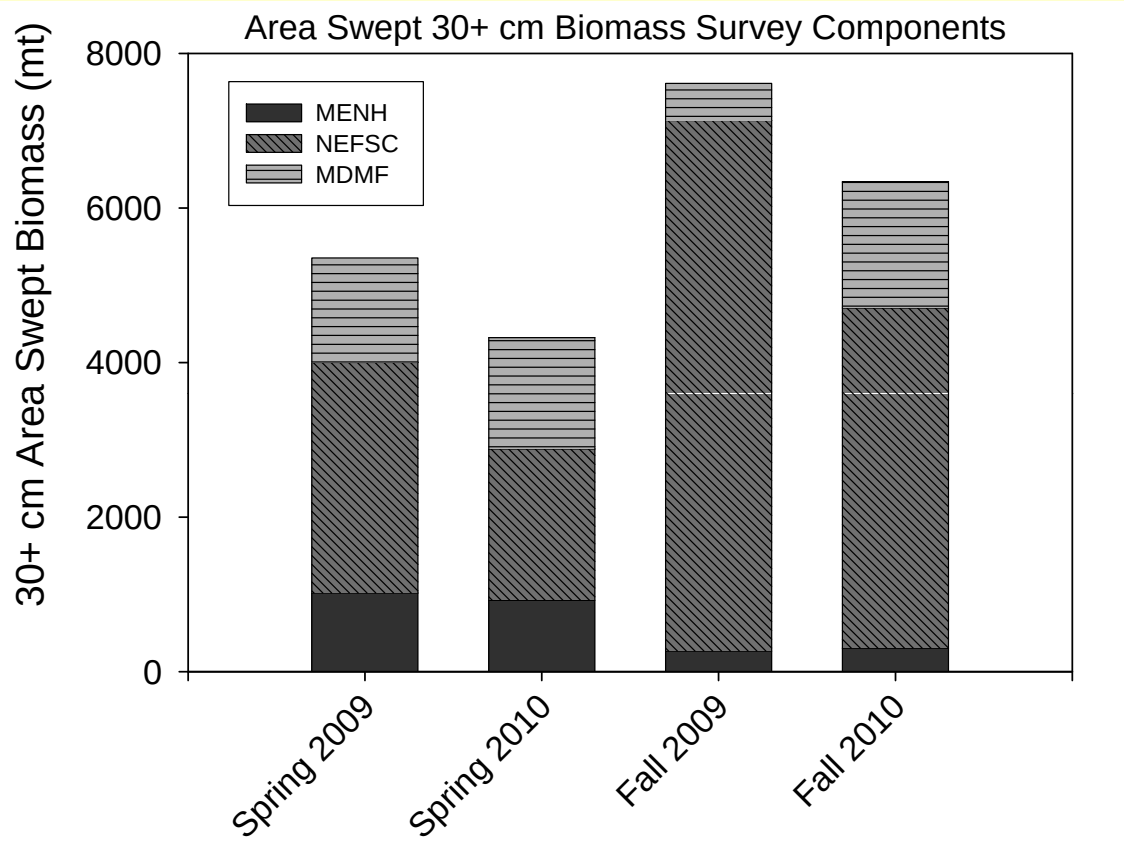
Catch (1982 – 2010)



Has declined over time.

GOM Wint. Fl.:

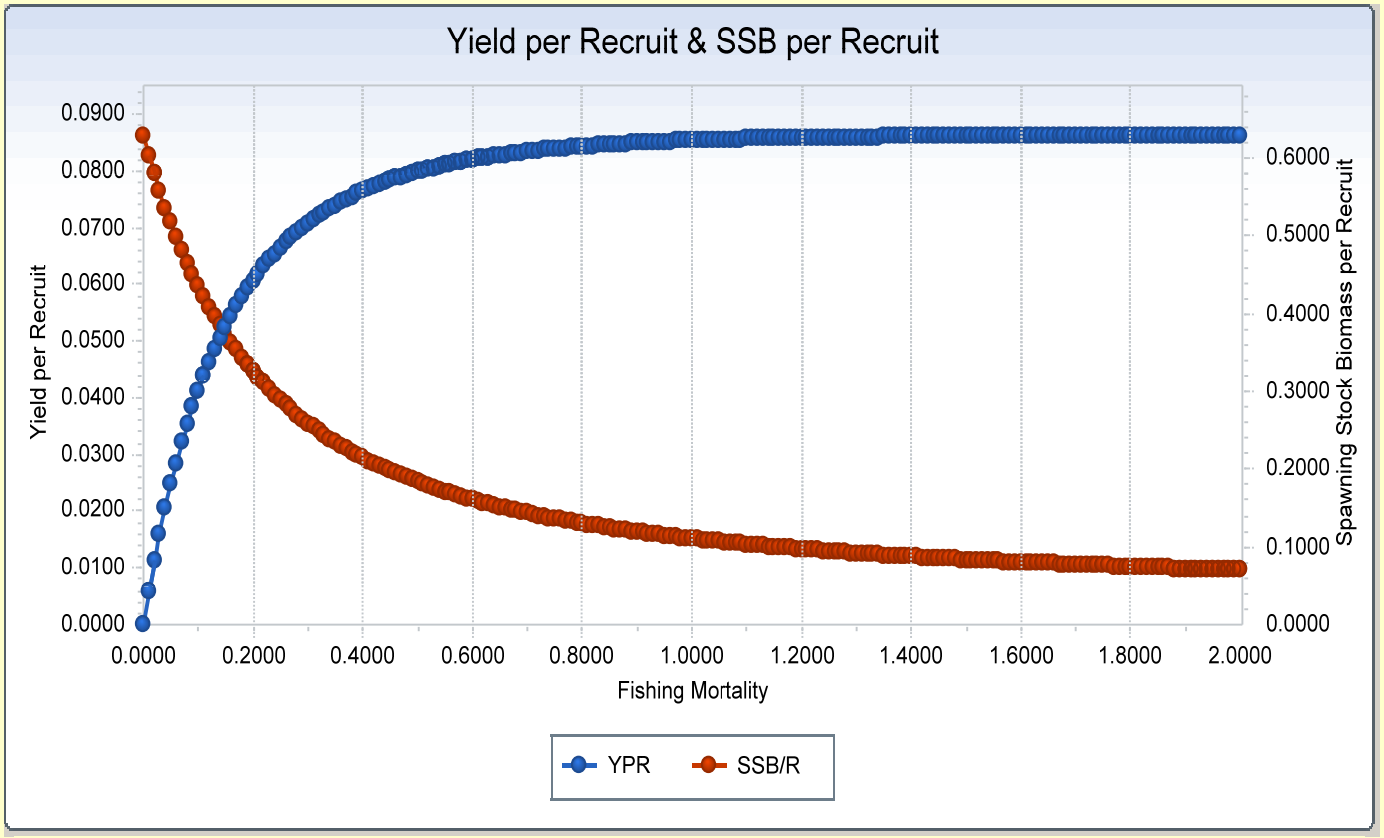
B estimates from NEFSC Surveys



- This is a survey-based, fall back method to determine overfishing status.
- Analytical model (ASAP) was not accepted.

GOM Wint. Fl.:

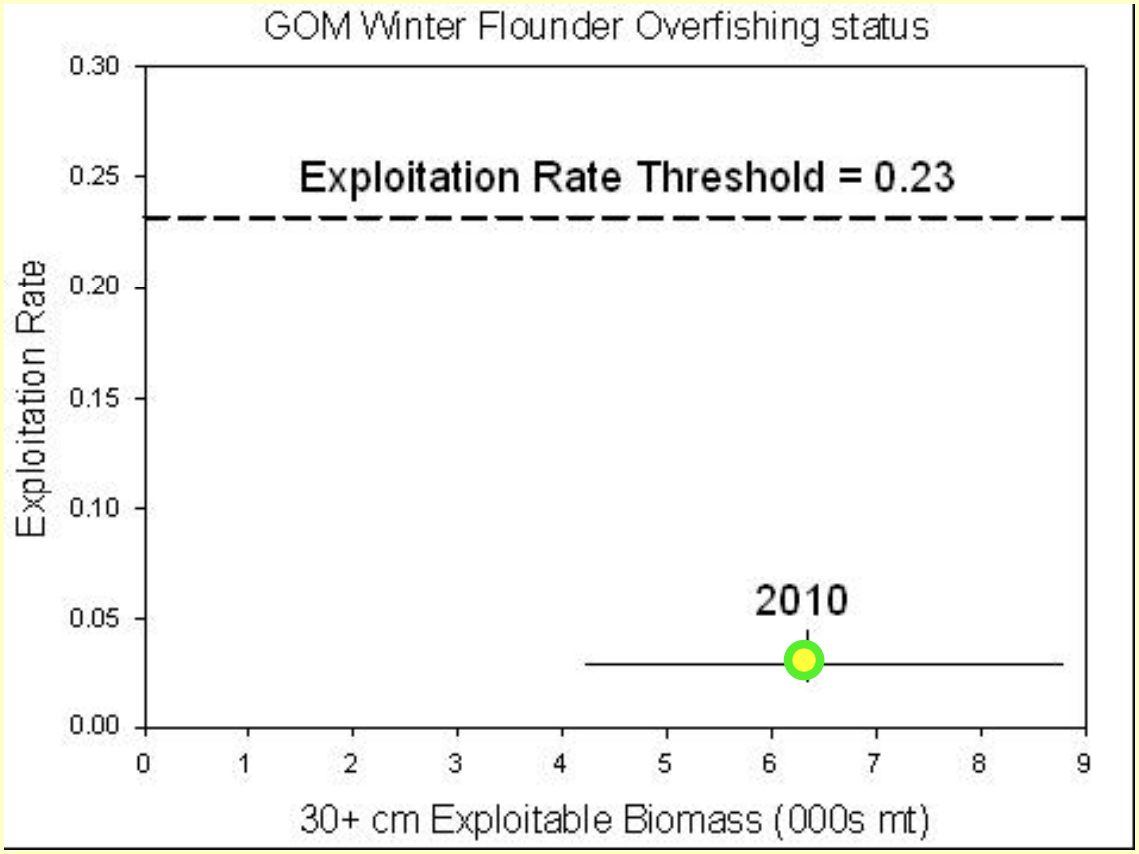
BRP Calcs



Overfishing threshold: BRP proxy $F_{40\%}$ = 0.31

Overfished target & threshold: (unknown)

GOM Wint. Fl.:



Overfishing Stock Status for 2010 with respect to a proxy for F_{MSY}. 80% confidence intervals shown for B and Expl Rate.

BRP $F_{40\%}$ = 0.31 (corresponds to threshold exploitation rate of 0.23).

GOM Wint. Fl.: SARC Panel Comments (1)

- **Assessment TORs were PARTIALLY addressed.**
- **Statistical catch-age model could NOT fit trends in the catch and survey data.**
- **Uncertainty about data quality, possible changes in productivity, and possible shifts in stock distribution led Review Panel to seek other approaches to provide management advice.**
- **Swept area-biomass method was adopted as a gauge of overfishing status and stock biomass.**
- **Based on swept-area method, overfishing did not appear to be taking place in 2010 in GOM wint flounder stock; not possible to determine whether overfished.**

GOM Wint. Fl.: SARC Panel Comments (2)

- **Because SCAA model was not accepted for use, only possible to estimate stock biomass and exploitation rates in 2009 and 2010.**
- **More information on what area of the stock distribution the particular survey covers should also be provided.**
- **F reference point, and the finding that overfishing is not taking place, is robust to reasonable choices of survey catchability q.**

GOM Wint. Fl.:	SARC Panel Recommendations

- General endorsement of Res. Rec. list from SDWG
- Catch calibrations between survey vessels were informative and appeared appropriate. Consider additional peer review.
- Rather than giving a point estimate, evaluate the probability of being overfished or overfishing taking place.
- Consider presenting relative survey Zs (i.e. relative total mortalities) for each survey to examine trends in exploitation rates independent of the assessment model.
- If a statistical catch-age model is eventually developed, consider how to appropriately estimate weight at age in the spawning population.