NOAA FISHERIES SERVICE

SAW/SARC-62 Summary
(NEFSC CRD#17-01)

Public Presentation: January 2017

SAW/SARC Process

1. **SAW Working Groups**

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

3. **Products: (Reviewer's Reports) + (2 Science Reports)**
   http://www.nefsc.noaa.gov/nefsc/saw/ (see SAW62)
   http://www.nefsc.noaa.gov/publications/ (see Ref. Docs.)

4. **Management advice:**
   - **SAW/SARC reports support SSC in making ABC recommendation.**

The 62th Northeast Regional
Stock Assessment Review Committee (62th SARC)

Stephen H. Clark Conference Room – Northeast Fisheries Science Center
Woods Hole, Massachusetts
Nov. 29 –Dec. 2, 2016

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

SARC Panelists:
Dr. Anders Nielsen
(Denmark; CIE)

Dr. Neil Klaer
(Australia; CIE)

Ms. Vivan Haist
(CAN; CIE)

A. Black sea bass

B. Witch flounder

(A.) Black sea bass

BSB

Assessment TORs (shortened)

1. Summarize spatial partitioning review
2. Estimate catch from all sources and describe uncertainty.
3. Present the survey data being used in the assessment.
4. Influence of environmental factors on distribution.
5. Implications of the hermaphroditic life history
6. Estimate annual fishing mortality, recruitment and stock biomass. Include historical retrospective.
7. Propose BRPs.
8. Evaluate stock status.
9. Conduct stock projections.
10. Review research recommendations and ID new ones.

BSB	SARC62 Panel Findings (1)

- **WG addressed criticisms of previous peer review.**
- **Assessment by north and south spatial sub-units is accepted.**
- **Combined BSB stock was not overfished and overfishing was not occurring in 2015.**
- **NEFSC Bigelow survey and recreational CPA demonstrate recent increase in abundance in the North sub-unit.**
- **Environment: Warm saline conditions improve juvenile survival. Shelf-slope front dictates offshore distribution.**

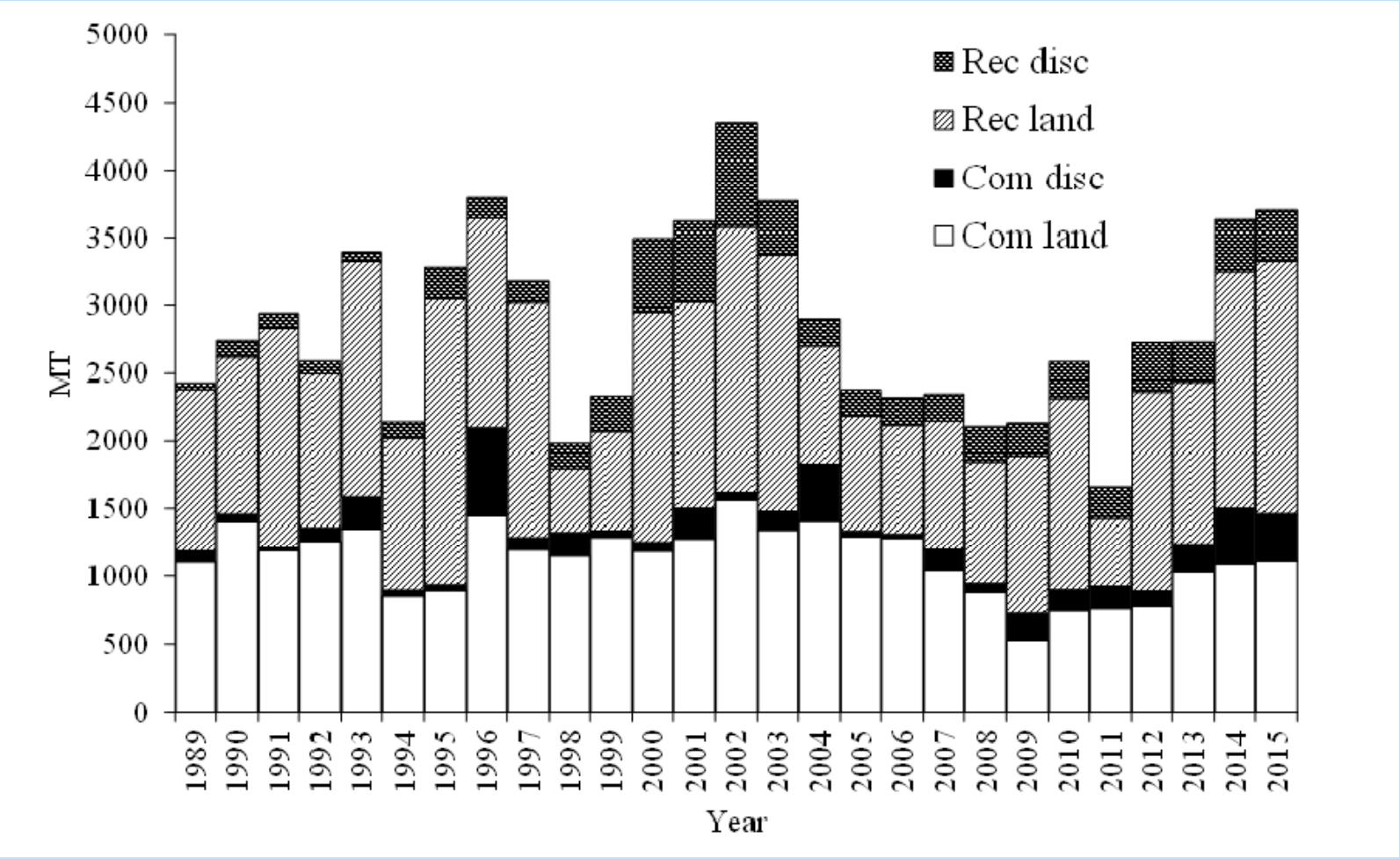
BSB	SARC62 Panel Findings (2)

- **Biological Reference Points were calculated separately for the N and S sub-units, and then combined.**
- **$F_{40\%}$ and $SSB_{40\%}$ were chosen as proxy BRPs**
- **Retrospective-adjustment is reasonable. Retros cancel when sub-units are combined. Adjustment does not alter status of the stock.**
- **Sensitivity analyses and other models provided additional support for the conclusions. Existing surveys provide good data on length, weight and age.**
- **Recreational catch and associated discard mortality are sources of assessment uncertainty.**

BSB	Panel Recommendations

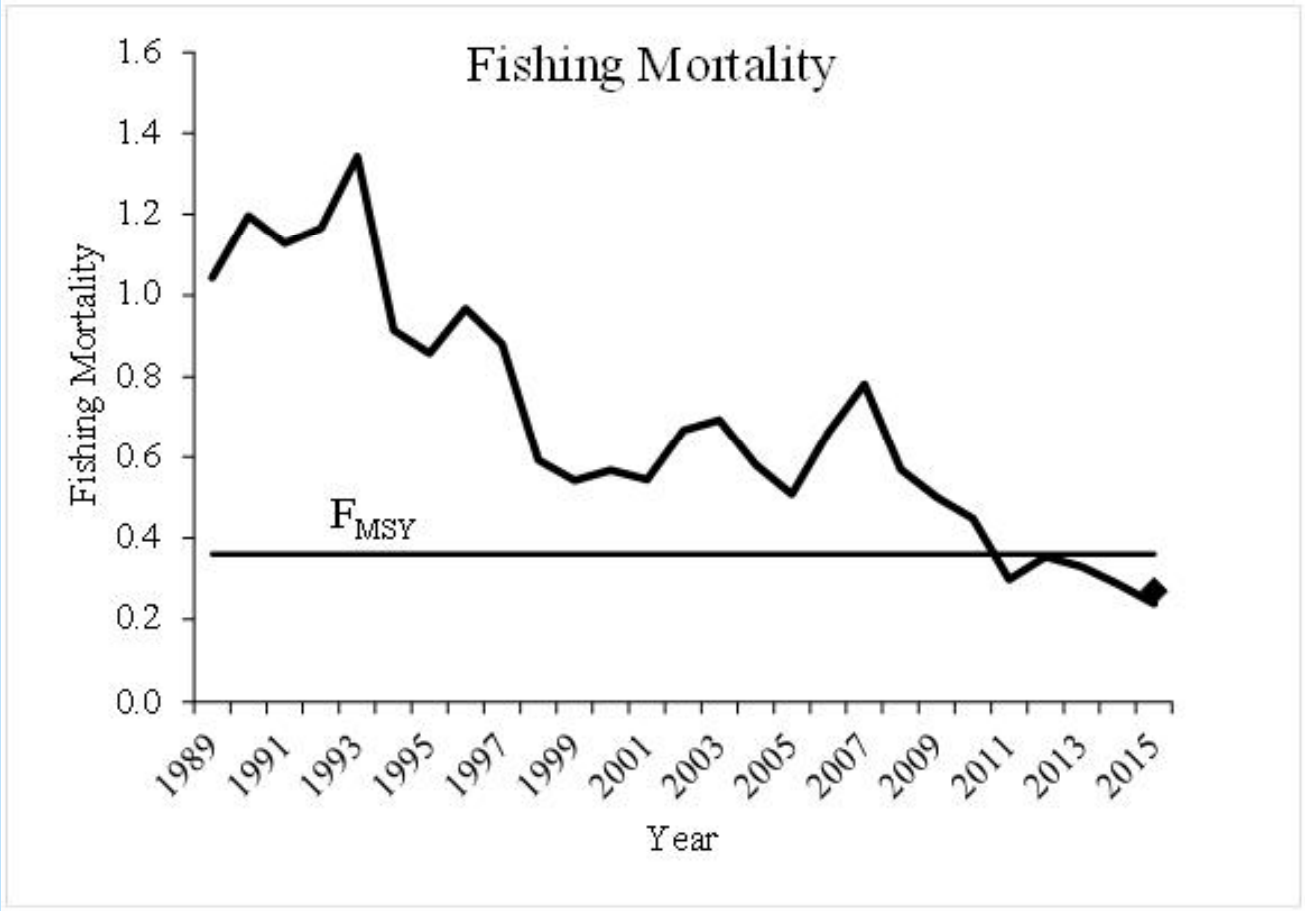
- **Spatial modeling could make additional use of survey indices and their relative catchabilities.**
- **Only the Combined projections should be used, because of the major retrospective issues seen within each sub-unit.**
- **Additional work on model uncertainty: 1) self-weighting models. 2) Application of prediction based methods with validation.**

BSB: Components of Catch



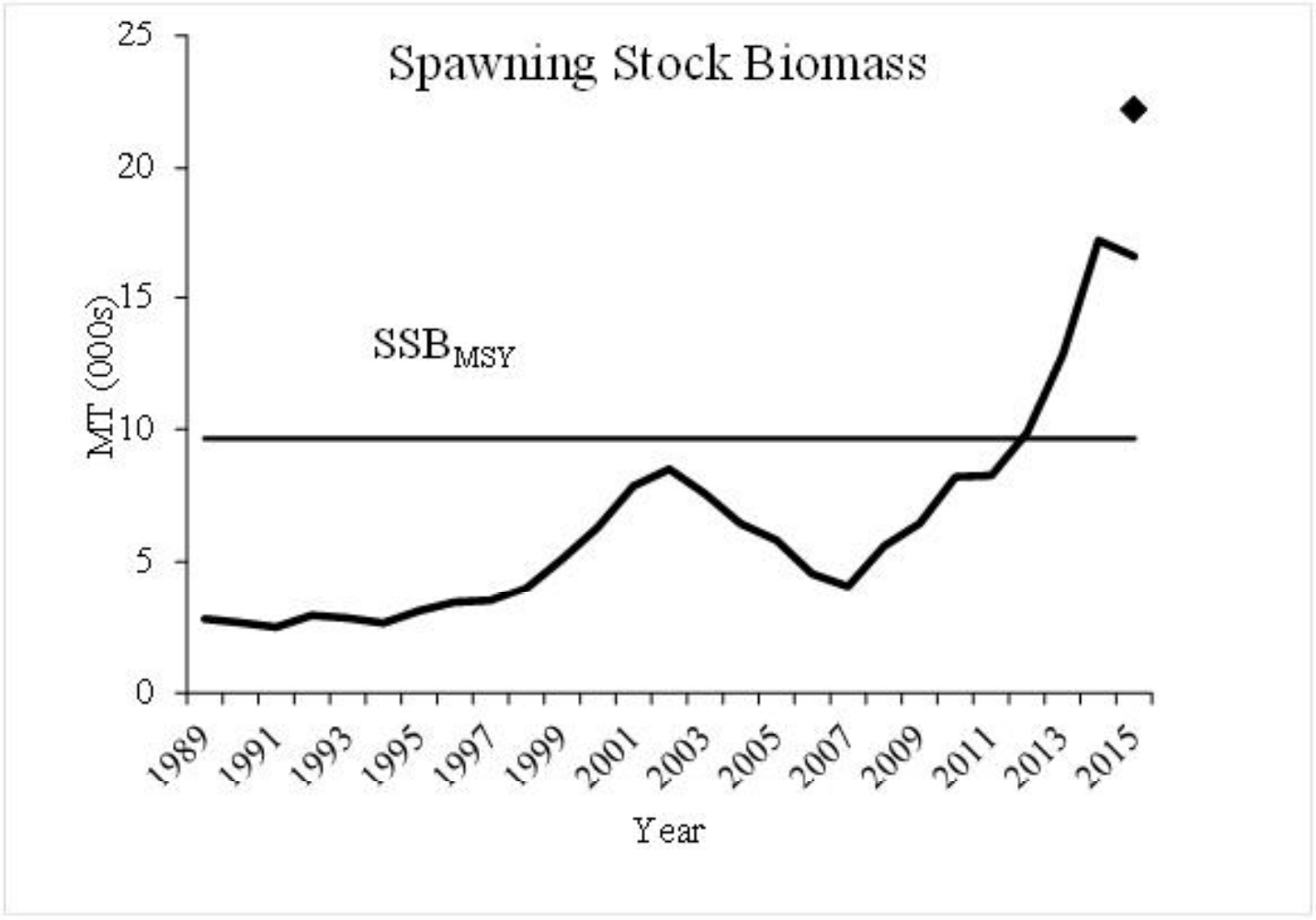
Commercial and recreational catch both important. Landings and discards have increased since 2011.

BSB: Fishing Mortality (1989 - 2015)



F was v. high until FMP began in 1997.
F has been below Fmsy proxy since 2011.
Current value in 2015 equals 0.27.

BSB: Spawning Stock Biomass (1989 - 2015)



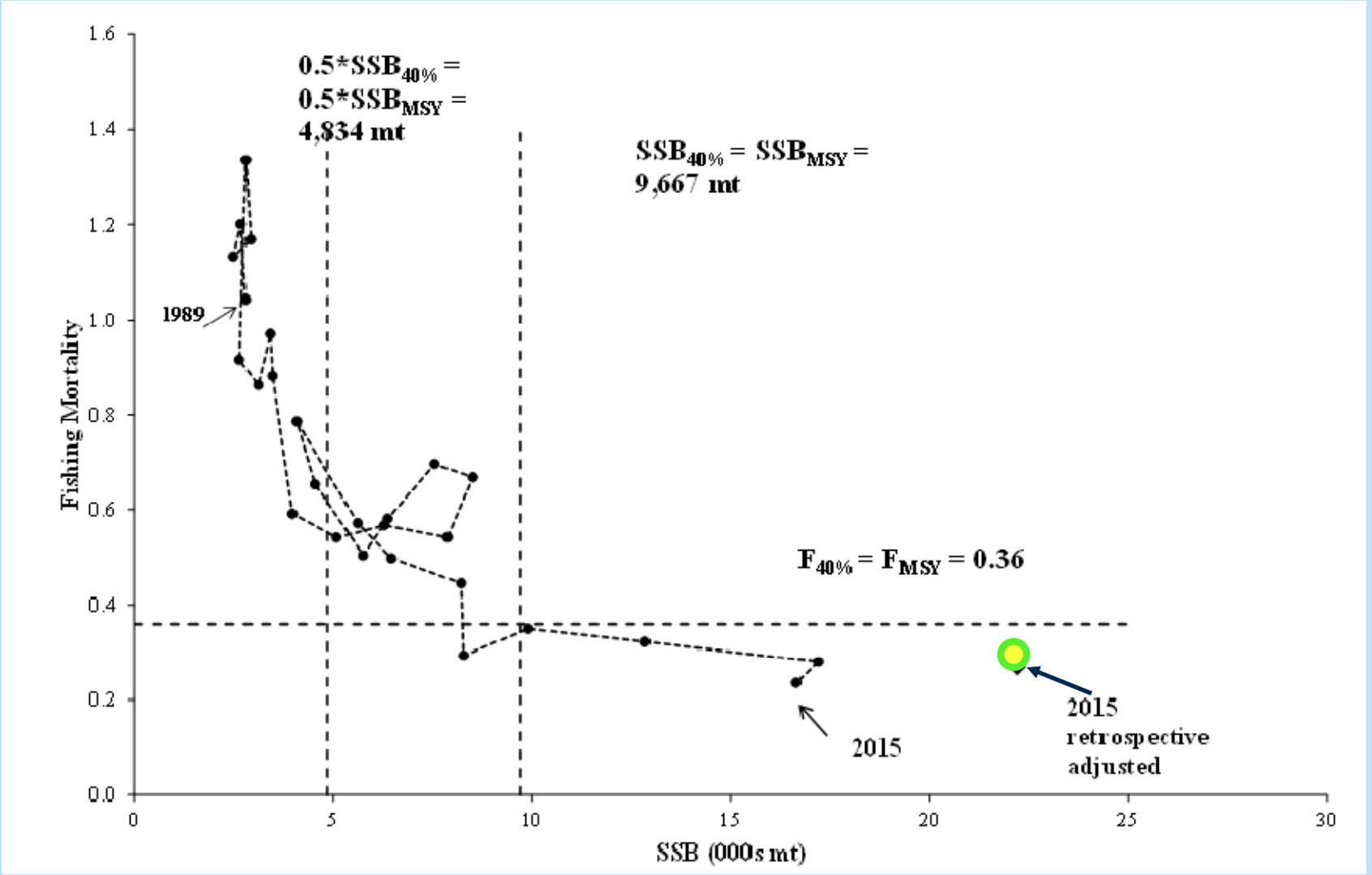
SSB has been on the rise since 2011 with low F, and annual recruitment ranging from average to very high. SSB is greater in the N subunit.

BSB: Recruitment (1989 - 2015)

Extremely high R in 2012 (2011 cohort). Dominant in the northern area, less so in the south. This cohort is moving through the fishery.

BSB: Stock Status over Time

Not Overfished, Not overfishing in 2015



A Sample BSB Projection

(Total Area Combined)

Assumptions: 2016 catch = quota, and fish at F_{MSY} proxy = 0.36 during 2017+.

		- 2 STD DEV	Average	+ 2 STD DEV
SSB (mt)	2015		22,176	
	2016	11,950	18,670	25,391
	2017	10,270	15,918	21,565
	2018	8,914	13,407	17,900
	2019	6,706	11,849	16,991
Recruits (000s)	2015		18,002	
	2016	2,025	25,081	57,593
	2017	1,987	25,126	57,664
	2018	1,998	25,096	57,597
	2019	2,012	25,133	57,846
Jan 1 biomass (mt)	2015		32,010	
	2016	20,322	29,350	38,379
	2017	18,461	27,540	36,619
	2018	15,255	23,315	31,375
	2019	11,725	20,788	29,851
Catch (mt)	2015		3,683	
	2016		3,024	
	2017	3,484	5,467	7,451
	2018	3,037	4,494	5,950
	2019	2,398	3,901	5,403

(B.) Witch flounder

Witch flounder

Assessment TORs (shortened)

1. Estimate catch from all sources
2. Present the survey data being used in the assessment
3. Influence of environmental factors on distribution.
4. Estimate annual fishing mortality, recruitment and stock biomass. Include a historical retrospective.
5. State the existing stock status definitions and updated or redefined biological reference points.
6. Evaluate stock status.
7. Stock and catch projections.
8. Current stock definition
9. Review research recommendations and ID new ones.

Witch Fl.	SARC62 Panel Findings (1)

- **New assessment model (ASAP) was rejected. Major retrospective pattern and unreasonable model q.**
- **Previous model (VPA) is not acceptable either. Similar retrospective pattern.**
- **Another model (SCAA) helped identify configurations to explore, but assumptions must be valid.**
- **Witch flounder stock status is unknown with respect to biological reference points.**
- **No basis currently for: model-based BRPs, or to examine accuracy of previous results. Use of $F_{40\%}$ for catch advice not recommended.**

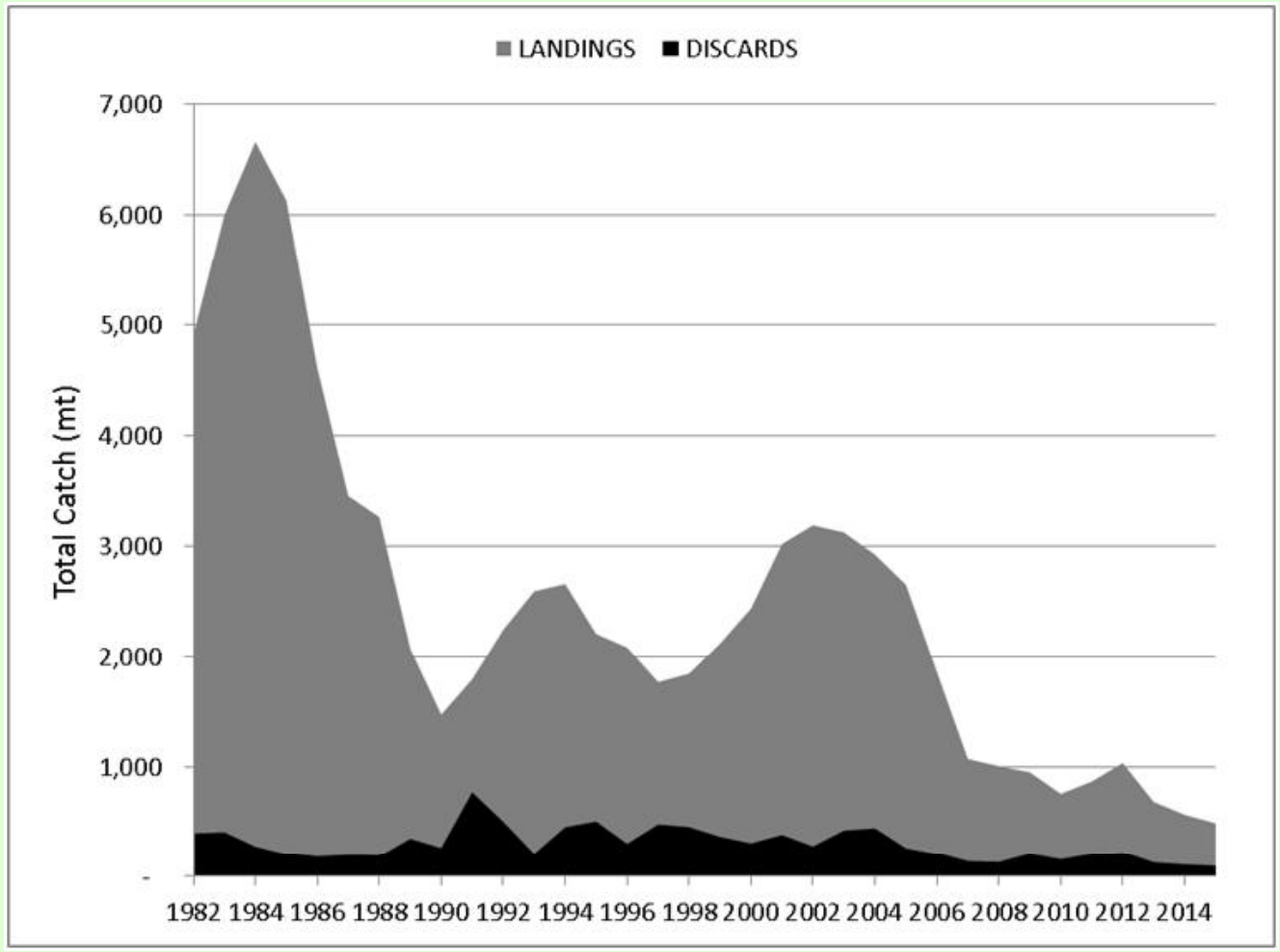
Witch Fl.	SARC62 Panel Findings (2)

- **An alternative empirical approach was used to determine biomass and exploitation rates. It could not be used to determine stock status, or do projections.**
- **Empirical analysis indicates stock biomass declined after 2002, but stabilized in recent years at a low historical level.**
- **Sweep study provides a *q* estimate that can be applied to NEFSC survey to determine a time series for population biomass. The analysis is based on several assumptions.**
- **Methods for calculation of discards seem appropriate.**

Witch flounder | Panel Recommendations

- **Use empirical approach as the basis for developing management advice. Panel did not fully review approach.**
- **Explore exploitation rate as basis for interim F_{MSY} proxy. ER is a fairly robust statistic.**
- **Evaluate assumptions associated with estimating catchability from the sweep study.**
- **Resolve the "retrospective" issue -- a general research topic.**
- **Document magnitude of under-reported catch through time.**

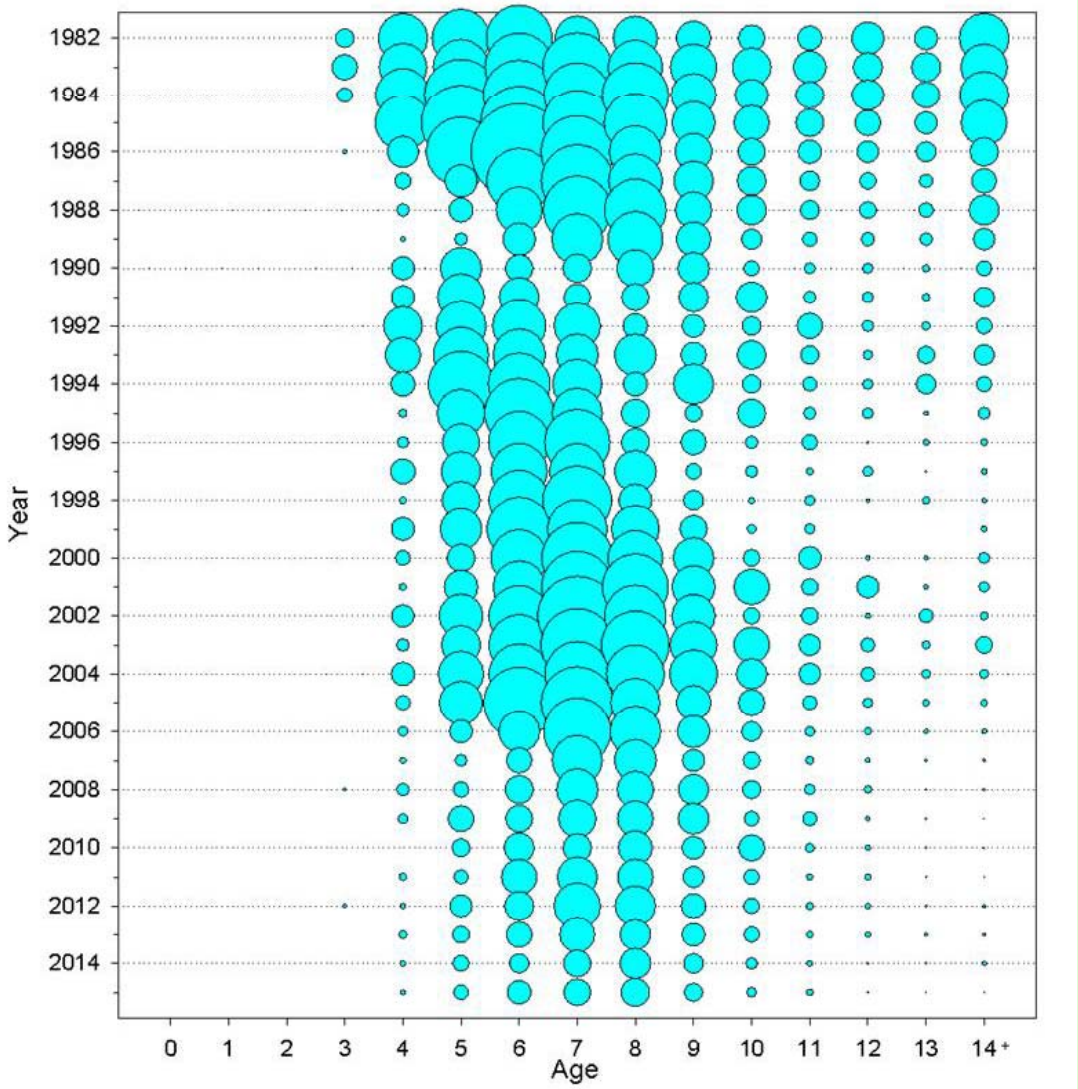
Witch flounder | Catch



Catches relatively low since 2008. Commer landings represent 70 – 97% of the catch. No Rec fishery.

Witch flounder

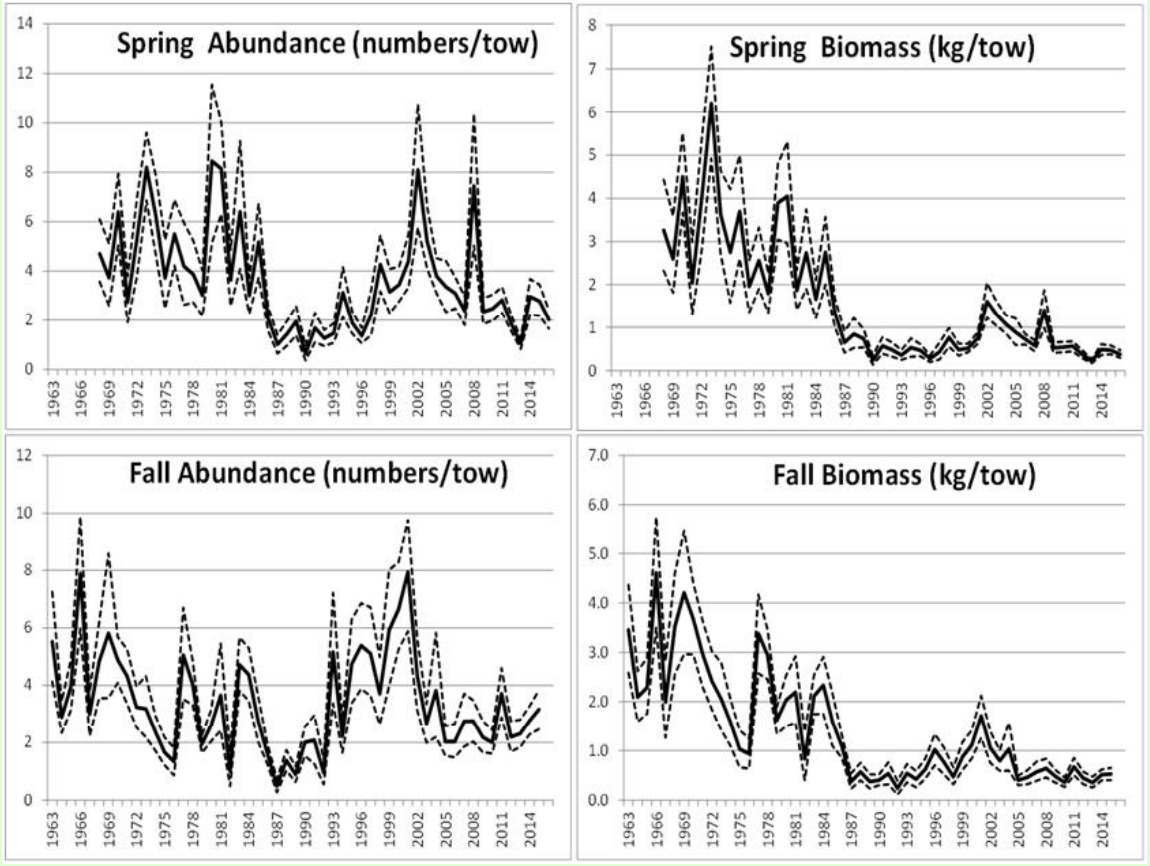
Commercial landings at Age



In Commercial landings data, truncation of age structure among older fish.

Witch flounder

NEFSC Survey Indices

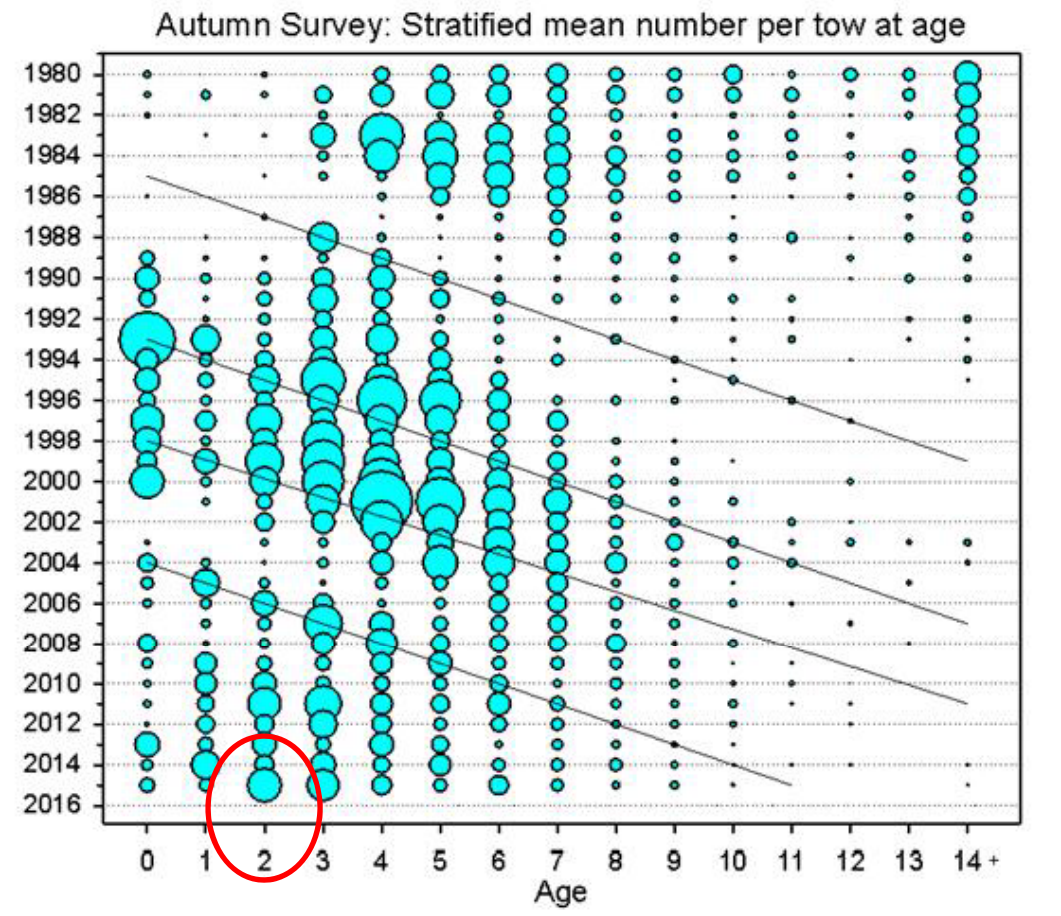


High #/tow in some years has not translated into high Biomass.

Biomass per tow has declined since the 1960's. Currently low, but not declining further.

Witch flounder

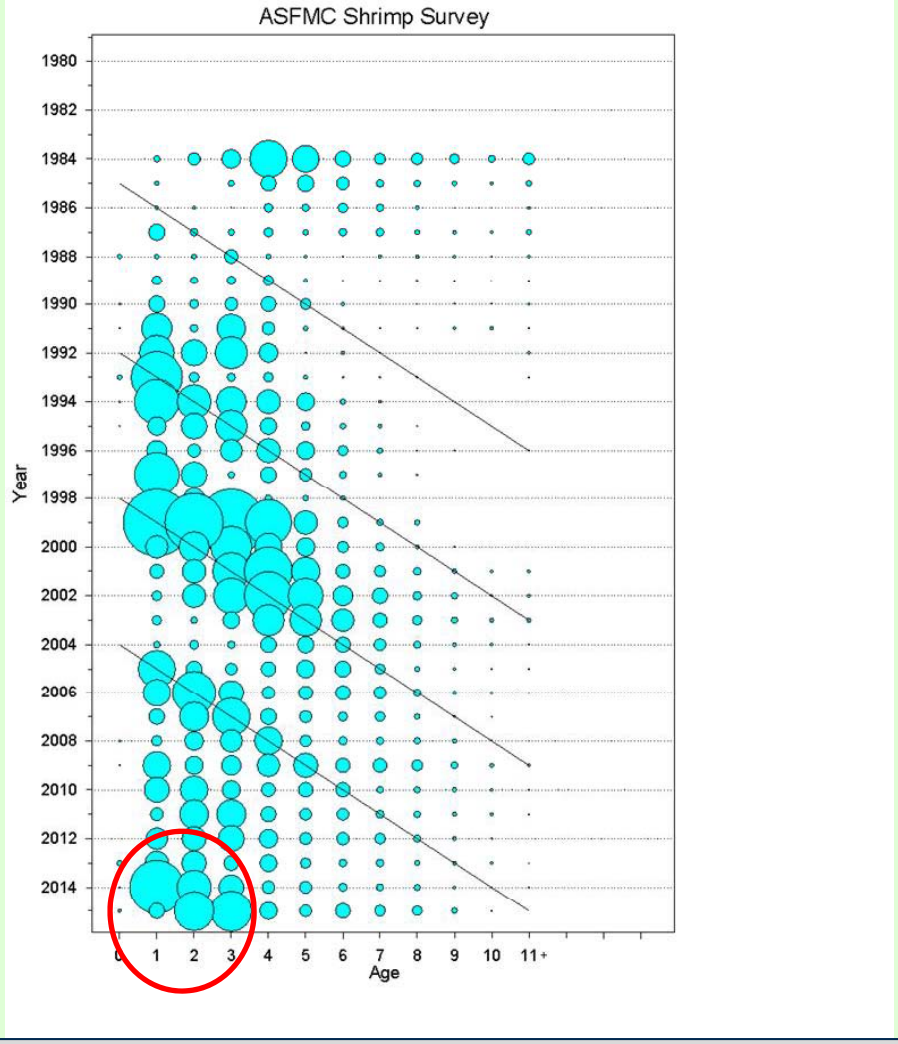
NEFSC Survey Age composition



In NEFSC survey, truncation of age structure among older fish. 2013 YC might be relatively strong, but this is uncertain.

Witch flounder

ASMFC “Shrimp” Survey Age composition



In “Shrimp” Survey, truncation of age structure. 2013 YC might be relatively strong. Similar YC signal appears in state surveys.

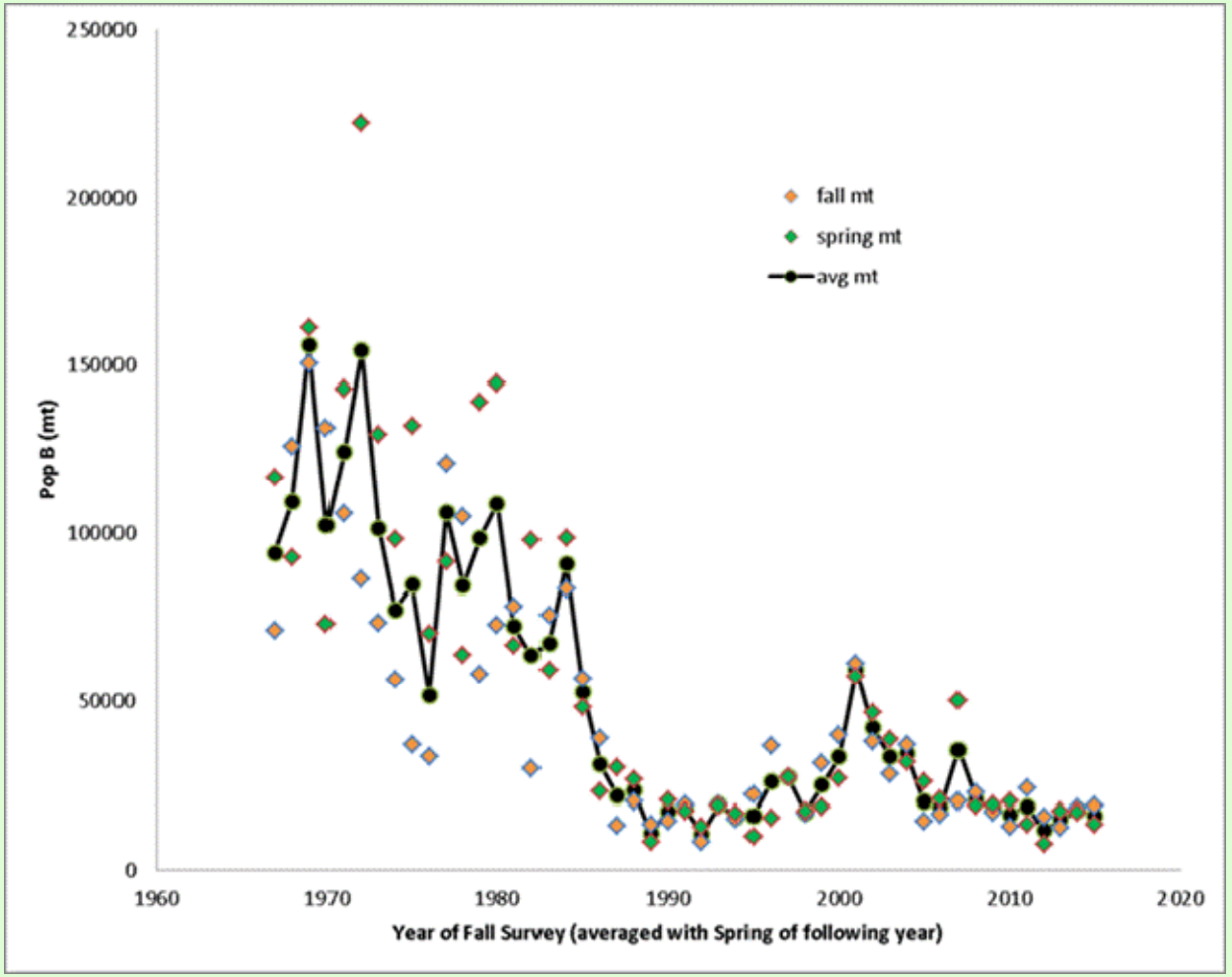
Survey Dredge Catchability Study

- **Twin trawl experiment (rockhopper sweep, chain sweep); *FV Karen Elizabeth* ; Gulf of Maine**
- **100+ paired tows; August 2016**
- **Study Purpose: to estimate maximum witch flounder catchability of NEFSC survey gear**

- **Results from study allowed estimation of <u>Population Biomass</u>**
- **There are several sources of uncertainty in estimating <u>Population Biomass</u>**

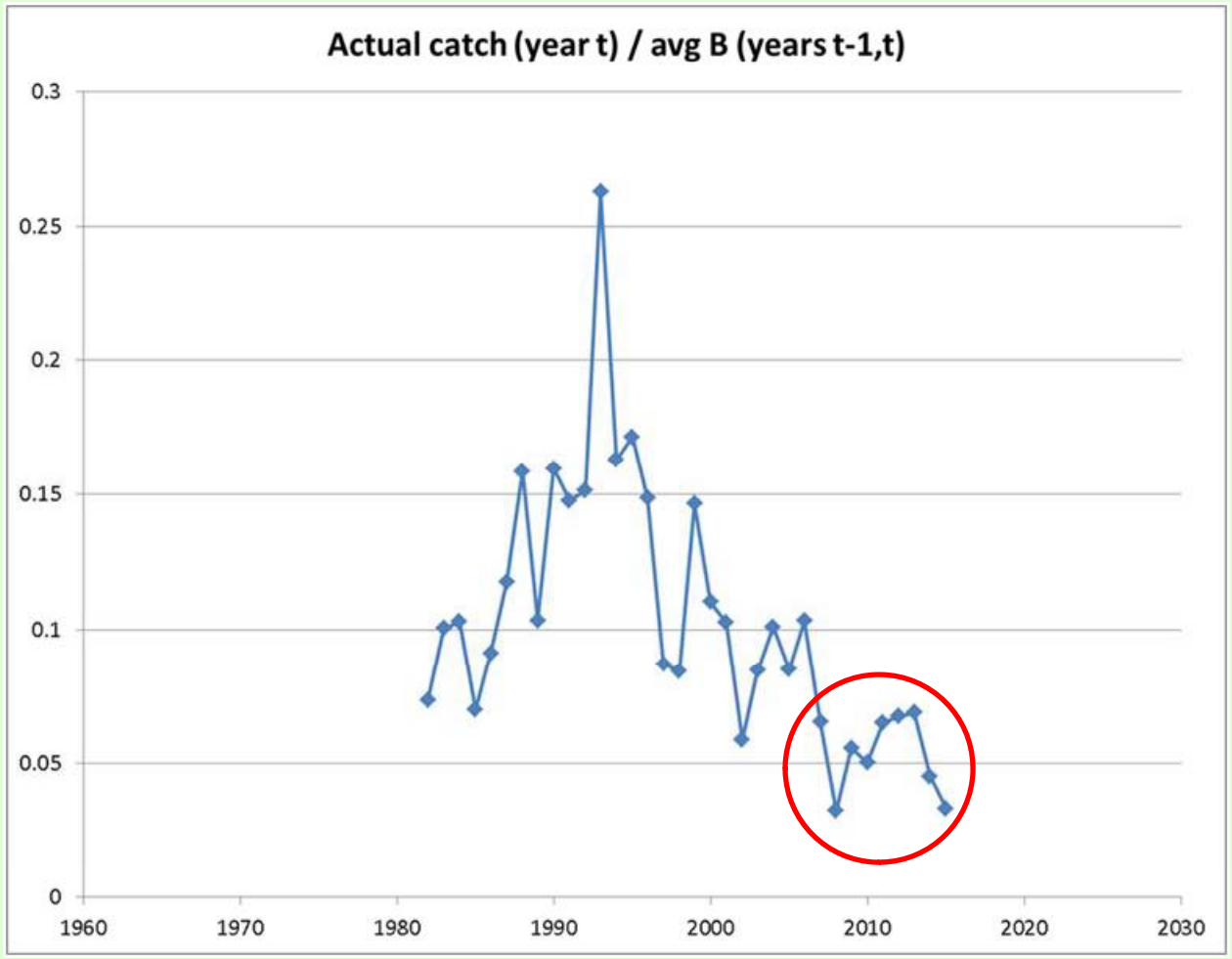
Witch flounder

Population Biomass



Stock biomass was highest 1960s – 1970s. Relatively low since 1990.
In recent years: it has declined since 2002 to about ~16 kmt .
Basis: "empirical area swept method".

Witch flounder | Exploitation Rate



Exploitation rate has declined since 1990.
Rate corresponding to recent catch is ~5%, and at this rate the stock has not declined further.