Gulf of Maine Winter Flounder

NOAA FISHERIES

NEFSC

Lead Scientist: Paul Nitschke

Last Assessed: 2014 Operational Assessments
2011 Benchmark SARC 52

30+ Survey Area-Swept

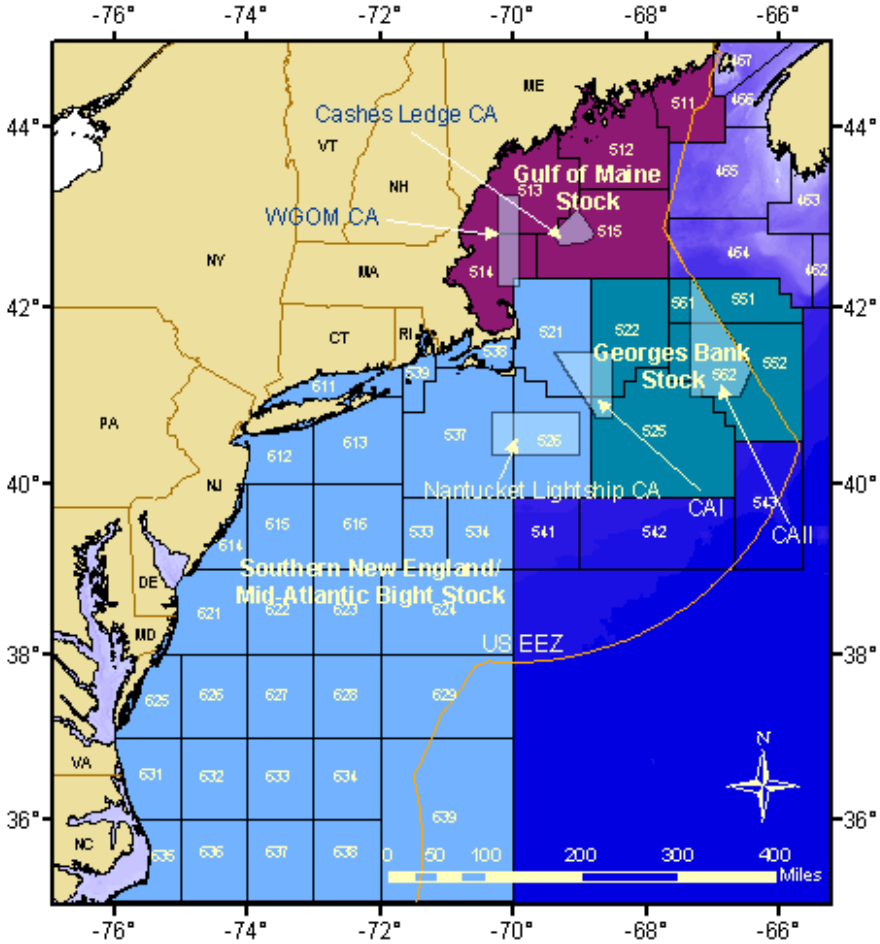
September 17, 2015

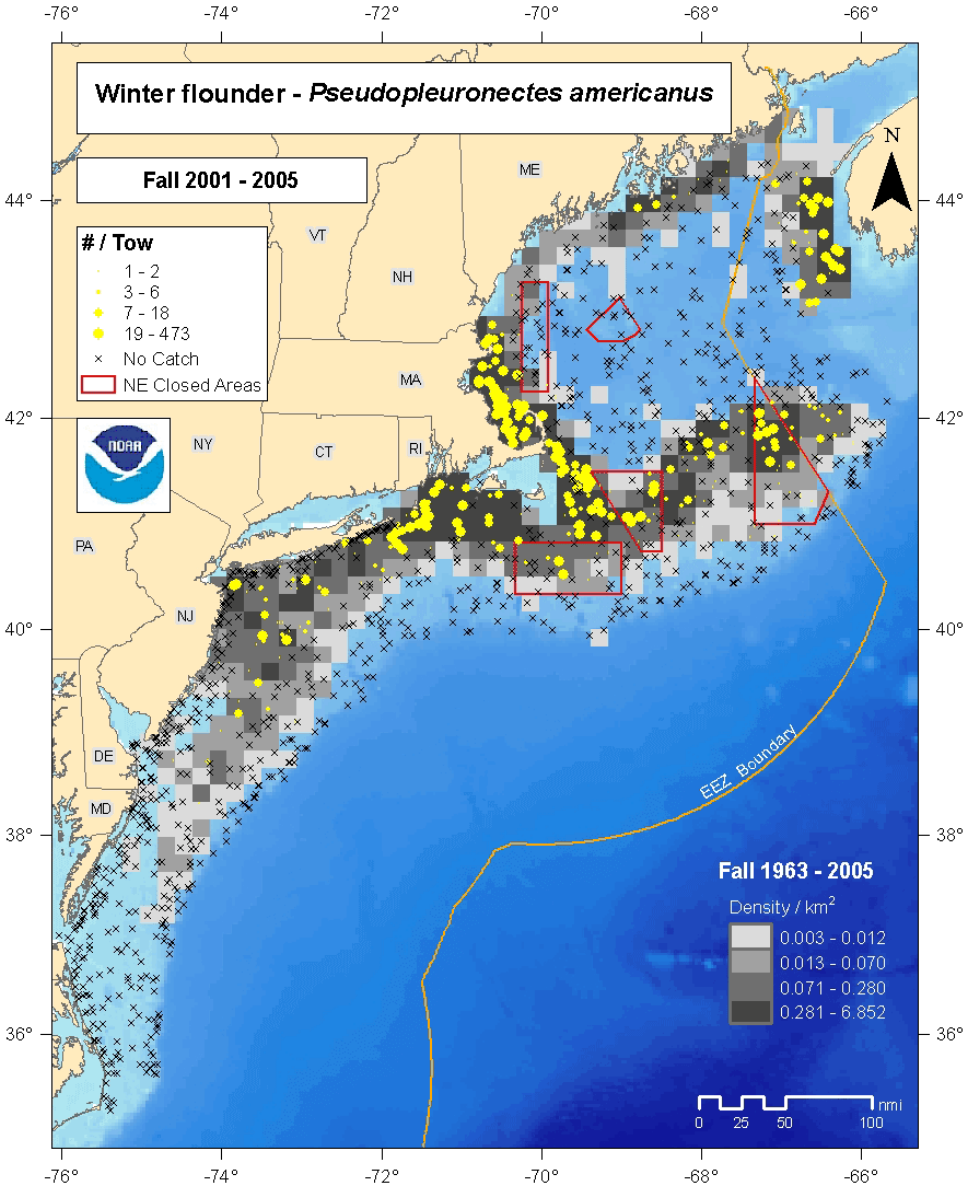
Assessment History

- Analytical model died at the SARC 52 Benchmark (2011) due to concerns with a large retrospective pattern. Models (VPA, SCALE, ASAP, SCAA) have difficulty with the apparent lack of a relationship between a large decrease in the catch with little change in the indices and age and/or size structure over time.
- Assessment is now based on 30+ cm area-swept biomass estimated directly from the surveys.

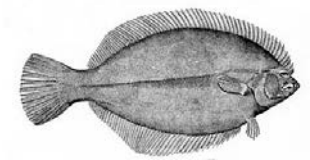
Current Status

- Overfished status is Unknown
- Overfishing not occurring

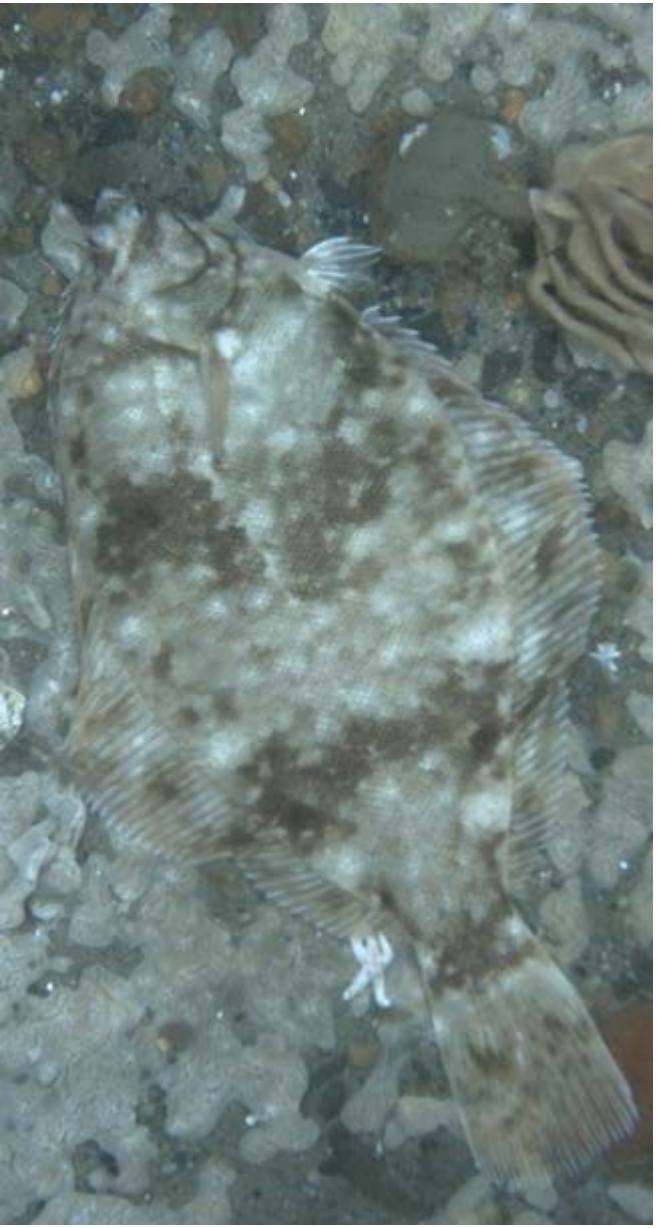


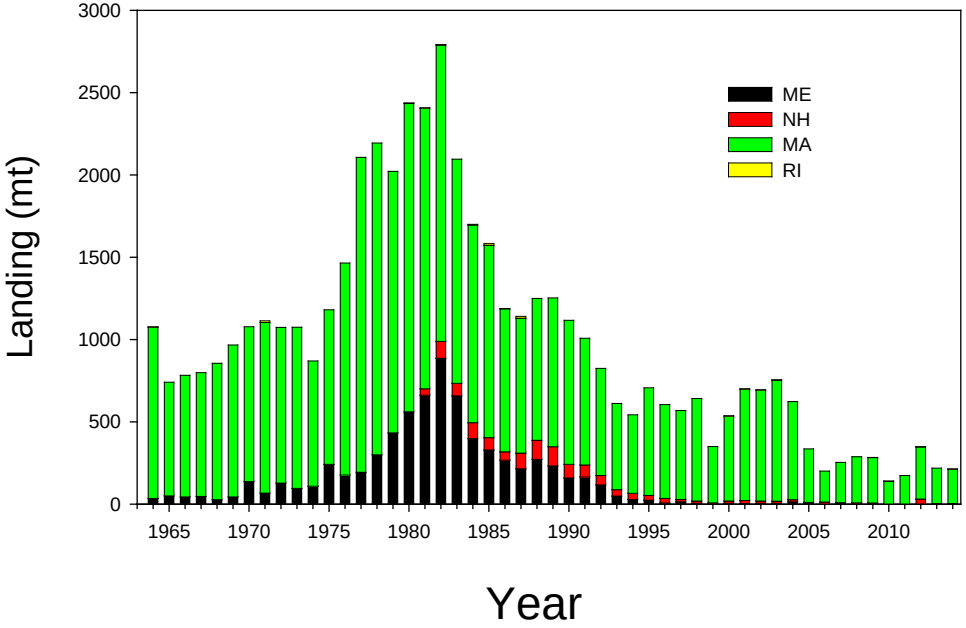


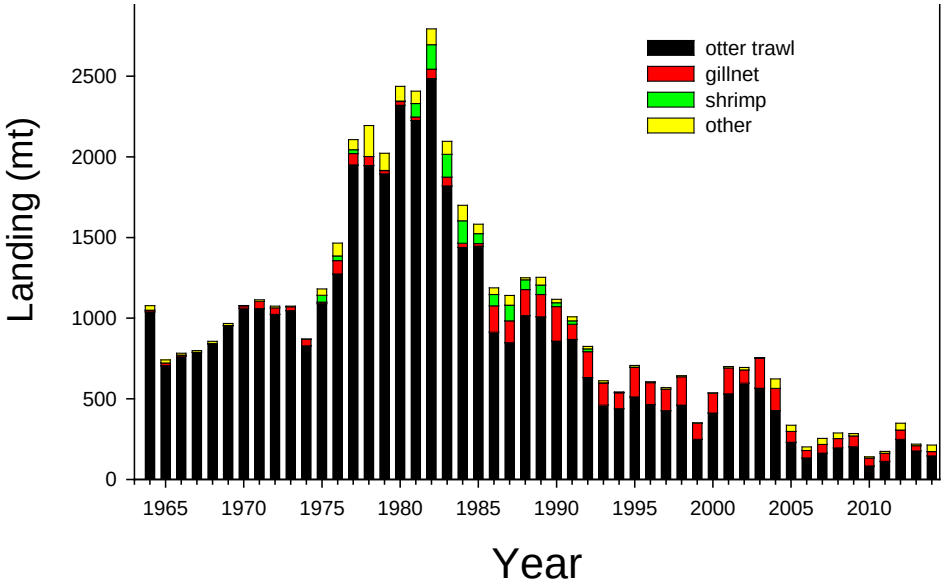
Assessment

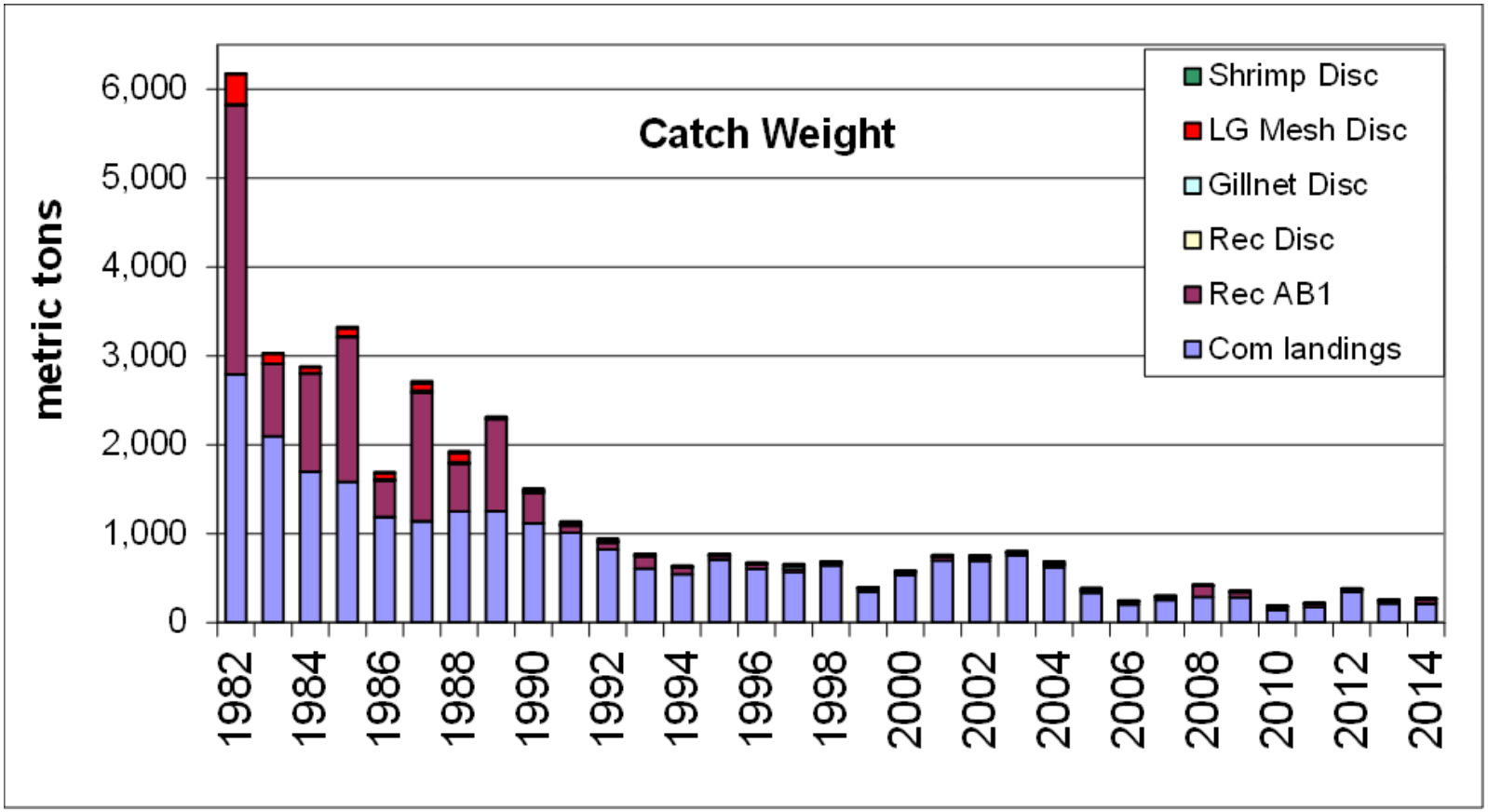


- Update trends in the NEFSC, MDMF, and MENH surveys.
- Estimate 2015 catch (commercial & recreational landing, recreational discards, large mesh trawl discards and gillnet discards).

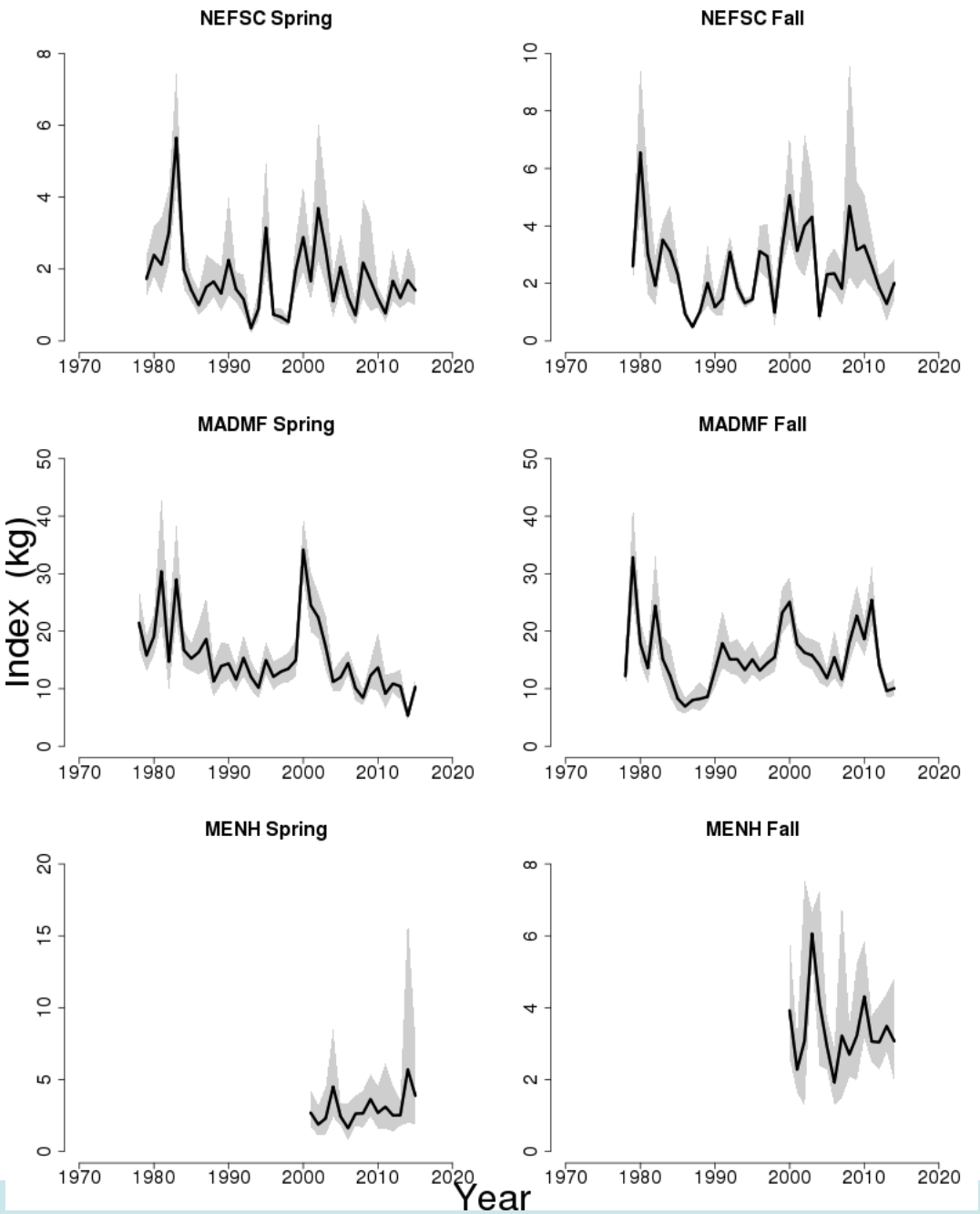



Landing (mt)
3000
2500
2000
1500
1000
500
0
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010
Year
ME
NH
MA
RI


Landing (mt)
2500
2000
1500
1000
500
0
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010
Year
otter trawl
gillnet
shrimp
other

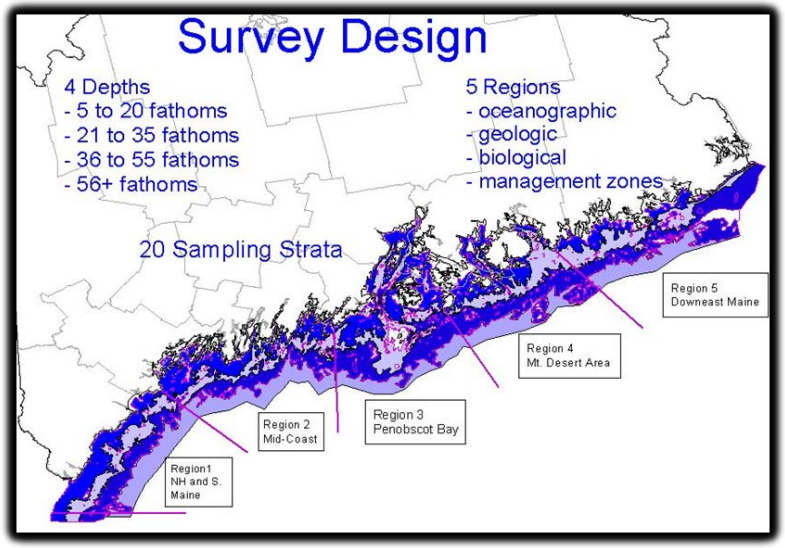


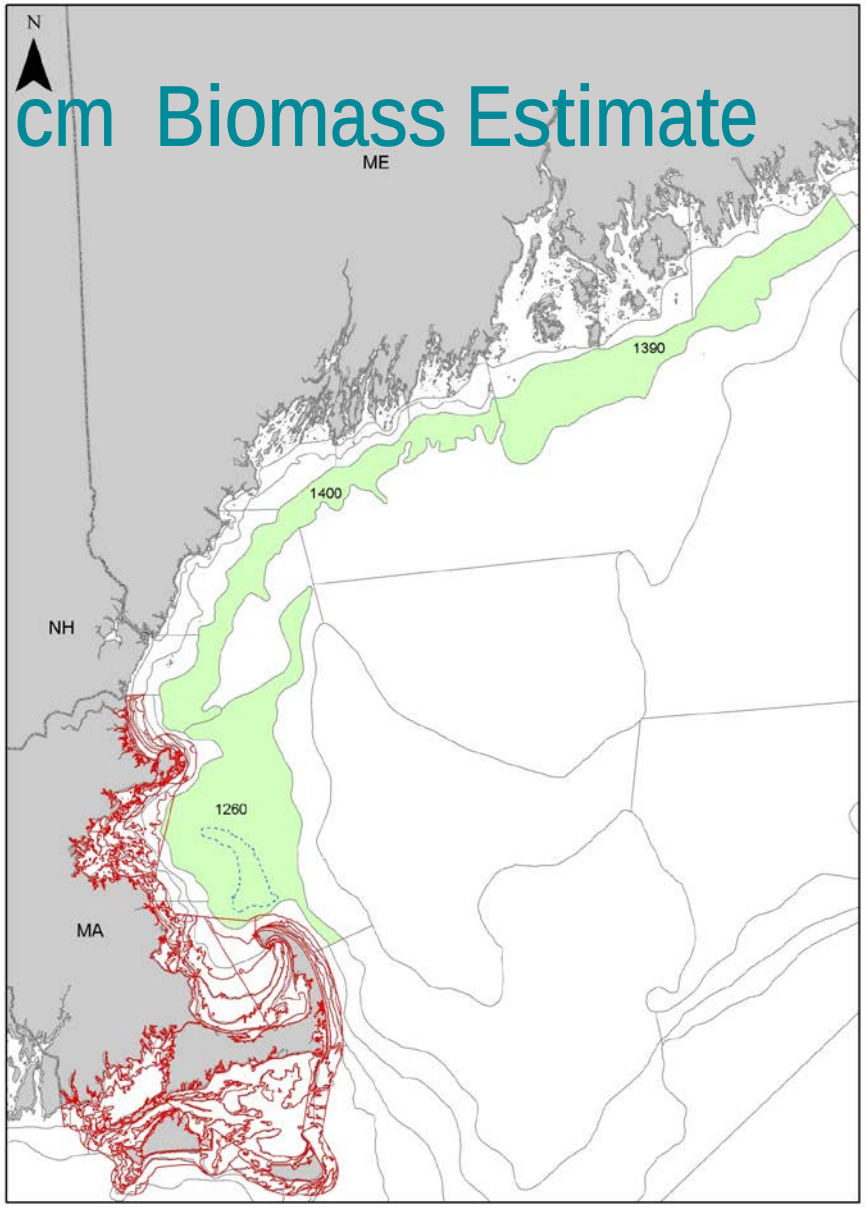
Commercial Discards assume a 50% mortality
Recreational Discards assume 15% mortality


NEFSC Spring
NEFSC Fall
MADMF Spring
MADMF Fall
MENH Spring
MENH Fall
Index (kg)
Year
1970
1980
1990
2000
2010
2020

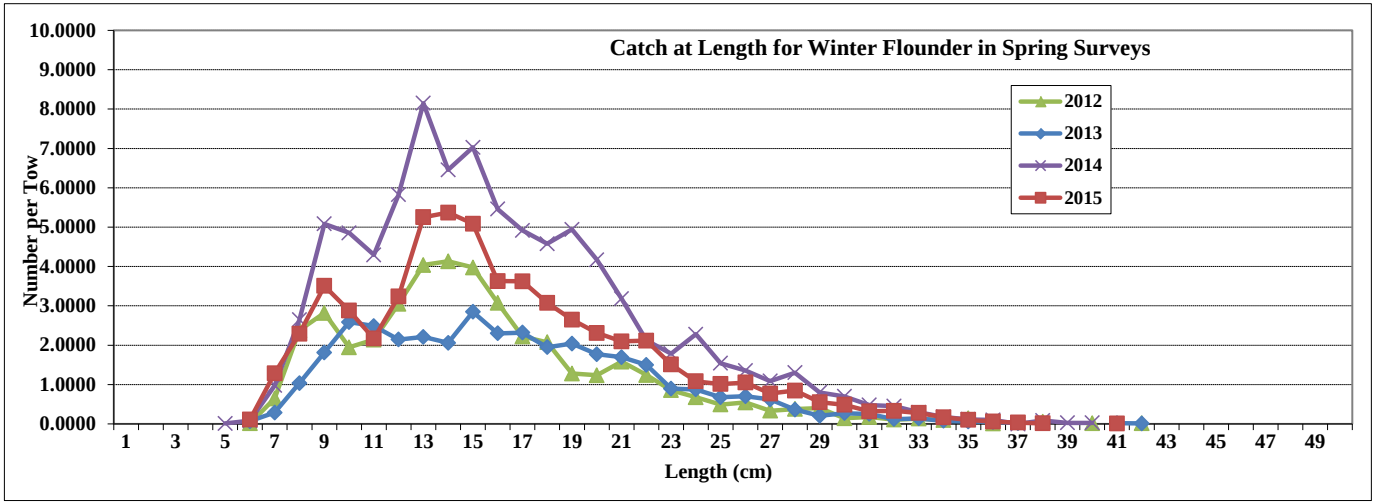
Combined Surveys 30+ cm Biomass Estimate

- Estimate Fall 2014 and Spring 2015 30+ cm biomass from the NEFSC, MDMF and MENH surveys.





MENH Survey Length Distribution



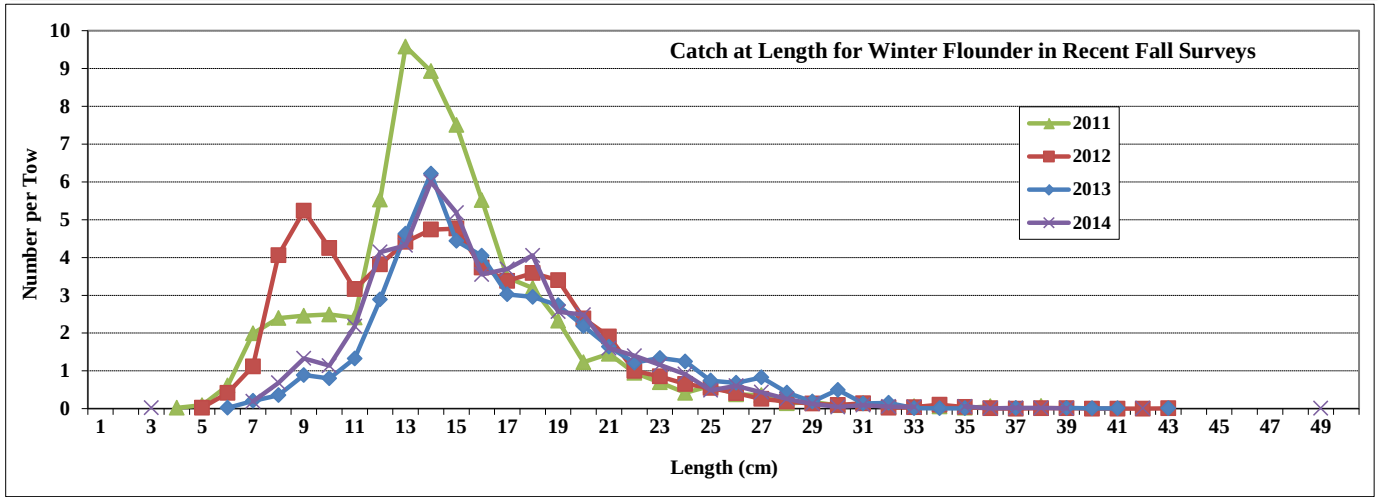


Table 7

	Combined Survey Estimate		
	NEFSC	MDMF	MENH
survey area (nm2)	2,990	309	3,475
Avg tow (wing area swept)	0.00700	0.00385	0.00462
Total area/tow footprint	427,143	80,343	752,154
Tow duration	20 min	20 min	20 min
Numbers per tow	34-65	80	35

Assessment

30+ cm Survey Area-Swept Biomass Estimate

Used in SARC 52 (2011) & 2014 Operational Update

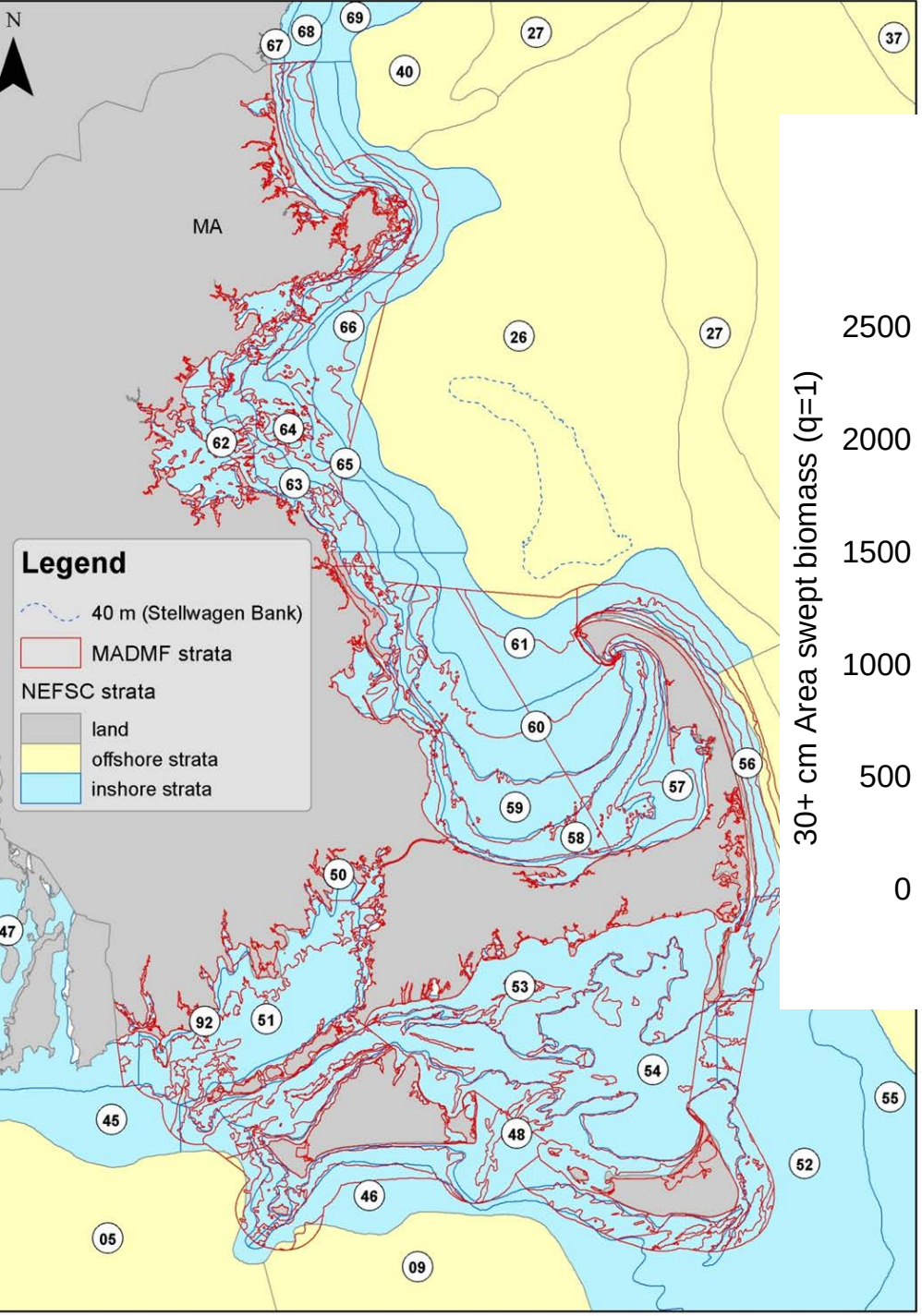
- Exploitable Biomass = 30+ cm biomass index per tow x total survey area / tow footprint x q

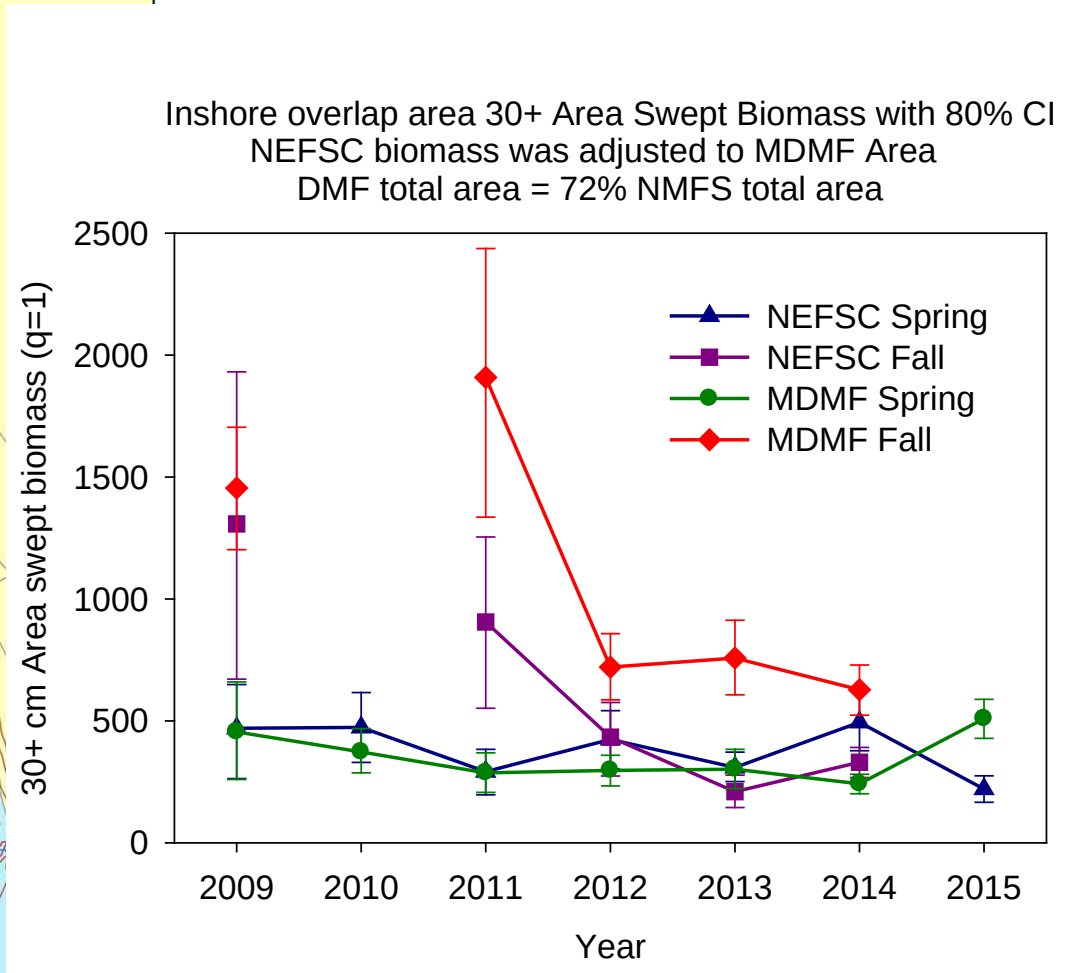
  Q = 0.6 Informed by GB winter flounder

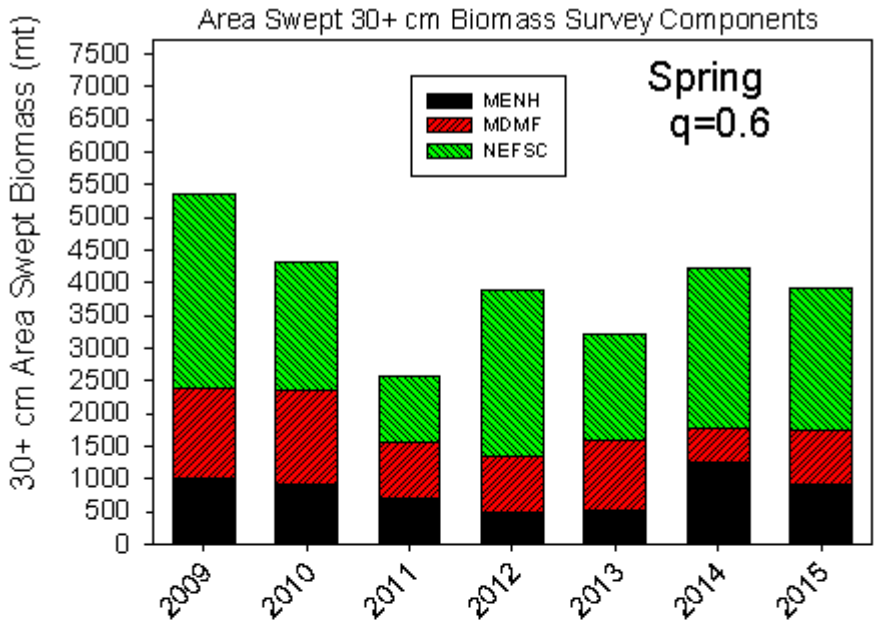
- Exploitation rate = catch / 30+ cm biomass
- Overfishing BRPs based on F40% from Length based YPR (SARC 52, Not updated).

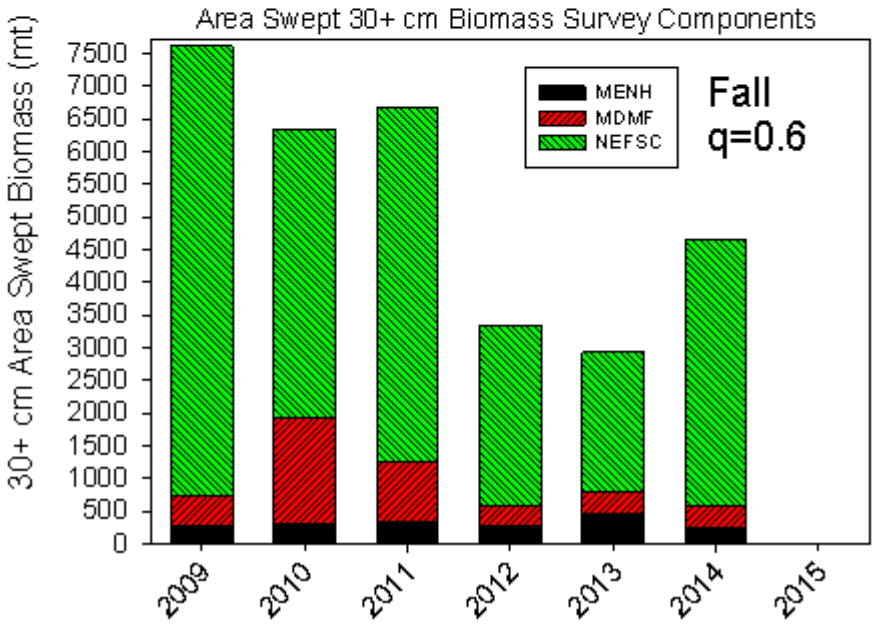
Length based YPR from SARC 52
m=0.3
FMSY = F40% = 0.31
Exploitation rate = 0.23
75%FMSY = 0.24
Exploitation rate = 0.17

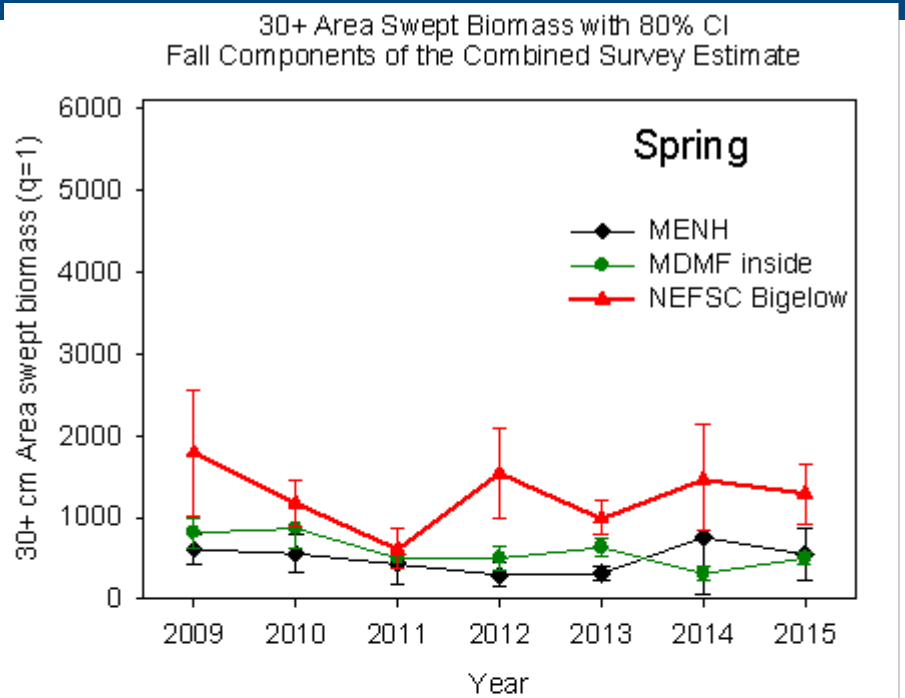
Knife edge selectivity at 30 cm

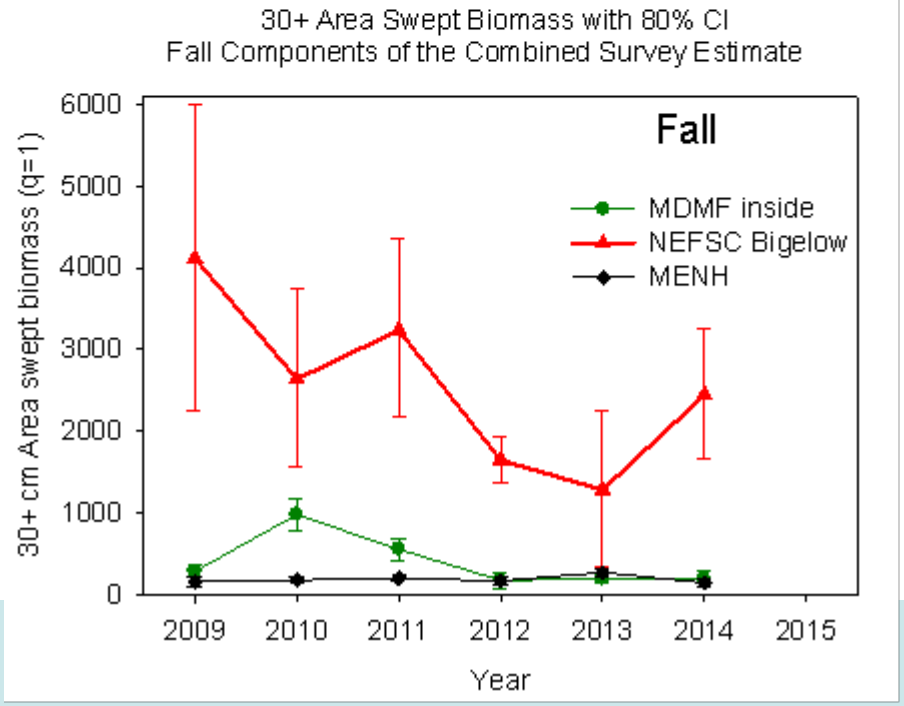

N
MA
Legend
40 m (Stellwagen Bank)
MADMF strata
NEFSC strata
land
offshore strata
inshore strata
67
68
69
27
37
40
66
26
27
62
64
65
63
61
60
56
57
59
58
50
47
53
92
51
54
55
45
48
52
46
05
09


Inshore overlap area 30+ Area Swept Biomass with 80% CI
NEFSC biomass was adjusted to MDMF Area
DMF total area = 72% NMFS total area
30+ cm Area swept biomass (q=1)
2500
2000
1500
1000
500
0
2009
2010
2011
2012
2013
2014
2015
Year
NEFSC Spring
NEFSC Fall
MDMF Spring
MDMF Fall


Area Swept 30+ cm Biomass Survey Components
30+ cm Area Swept Biomass (mt)
7500
7000
6500
6000
5500
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
MENH
MDMF
NEFSC
Spring
q=0.6
2009
2010
2011
2012
2013
2014
2015

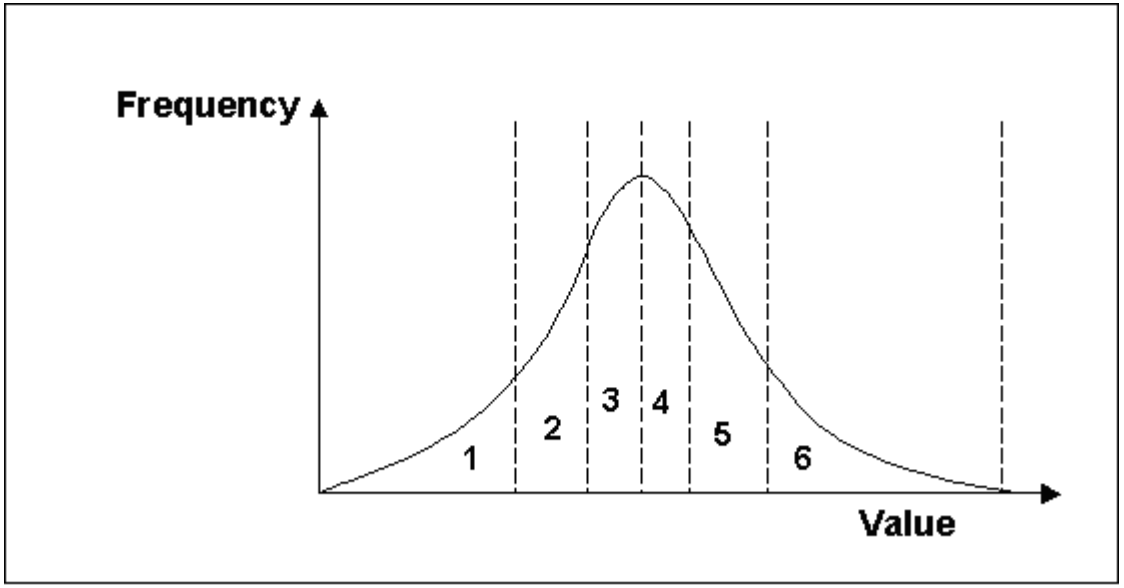

Area Swept 30+ cm Biomass Survey Components
30+ cm Area Swept Biomass (mt)
7500
7000
6500
6000
5500
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
MENH
MDMF
NEFSC
Fall
q=0.6
2009
2010
2011
2012
2013
2014
2015


30+ Area Swept Biomass with 80% CI
Fall Components of the Combined Survey Estimate
Spring
MENH
MDMF inside
NEFSC Bigelow
30+ cm Area swept biomass (q=1)
6000
5000
4000
3000
2000
1000
0
2009
2010
2011
2012
2013
2014
2015
Year


30+ Area Swept Biomass with 80% CI
Fall Components of the Combined Survey Estimate
Fall
MDMF inside
NEFSC Bigelow
MENH
30+ cm Area swept biomass (q=1)
6000
5000
4000
3000
2000
1000
0
2009
2010
2011
2012
2013
2014
2015
Year

Uncertainty was estimated using the Latin Hypercube approach

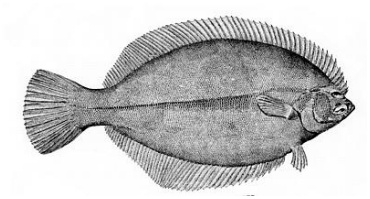
$$B_{Tot} = A_{NEFSC}\frac{I_{NEFSC}}{e\ a_{NEFSC}} + A_{MADMF}\frac{I_{MADMF}}{e\ a_{MADMF}} + A_{MENH}\frac{I_{MENH}}{e\ a_{MENH}}$$



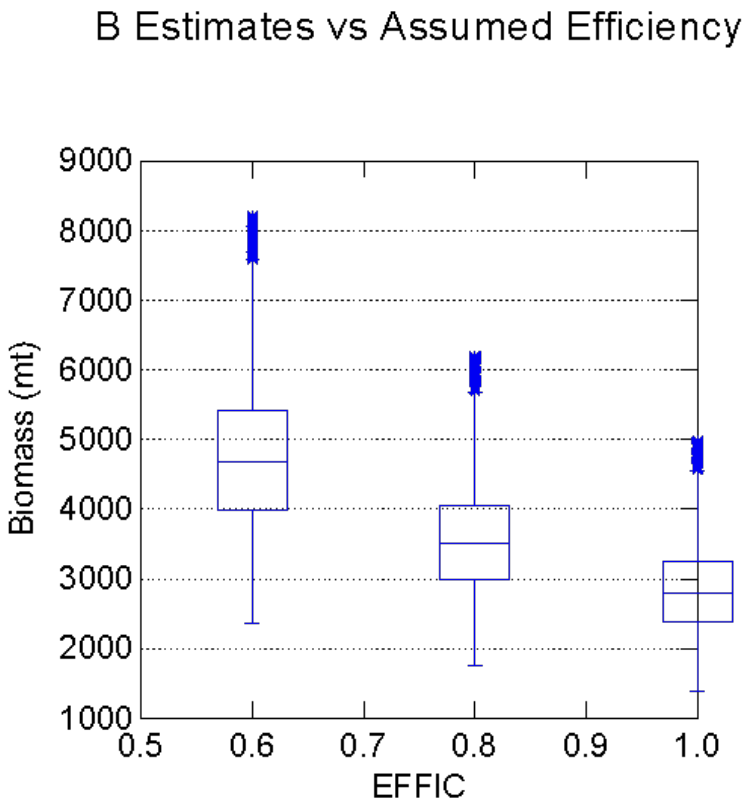
40 equal probability intervals

$$E[B_{Tot}] = \sum_{i=1}^{40}\sum_{j=1}^{40}\sum_{k=1}^{40}\sum_{l=1}^{40}\sum_{m=1}^{40}\sum_{n=1}^{40}\left[A_{NEFSC}\frac{I'_i}{e\ a'_j} + A_{MADMF}\frac{I'_k}{e\ a'_l} + A_{MENH}\frac{I'_m}{e\ a'_n}\right]\delta^6$$

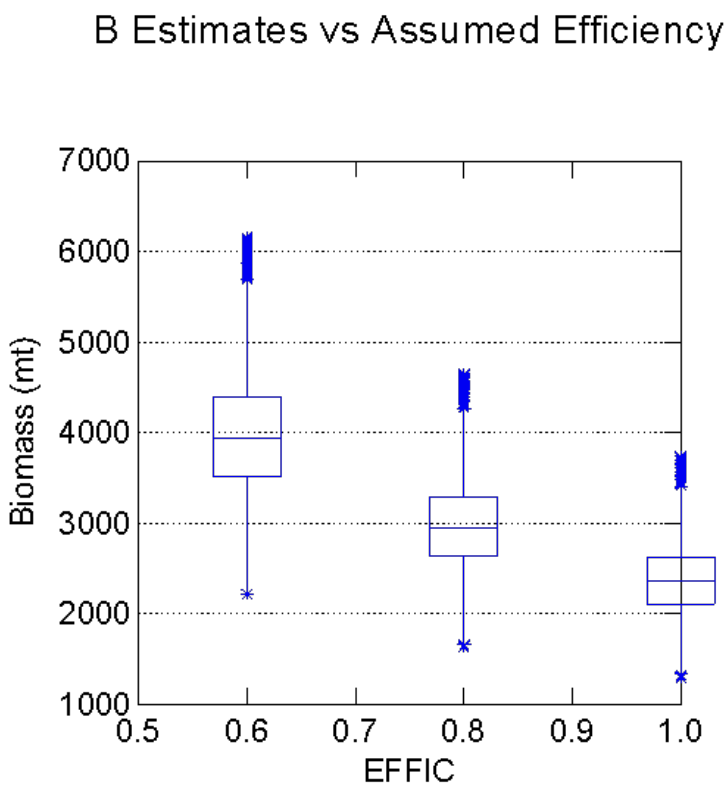
40^6 = 4,096,000,000 evaluations



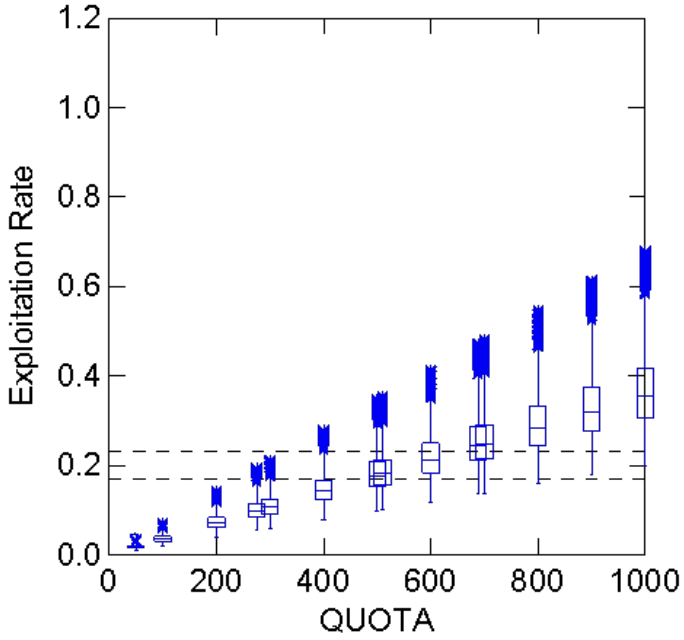
Fall 2014



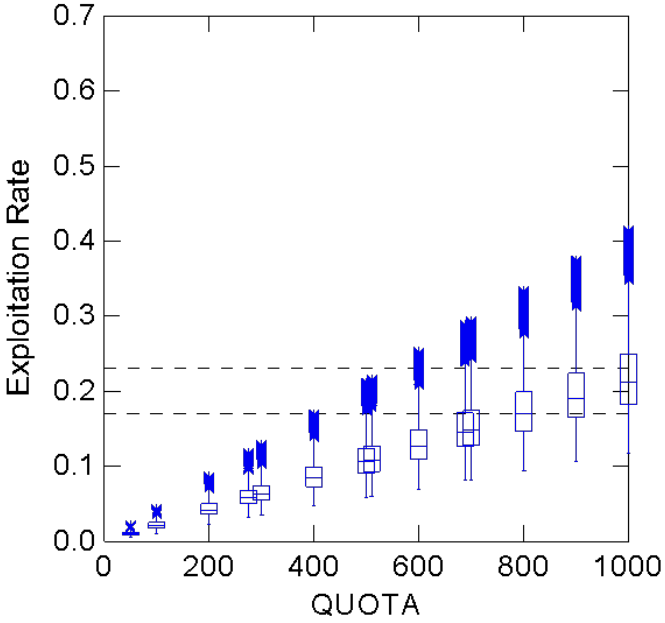
Spring 2015

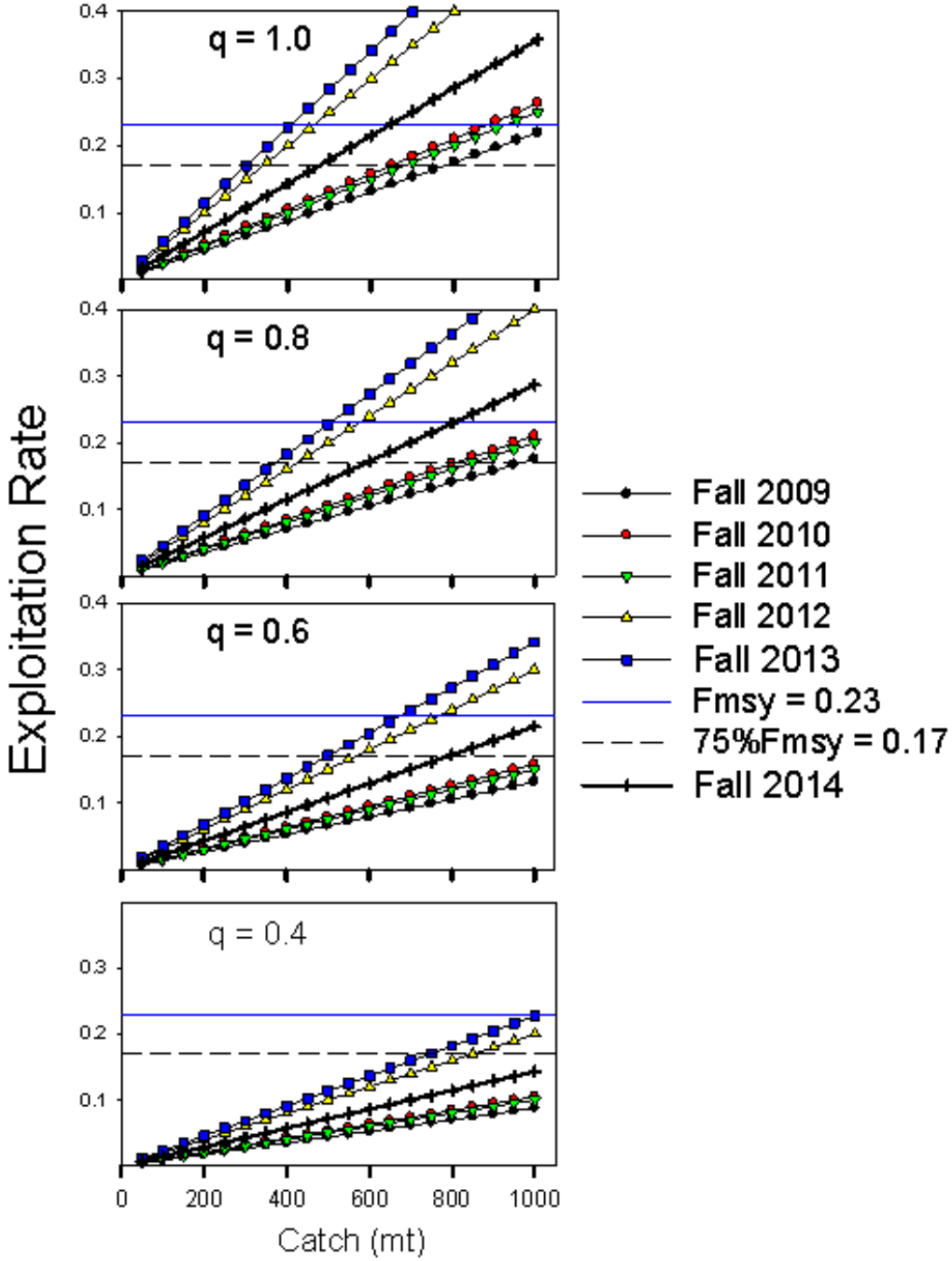


Exploitation Estimates: Fall 2014, Efficiency=1.0

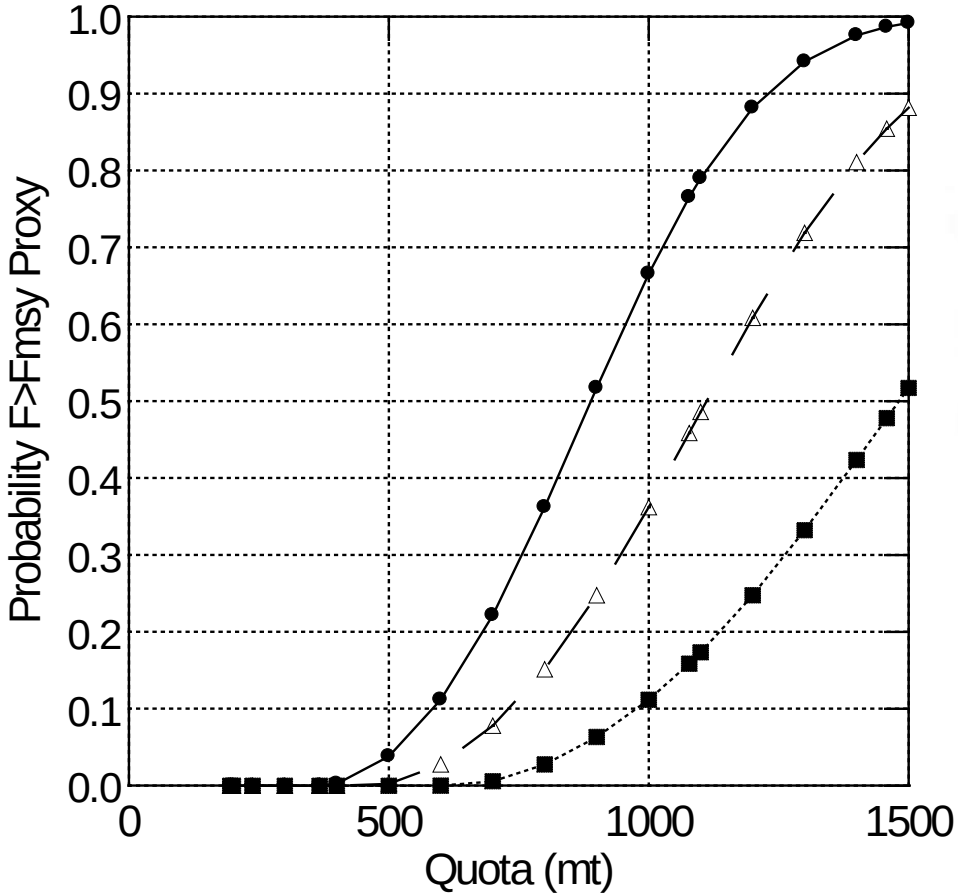


Exploitation Estimates: Fall 2014, Efficiency=0.6

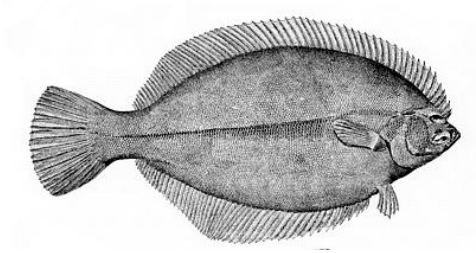



q = 1.0
q = 0.8
q = 0.6
q = 0.4
Exploitation Rate
Catch (mt)
0.4
0.3
0.2
0.1
0
200
400
600
800
1000
Fall 2009
Fall 2010
Fall 2011
Fall 2012
Fall 2013
Fmsy = 0.23
75%Fmsy = 0.17
Fall 2014

Probability of Exceeding Fmsy Proxy=0.23



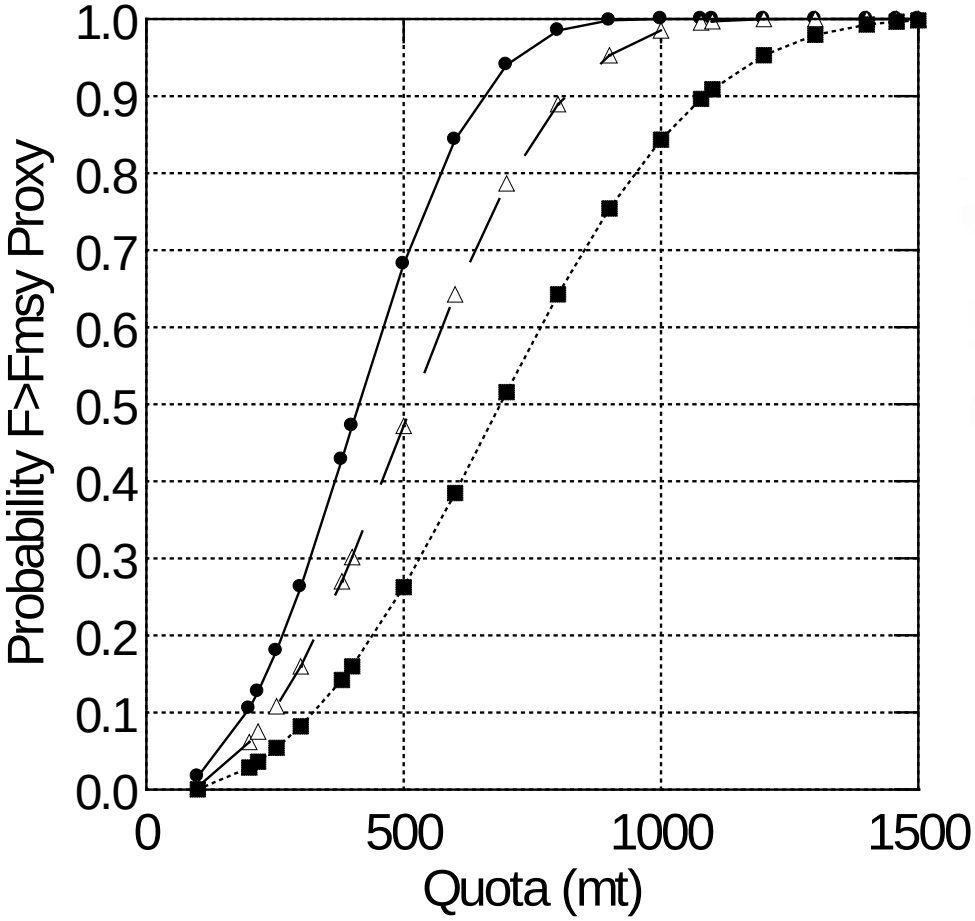
OFL = 1458 mt
SARC 52
Fall 2010



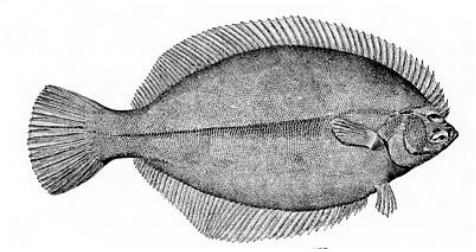
Efficiency

- 100%
- 80%
- 60%

Probability of Exceeding Fmsy Proxy=0.23



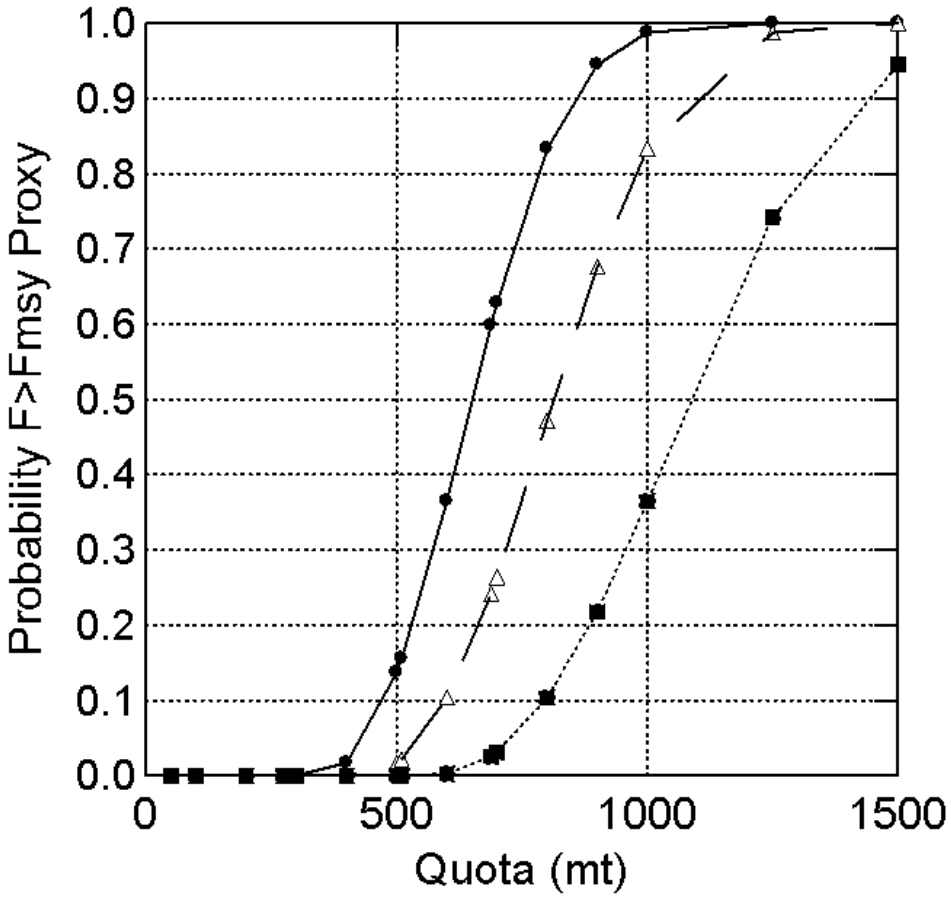
OFL = 688 mt
OP-UP
Fall 2013



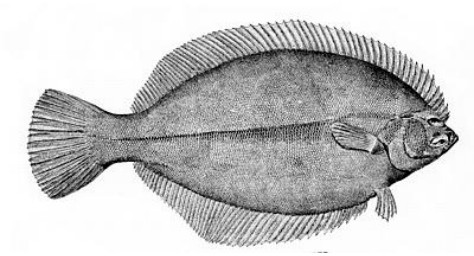
Efficiency

- 100%
- 80%
- 60%

Probability of Exceeding Fmsy Proxy=0.23



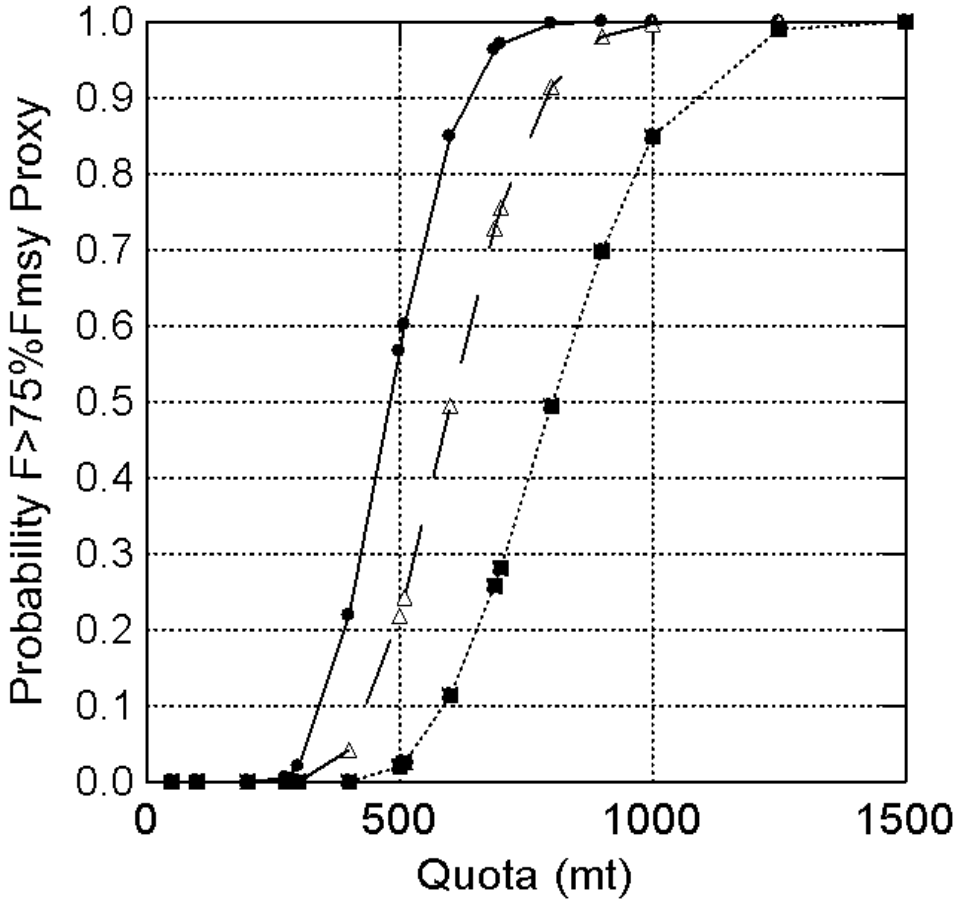
OFL = 1080 mt
Update 2015
Fall 2014



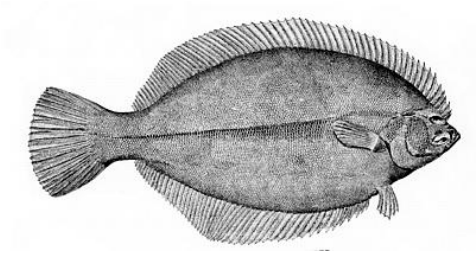
Efficiency

- 100%
- 80%
- 60%

Probability of Exceeding 75% Fmsy Proxy=0.17

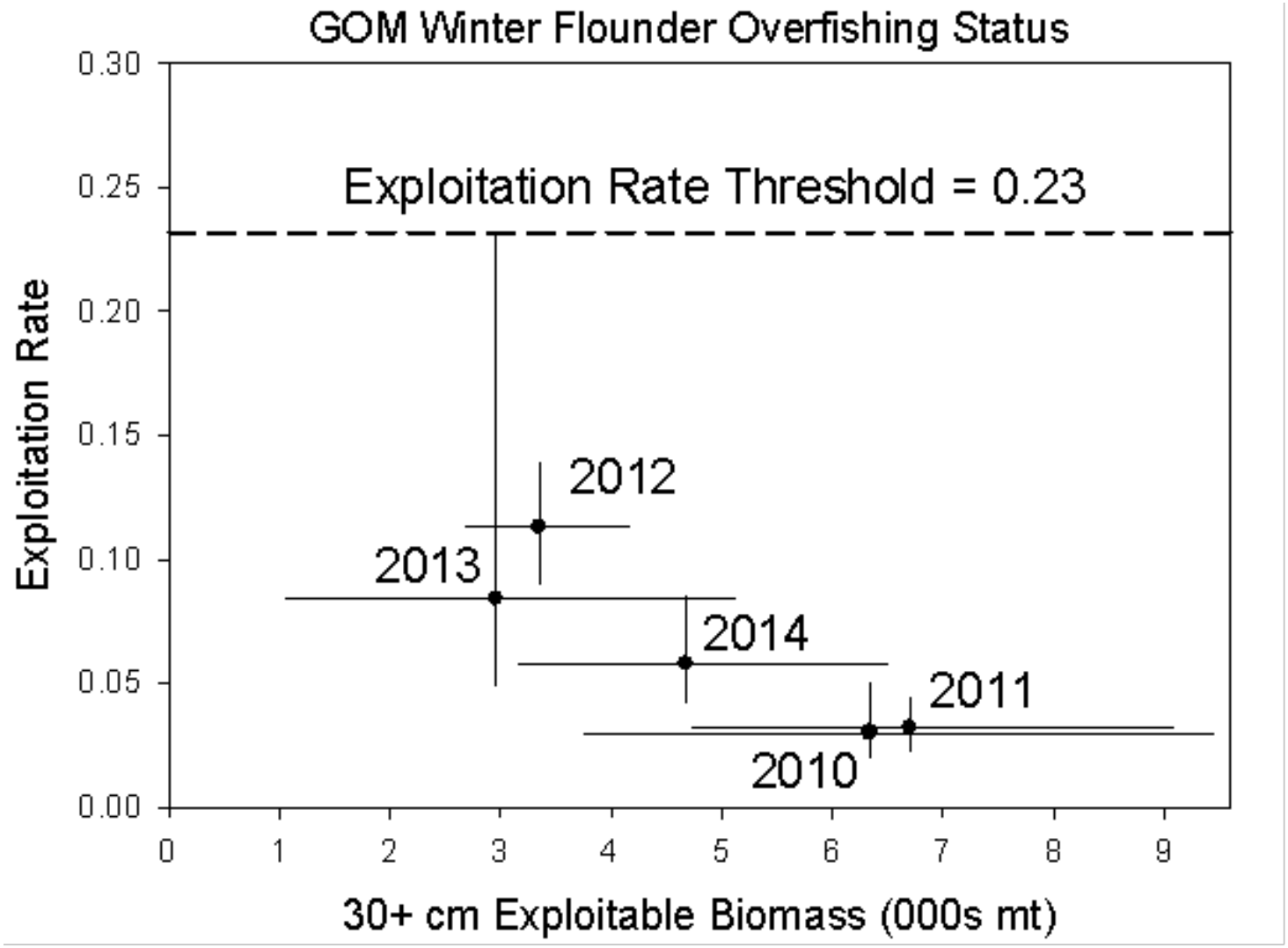


ABC = 810 mt
Update 2015
Fall 2014

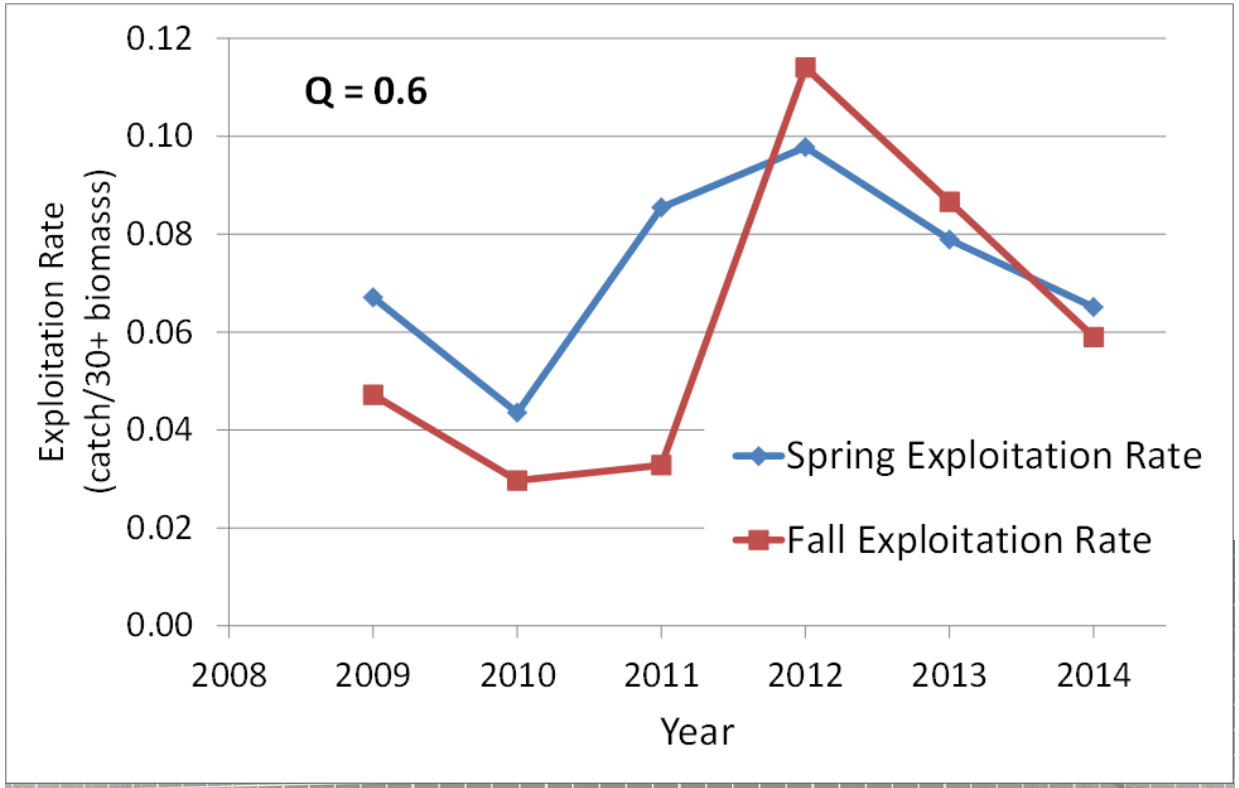


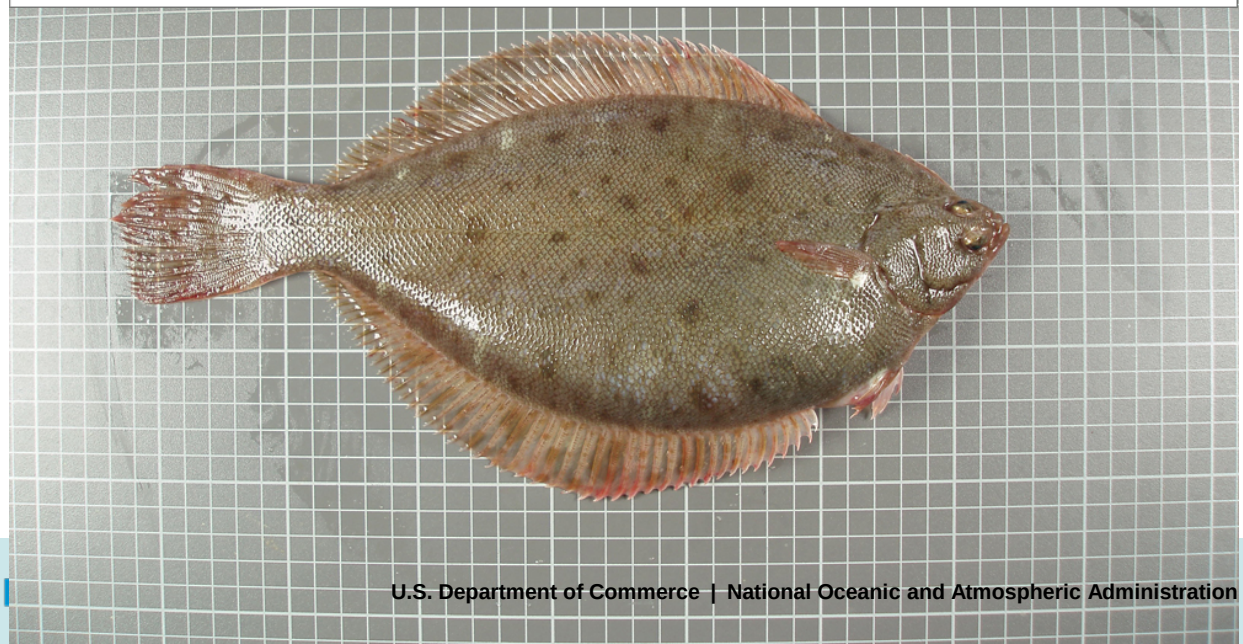
Efficiency

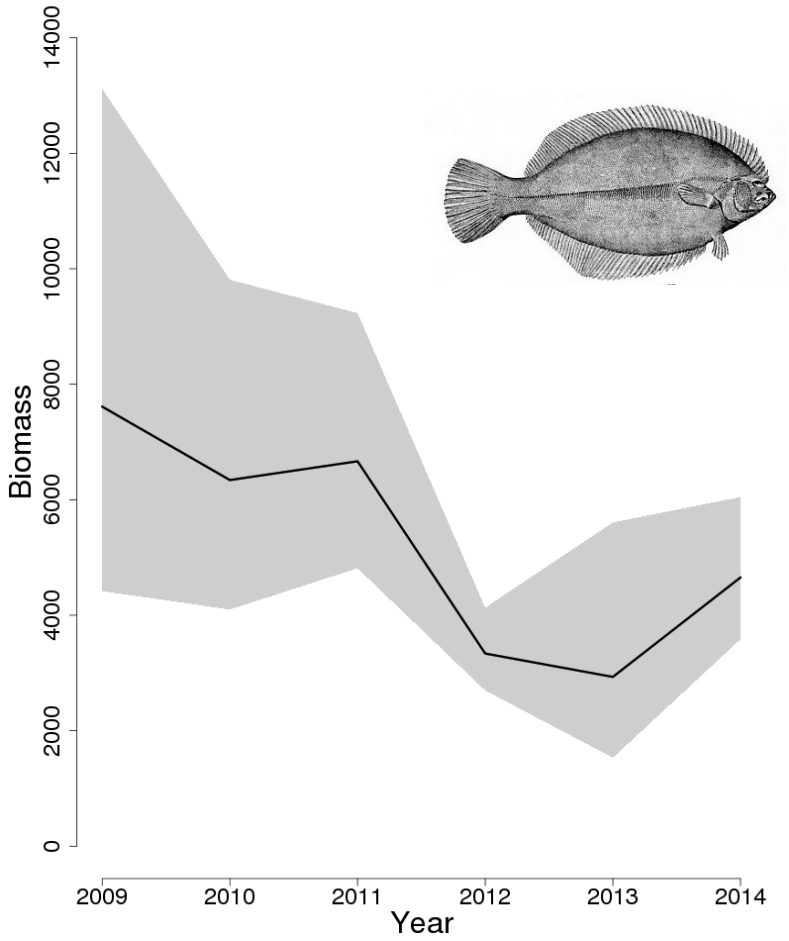
- ● 100%
- △ 80%
- ■ 60%

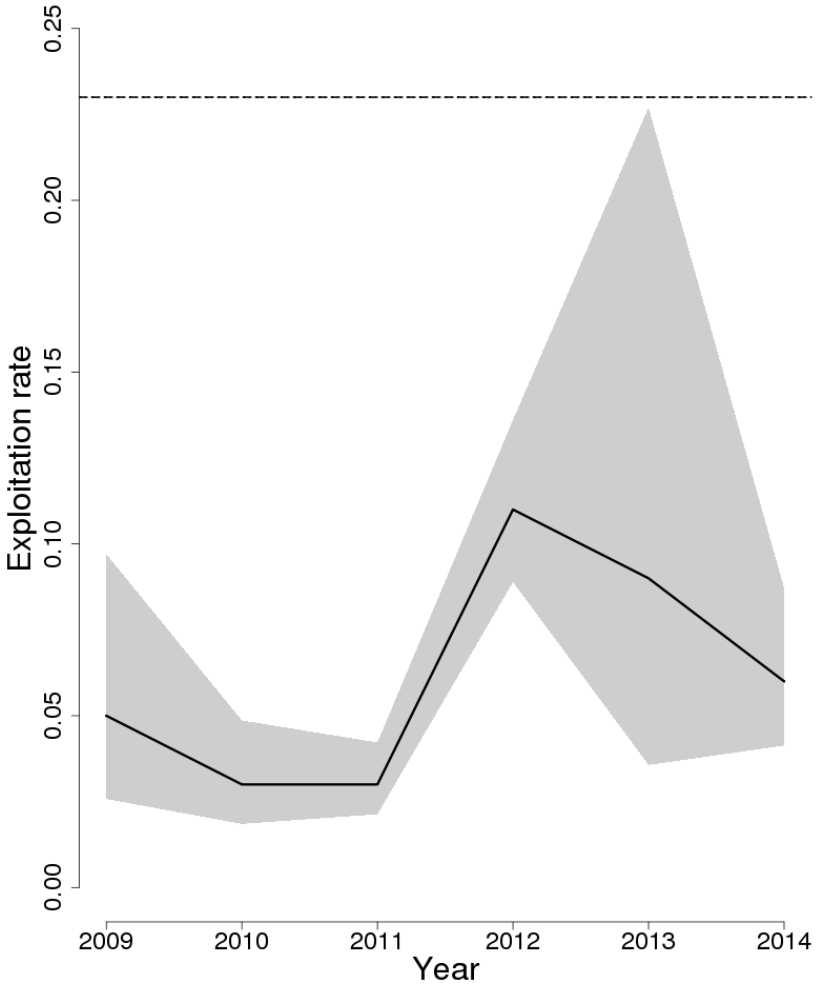


90% confidence intervals are shown for biomass and exploitation rate


Q = 0.6
Exploitation Rate
(catch/30+ biomasss)
0.12
0.10
0.08
0.06
0.04
0.02
0.00
2008
2009
2010
2011
2012
2013
2014
Year
Spring Exploitation Rate
Fall Exploitation Rate




Biomass
0
2000
4000
6000
8000
10000
12000
14000
2009
2010
2011
2012
2013
2014
Year

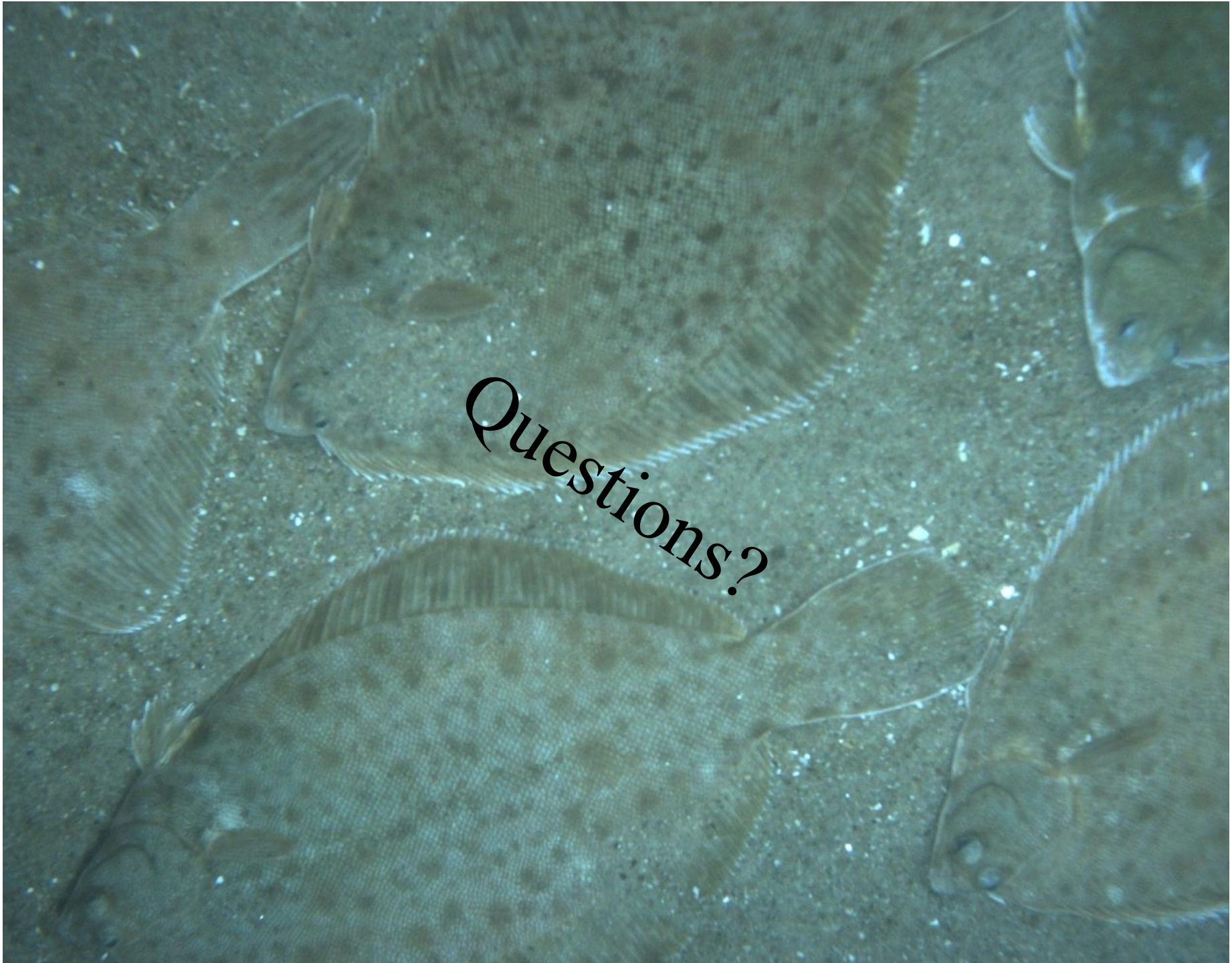

Exploitation rate
0.00
0.05
0.10
0.15
0.20
0.25
2009
2010
2011
2012
2013
2014
Year

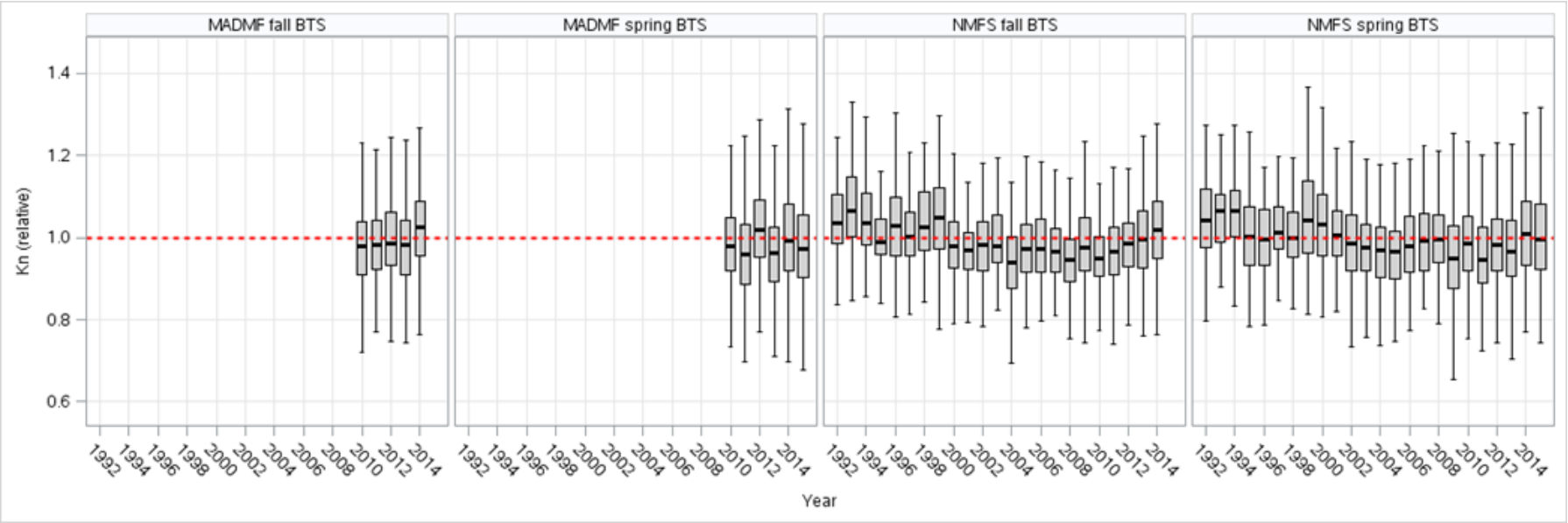
Sources of Uncertainty

Limited information exists to inform the Q assumption. There are questions with herding from the ground cables and escapement below the footrope and above the headrope in the surveys. The GB yellowtail 2014 empirical benchmark used a Q estimated from the flatfish literature (0.37 on the doors). However catch advice from door spread estimates would still have resulted in higher catch limits than the removals that have occurred.

Concerns

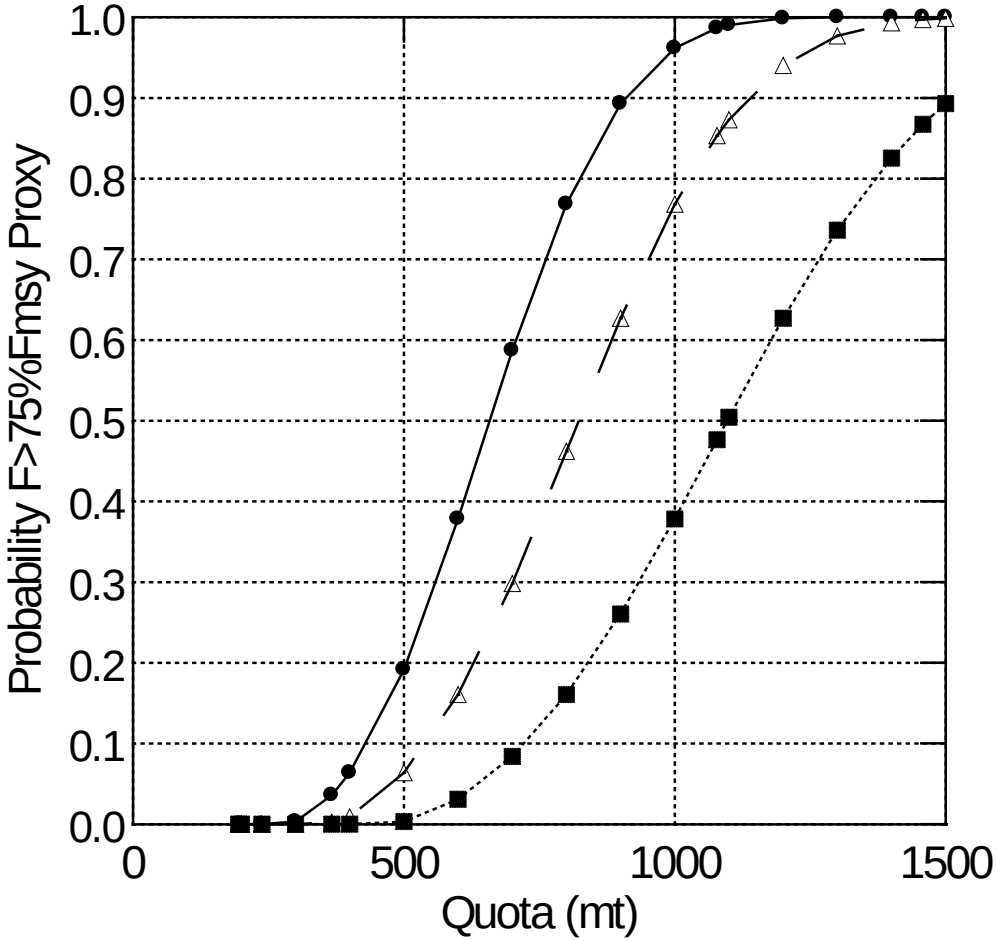
The general lack of a response in the survey 30+ cm biomass is a general source of concern with catches remaining far below the overfishing limit.


Questions?

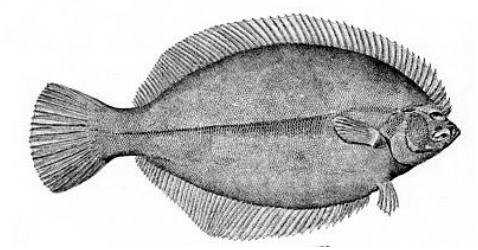

MADMF fall BTS
MADMF spring BTS
NMFS fall BTS
NMFS spring BTS
Kn (relative)
1.4
1.2
1.0
0.8
0.6
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
Year

	Landings		Discards				
year	recreational	commercial	recreational	gillnet	lg mesh	shrimp	Total
1981	2,270						
1982	3,024	2,793	11		343	7	6,178
1983	817	2,096	2		112	8	3,035
1984	1,103	1,699	3		67	12	2,883
1985	1,629	1,582	8		93	14	3,327
1986	411	1,188	5	12	63	16	1,696
1987	1,443	1,140	12	12	81	25	2,713
1988	537	1,250	2	12	106	19	1,927
1989	1,035	1,253	6	4	11	5	2,315
1990	344	1,116	3	22	5	21	1,511
1991	86	1,008	1	3	17	21	1,136
1992	77	825	1	12	7	24	947
1993	134	611	3	19	4	7	777
1994	77	543	2	6	6	6	640
1995	40	707	1	12	8	8	777
1996	52	606	2	6	2	7	675
1997	32	569	3	38	5	14	660
1998	27	643	1	7	7	4	690
1999	34	350	1	4	9	1	399
2000	31	535	2	12	3	3	587
2001	37	700	3	3	14	2	759
2002	35	694	1	5	17	0	752
2003	29	755	1	3	13	2	803
2004	29	623	1	4	30	2	689
2005	23	336	2	1	23	3	388
2006	34	201	1	0	10	1	248
2007	28	254	1	1	15	1	300
2008	124	288	3	1	9	2	426
2009	60	283	4	1	8	3	359
2010	40	140	3	0	2	3	188
2011	38	173	4	0	3	0	219
2012	22	348	1	1	9	1	381
2013	29	218	1	0	5	1	254
2014	55	213	2	0	5	0	275

Probability of Exceeding 75% Fmsy Proxy=0.17



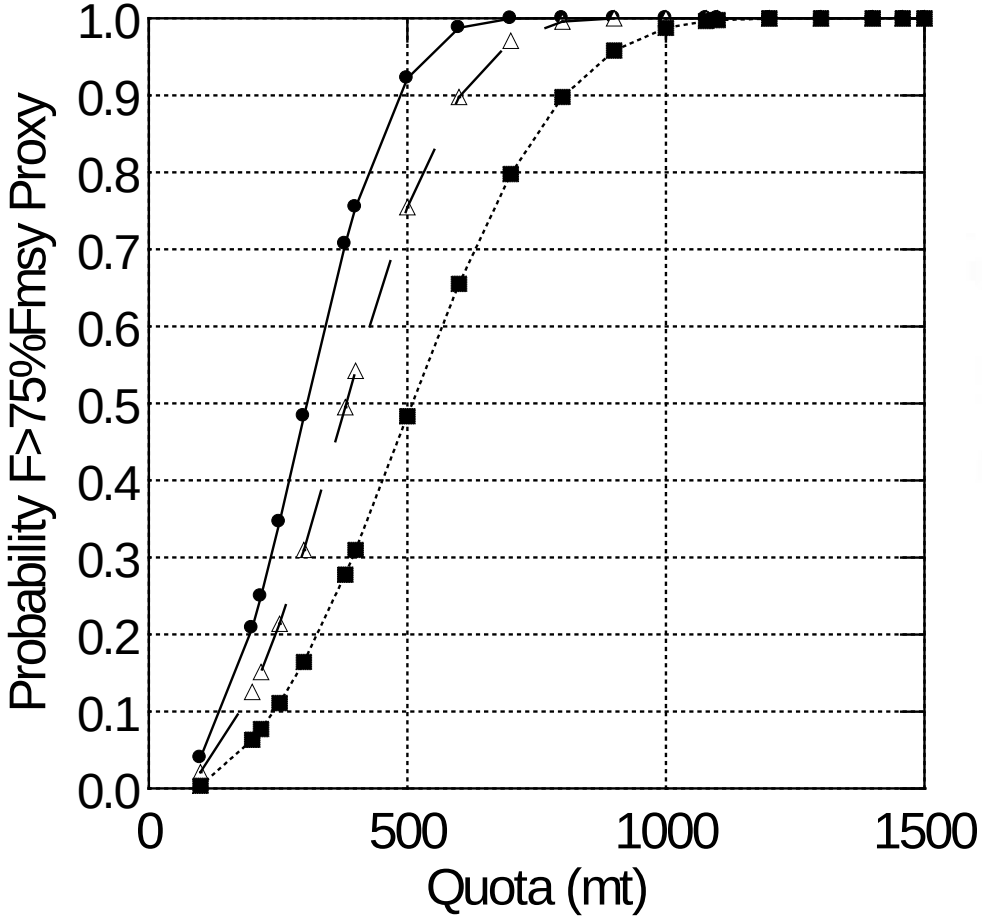
ABC = 1078
SARC 52
Fall 2010



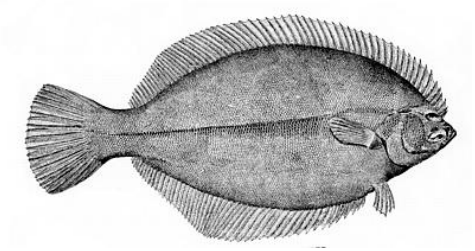
Efficiency

- 100%
- 80%
- 60%

Probability of Exceeding 75% Fmsy Proxy=0.17

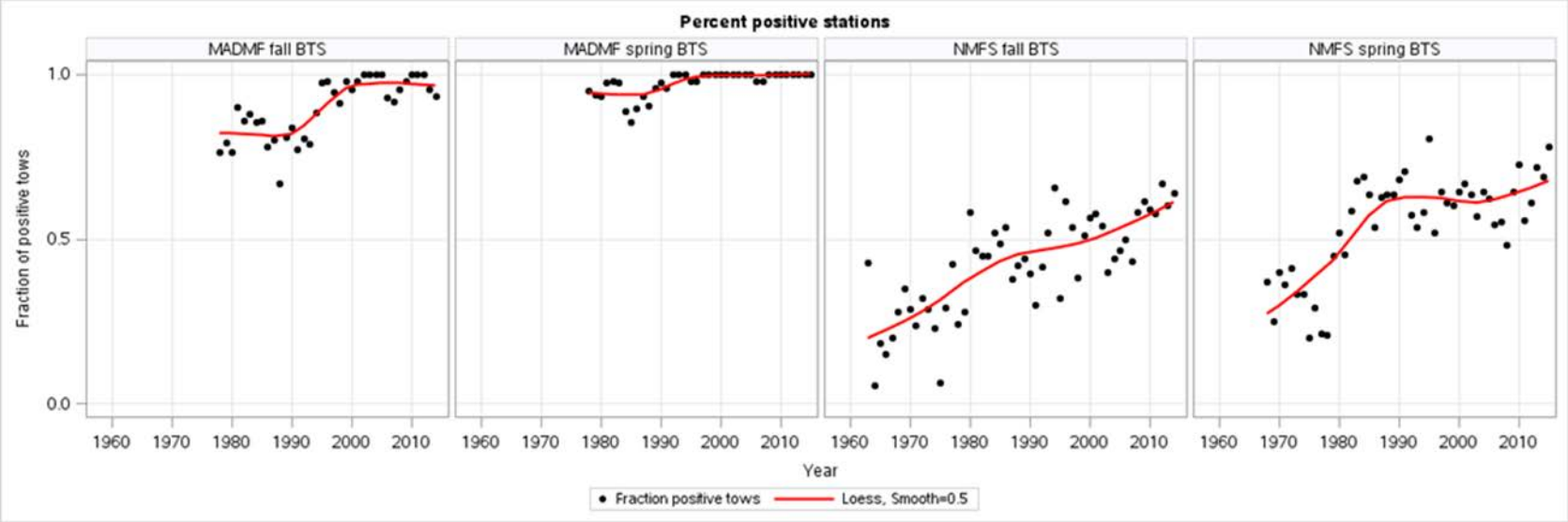


ABC = 510
OP-UP
Fall 2013



Efficiency

- 100%
- 80%
- 60%


Percent positive stations
MADMF fall BTS
MADMF spring BTS
NMFS fall BTS
NMFS spring BTS
Fraction of positive tows
1.0
0.5
0.0
1960
1970
1980
1990
2000
2010
Year
Fraction positive tows
Loess, Smooth=0.5