

Atlantic States Marine Fisheries Commission

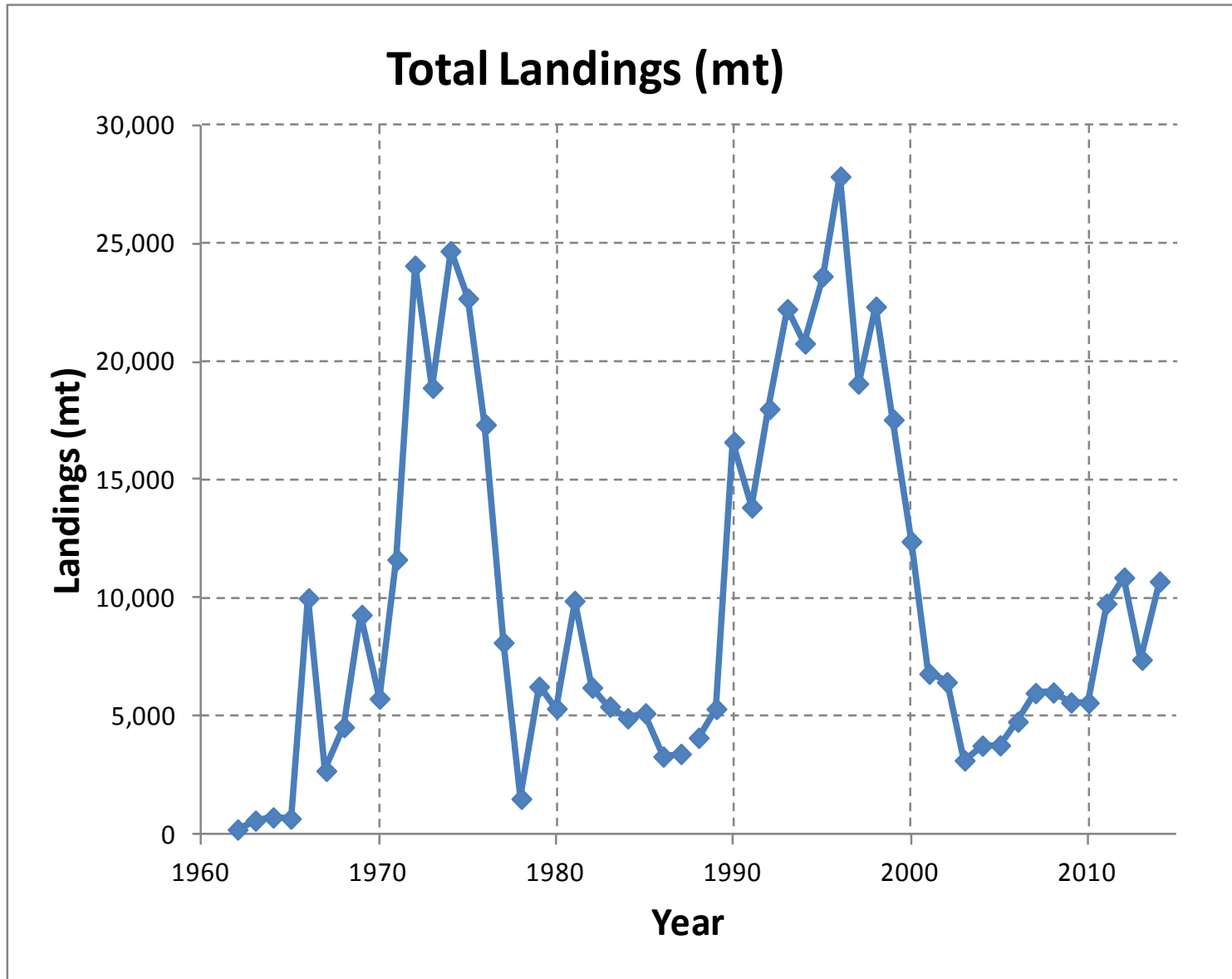
Spiny Dogfish Assessment
Update 2015

Excerpt from presentation given by Dr.
Paul Rago, NEFSC to MAFMC SSC

2014 Catch Highlights

- Total landings in 2014 of 10,715 mt - increased from a drop in 2013 but were similar to 2012.
- Recreational and foreign fleets were only 64 mt.
- Landings estimates from Canada were not available
- Total discards increased from 12,820 mt in 2013 to 15,327 mt in 2014. (+19%)
- Total DEAD discards increased from 5,010 mt to 5,783 (+15%).
- Dead discards/Landings Ratio = 0.54.

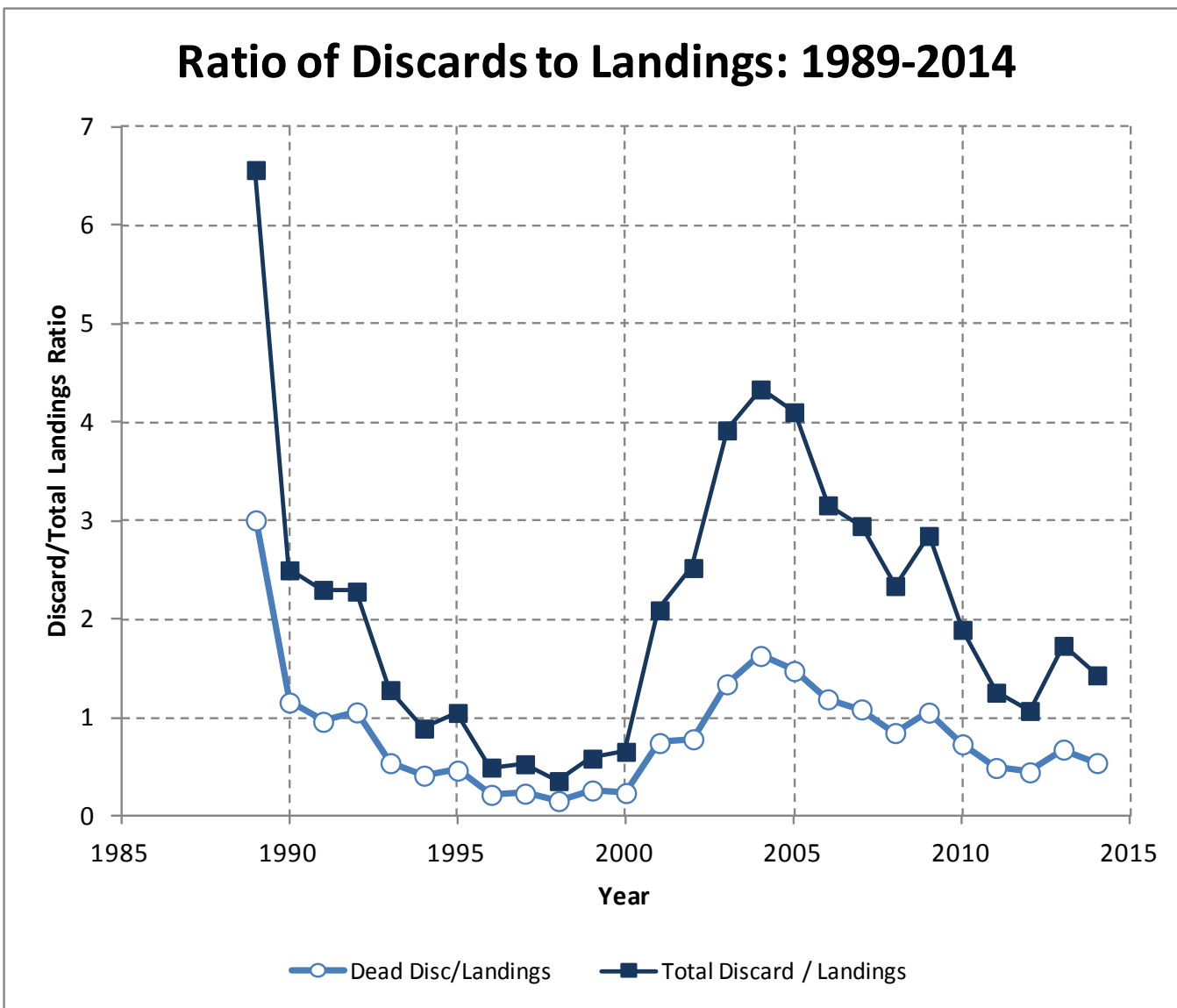
Estimated total landings (mt, live) of spiny dogfish in NAFO Areas 2 to 6, 1962-2014.



Year	Total Discard	Total Dead Discards (mt)	Total Landings (mt)	Dead Discard/ Landings	Total Discard / Landings	Total Catch (mt)
1989	34,990	16,020	5,333	3.00	6.56	21,353
1990	41,474	19,174	16,611	1.15	2.50	35,785
1991	31,831	13,274	13,848	0.96	2.30	27,122
1992	41,066	18,983	18,008	1.05	2.28	36,991
1993	28,461	11,969	22,225	0.54	1.28	34,194
1994	18,486	8,556	20,774	0.41	0.89	29,330
1995	24,760	10,932	23,615	0.46	1.05	34,547
1996	13,742	6,025	27,827	0.22	0.49	33,852
1997	10,065	4,366	19,078	0.23	0.53	23,443
1998	7,963	3,435	22,329	0.15	0.36	25,764
1999	10,263	4,581	17,552	0.26	0.58	22,134
2000	8,111	2,917	12,405	0.24	0.65	15,321
2001	14,252	5,063	6,819	0.74	2.09	11,882
2002	16,283	5,049	6,462	0.78	2.52	11,510
2003	12,358	4,225	3,155	1.34	3.92	7,380
2004	16,370	6,146	3,778	1.63	4.33	9,925
2005	15,552	5,589	3,792	1.47	4.10	9,382
2006	15,126	5,688	4,792	1.19	3.16	10,480
2007	17,681	6,510	6,002	1.08	2.95	12,512
2008	14,080	5,088	6,025	0.84	2.34	11,113
2009	15,952	5,897	5,606	1.05	2.85	11,503
2010	10,584	4,081	5,594	0.73	1.89	9,675
2011	12,264	4,787	9,779	0.49	1.25	14,566
2012	11,626	4,848	10,881	0.45	1.07	15,729
2013	12,820	5,010	7,410	0.68	1.73	12,420
2014	15,327	5,783	10,715	0.54	1.43	16,498

*Total catch
and
discards,
1989-2014*

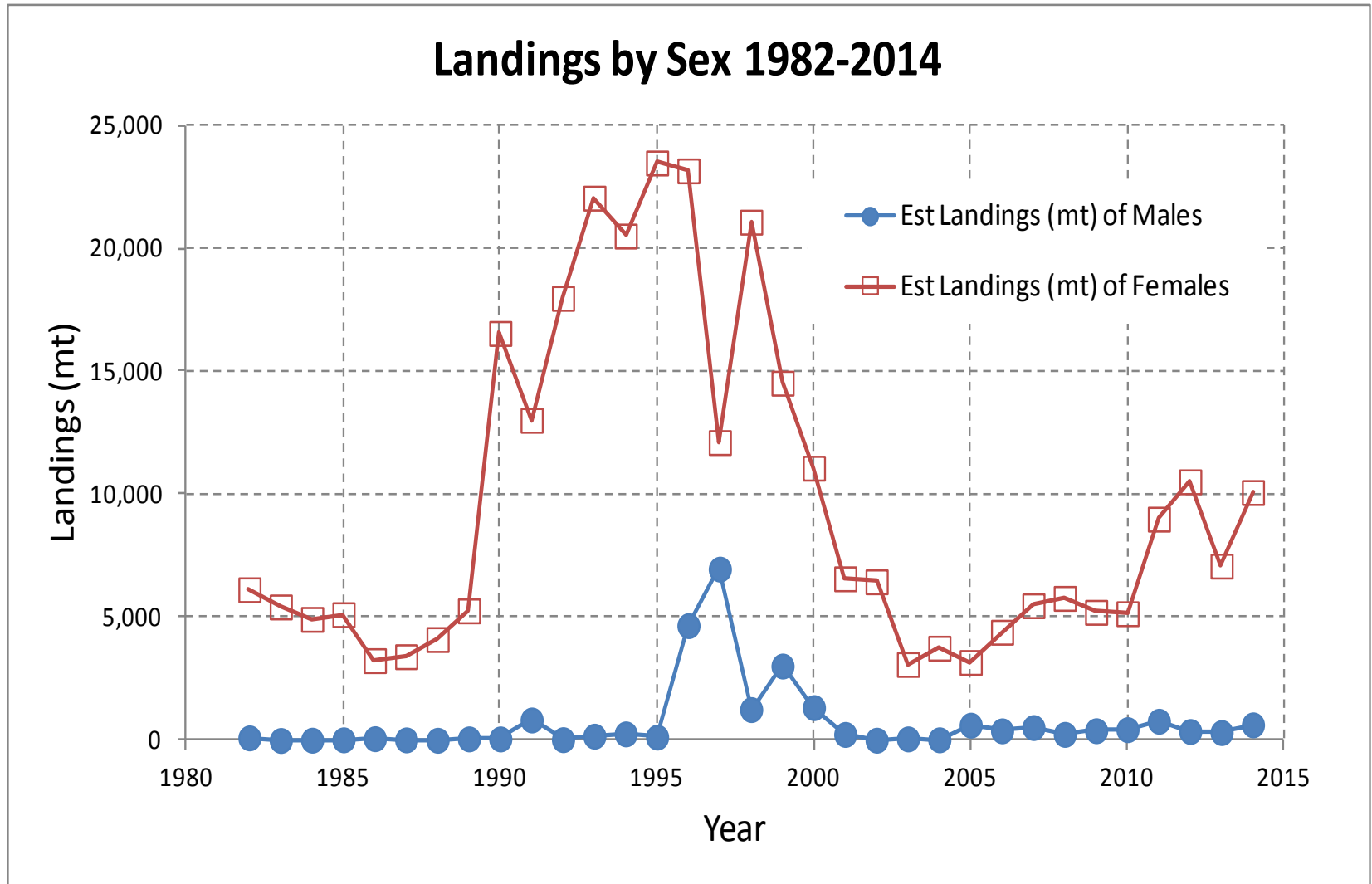
Trends in the ratio of total discards to landings and total dead discards to landings for spiny dogfish, 1989-2014.



Biological Composition of Catch

- Overall landings and discards dominated by female spiny dogfish.
- Pattern in sex ratio of landings has been consistently observed except for small period, 1996-2000.

Estimated total landings, 1982-2014 by sex, 1991-2014.

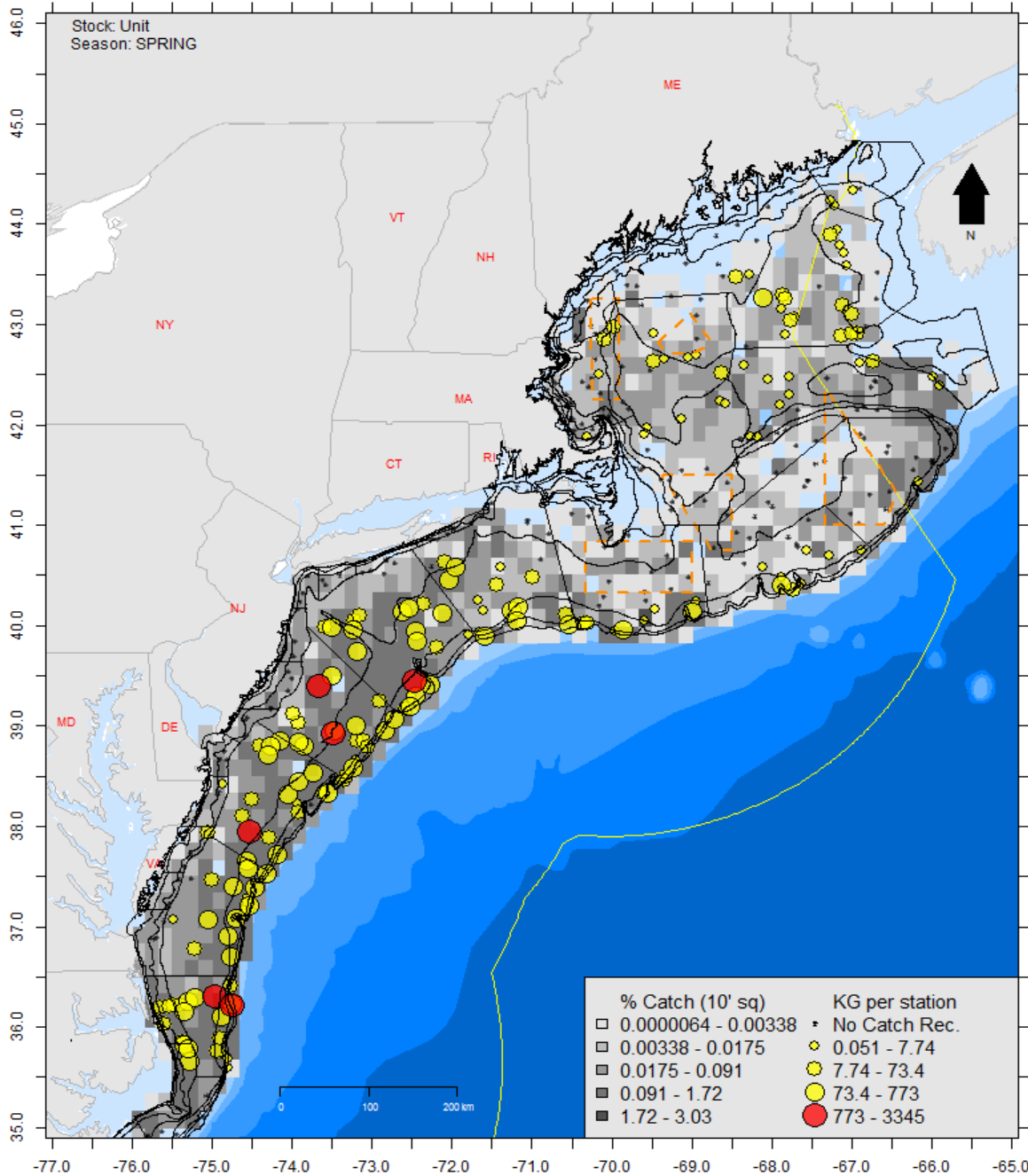


Survey Summary

- **No estimates for 2014 due to incomplete survey.**
- The raw 2-yr average (ie 2013 and 2015) of Female SSB of 135,500 mt in 2015 dropped sharply from 3-yr 235,900 mt in 2013, however, the 2012 biomass was not only the largest on record, but also the most variable.
- Pup Production in 2015 of 2.4 kt was slightly below the long-term average of 2.59 kt (Fig. 7) in the NEFSC spring survey.
- Size frequency plots for males and females in the spring surveys are depicted in Fig. 17. The 2-yr survey average for 2013 and 2015 suggests a large number of recruiting females in the 40 to 60 cm range. This pattern is consistent with high recruitments since 2009.

DOGFISH, SPINY

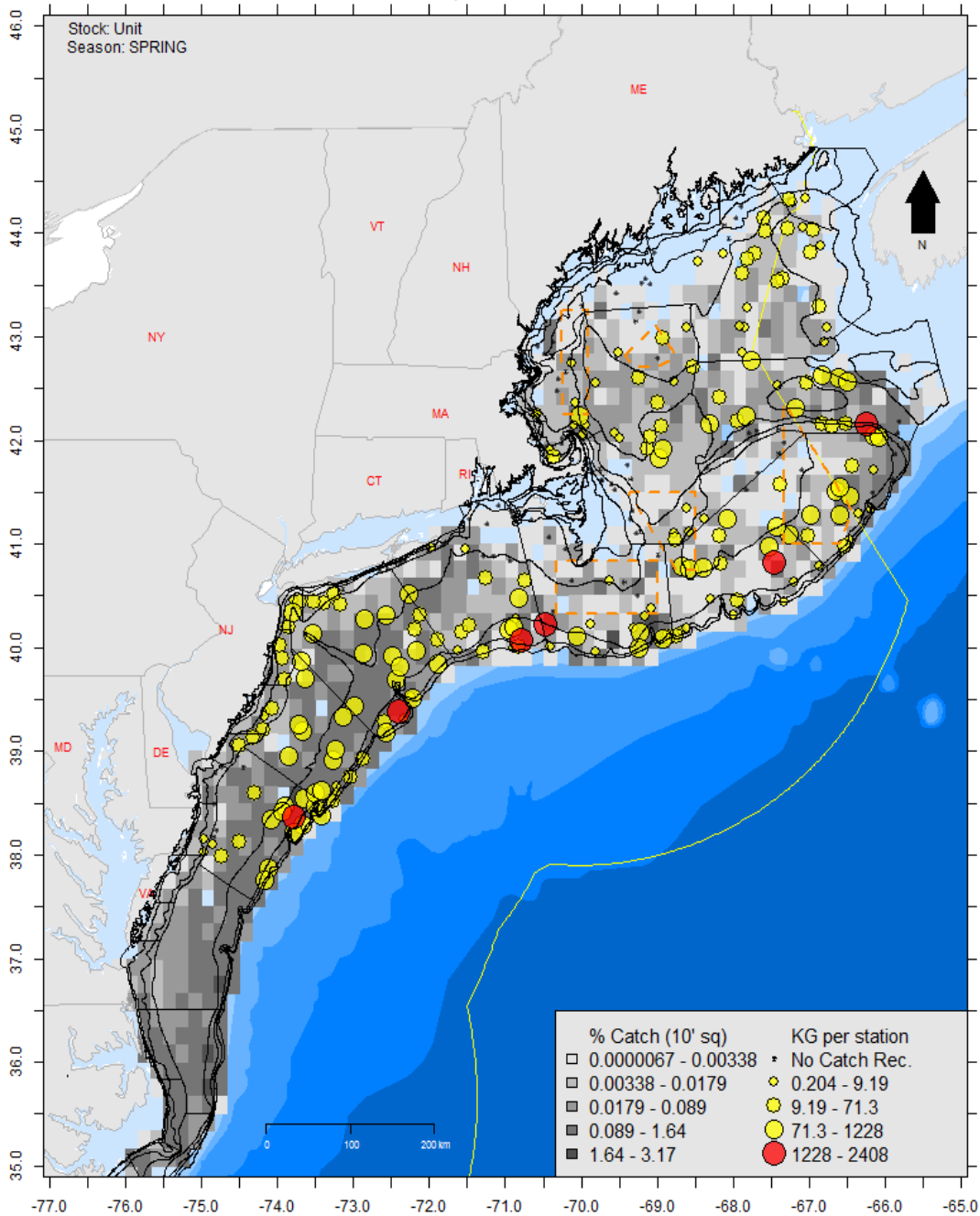
Squalus acanthias



Spatial distribution of Spiny Dogfish Survey for **2015**. Base map shading shows quintiles of total catch over the entire time series expressed as percent of total catch by 10 minute square. Yellow dots represent catches by number, by quintile except for top 6 values, show in red.

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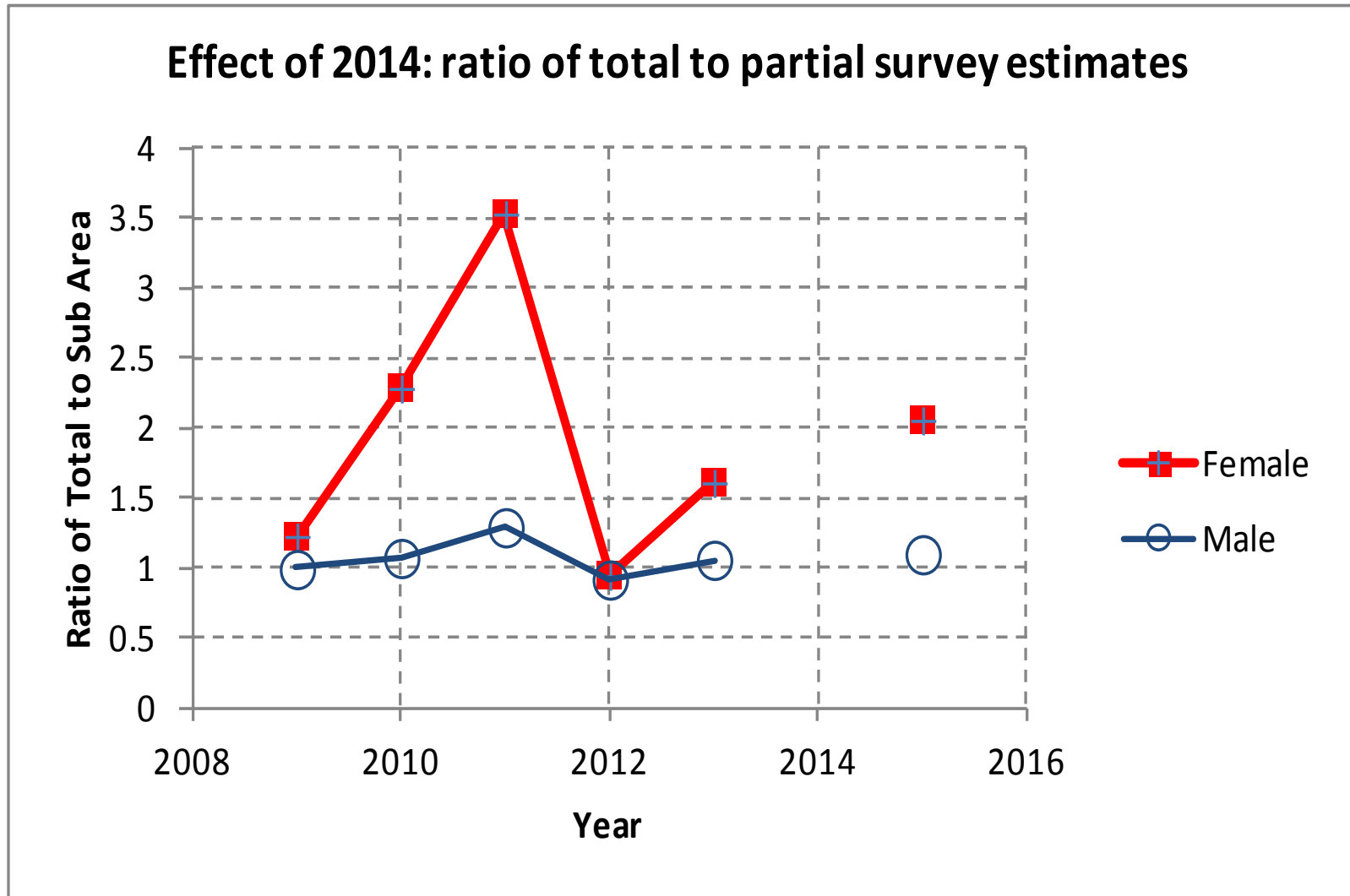


Spatial distribution of Spiny Dogfish Survey for **2014**. Base map shading shows quintiles of total catch over the entire time series expressed as percent of total catch by 10 minute square. Yellow dots represent catches by number, by quintile except for top 6 values, show in red. Note absence of sampling south of Maryland.

Why wasn't 2014 imputed

- Used average of 2013 and 2015 for 3-yr average of 2013 to 2015.
- Alternative method:
 - $X_{\text{imputed}} = [X_{\text{all}}/X_{\text{reduced}}] * X_{2014}$
 - Where X = mean, all=all strata, reduced=reduced strata set from some alternative set of years
 - Swept area biomass_2014= $X_{\text{imputed}} * A/a$
 - Where A =total area of survey, a =trawl footprint
- **HOWEVER—Fraction of population in reduced set is highly variable.**

Comparison of ratio of full survey mean catch weight per tow in the complete survey to mean weight per tow in the truncated survey for 2014. All tows are from FSV Bigelow.



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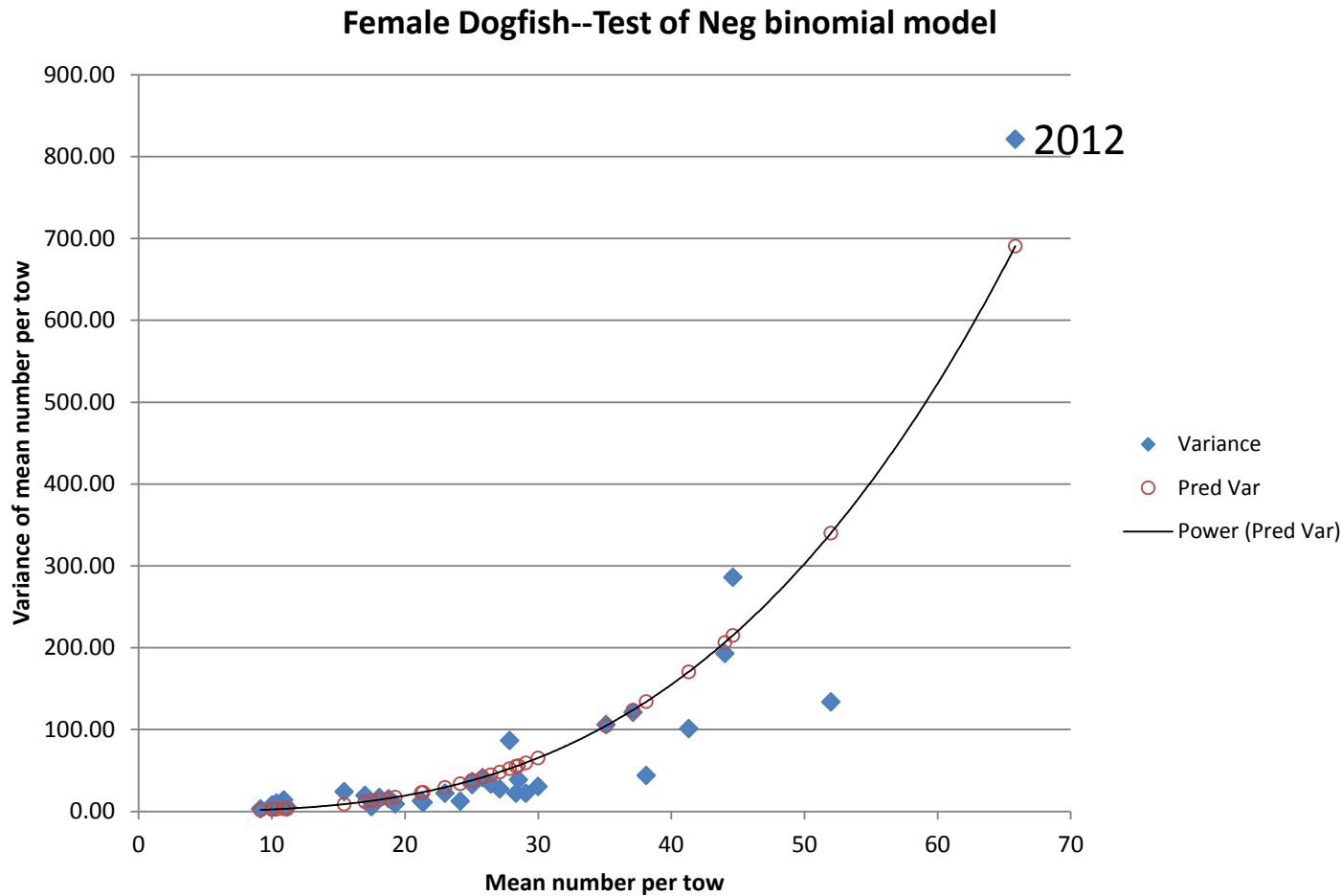
Table 7 (partial) Biomass estimates for spiny dogfish (thousands of metric tons) based on area swept by NEFSC trawl during spring surveys, 1968-2015. Estimate for 2014 not included as survey coverage was incomplete.

Estimated derived from the FSV Bigelow using a weight specific calibration to convert to Albatross equivalents.											
Year	Lengths >= 80 cm			Lengths 36 to 79 cm			Length <= 35 cm			All Lengths	3-pt Average Female SSB
	Females	Males	Total	Females	Males	Total	Females	Males	Total		
2009	148.3	21.9	170.2	54.9	326.1	381.0	2.95	3.76	6.71	557.9	182.7
2010	160.6	18.3	178.8	64.0	287.3	351.3	1.15	1.44	2.59	532.7	183.5
2011	213.9	26.7	240.6	60.0	408.6	468.6	0.99	2.48	3.47	712.6	174.2
2012	348.4	44.5	399.0	72.6	584.7	723.0	4.06	5.04	9.16	1131.1	241.0
2013	145.6	57.2	202.7	133.1	444.3	577.4	5.25	6.48	11.73	791.8	235.9
2014	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2015	125.4	22.3	147.7	40.5	280.2	320.6	1.07	1.35	2.42	470.8	135.5

Data have been adjusted to AL IV equivalents using HB Bigelow calibration coefficients. 3-pt Ave SSB for 2015 is 2013 and 2015 only.

Average of 2013 and 2015 only

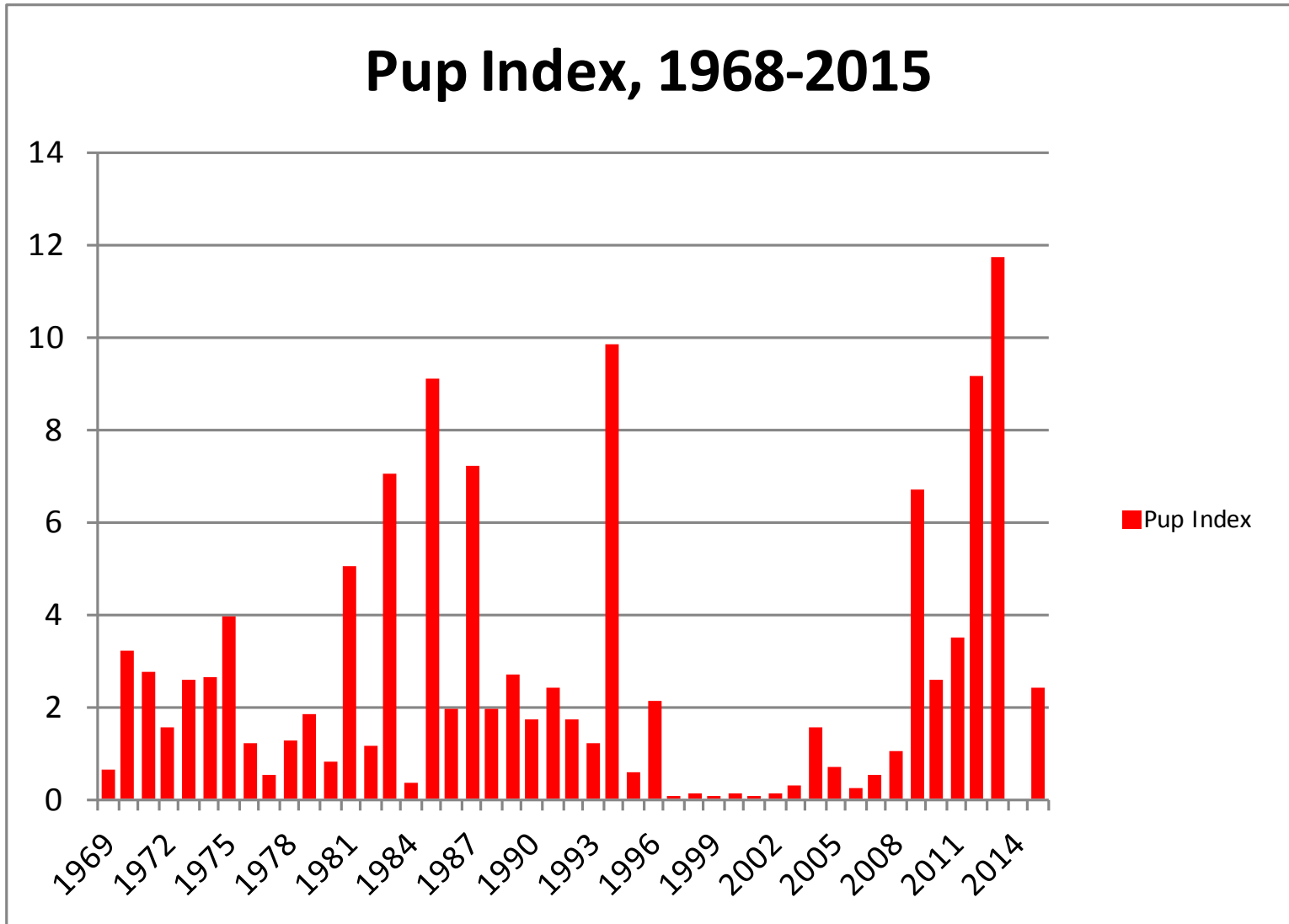
Comparison of Means and Variances of Survey abundance indices using Negative Binomial model: $Var = \mu + \mu^2 / 413.0$, where 413.0 is an estimate.



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Estimated swept area biomass (mt) of total pups (spiny dogfish < 36 cm) captured in the NEFSC spring bottom trawl survey, 1968-2015. No survey data available for 2014.

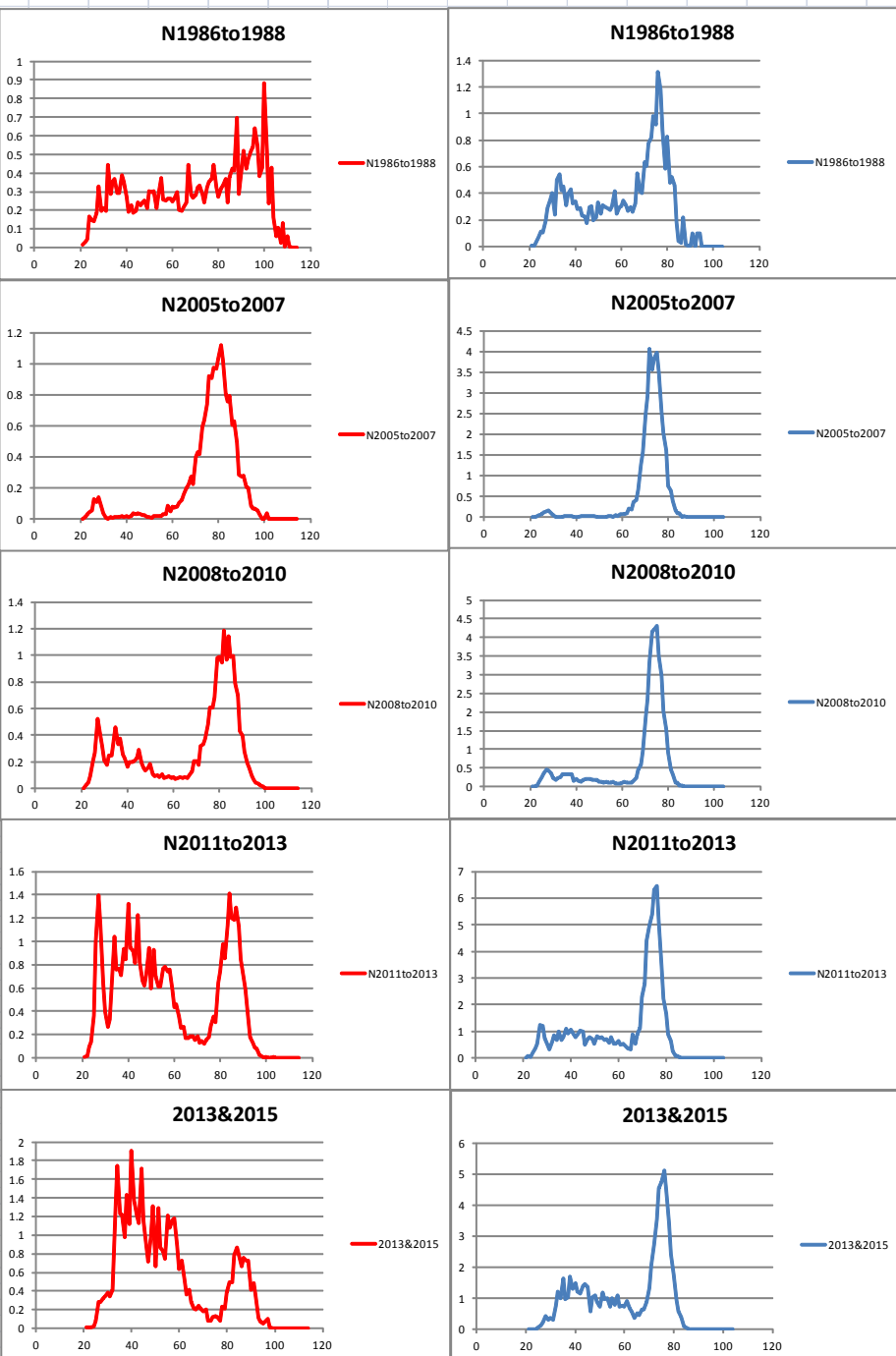


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Females

Males



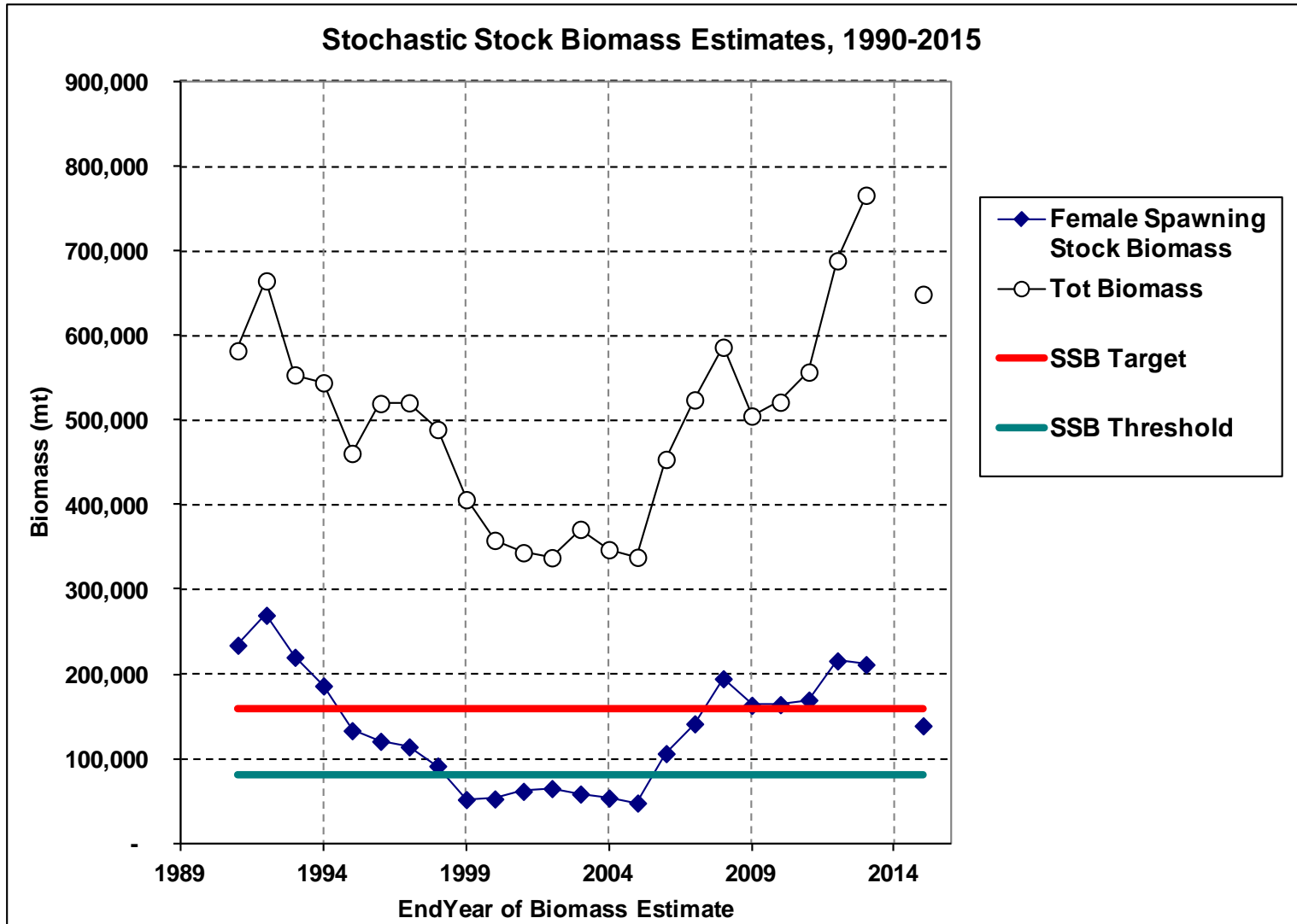
Composite size frequencies for female and male spiny dogfish in NEFSC spring bottom trawl survey. Y axis is average number per tow. Note scale differences among years.

--Non overlapping years
--Some evidence of strong recruitment since 2008.

Assessment Summary

- Stock is rebuilt
- Overfishing is not occurring
 - F_{2014} : .214 F_{MSY} : 0.2439
- Stock is NOT overfished
 - B_{2015} : 138,997 mt. B_{MSY} : 159,288 mt. 87 % of target
- Short term declines in abundance are expected but recruitment of sub-adults to exploitable biomass should increase stock. Relatively low risk of falling below $\frac{1}{2} B_{msy}$.
- Median OFL for 2016 = 24,247 mt
- Pstar based estimates for ABC for 2016 is 16,765 mt

Comparison of stochastic female SSB with target and threshold biomass values for 1991-2015. Estimate for 2014 not available. SSB target is defined as 159,288 mt. SSB threshold is 79,644 mt.



Projections at $F=F_{msy}$ proxy=0.2439

- Assumed that 2015 catches are **16,542** mt
- Projected for 250 yrs to check for stability at F_{msy}
- Continuing modest decreases in stock size are likely in next few years but current runs suggest the stock has low probability of declining below the threshold biomass.
- Recruitment of strong year classes in from 2008-2013 should increase stock beginning around 2019.

Stochastic SSB Projections at $F=F_{msy}$: 90% CI

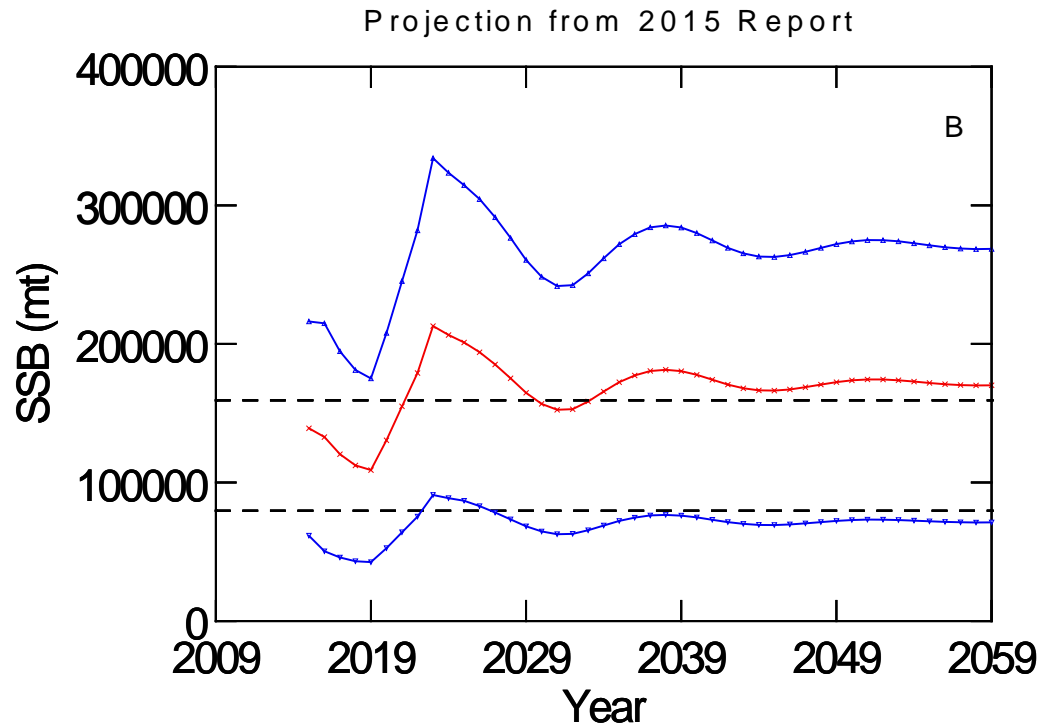


Figure 12. Comparison of Stochastic projections of SSB at current fishing mortality MSY proxy ($F=0.2439$) for 2015 (B). F_{msy} proxies are based on results in Rago(2011). Horizontal dashed lines represent biomass target and threshold values of 159,288 mt and 79,644 mt, respectively. Projections depict 5%, 50% and 95% tiles for each scenario. The expected finite rate of population increase at $F=0.2439$ is 1.000 or 0% change per year. The finite rate of population increase at $F=0.19235$ is 1.01283 or about a 1.28% increase per year.



Spiny Dogfish Fishery Performance Report

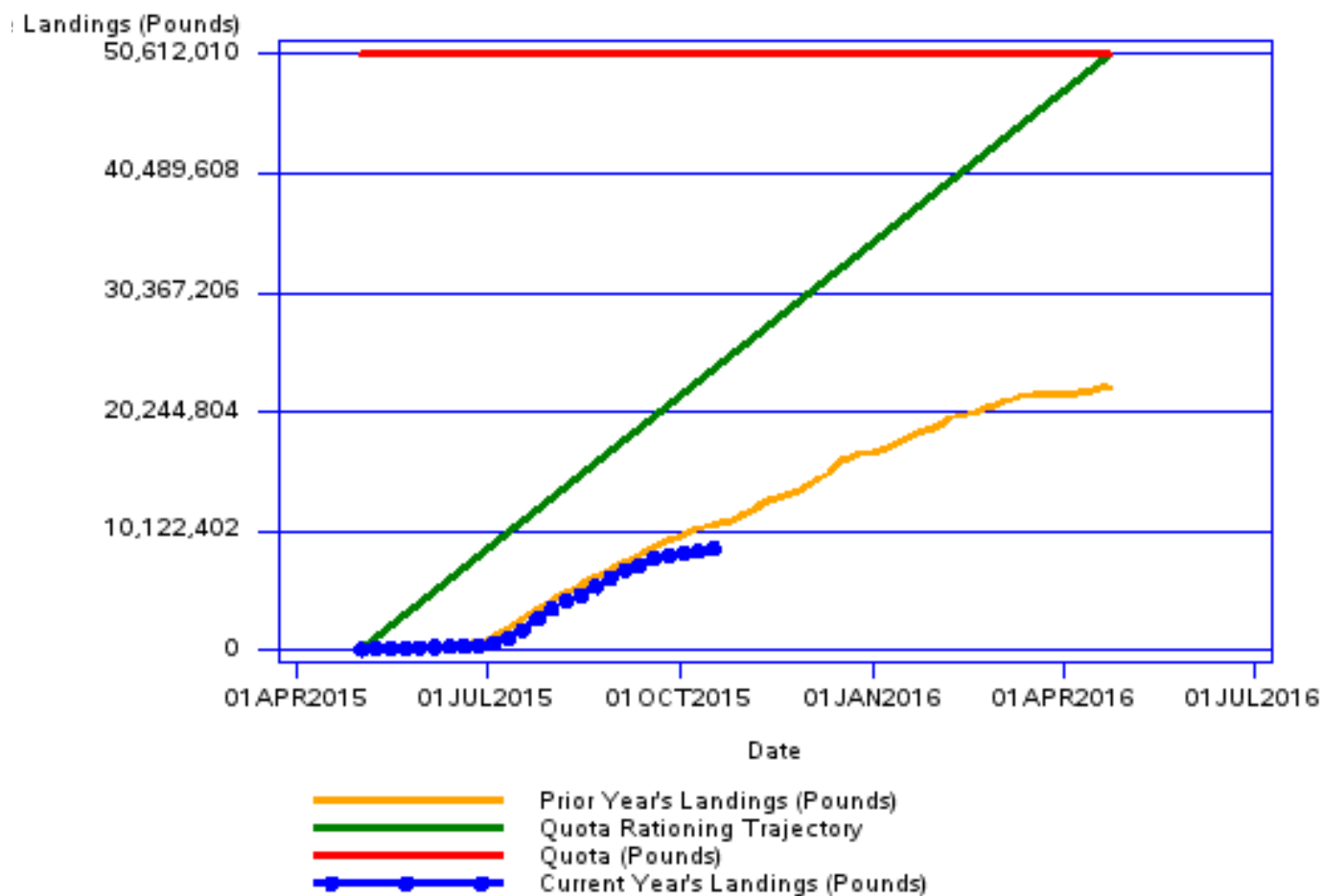
Presented to the ASMFC Spiny Dogfish Board
November 4, 2015



Recent Landings

Spiny Dogfish Quota Monitoring Report

2016 fishing year quota:
50,612,000 pounds





Management Measures

		Landings (lbs.)
As of 10/21/2015	2016	Trending below 2015
As of late April	2015	22,315,621
As of late April	2014	16,099,726
As of late April	2013	27,979,613
As of late April	2012	Quota of 20,000,000, caught quota



Fishery Performance Report

- Boats have no problem catching trip limits
- Limited markets
- Some processor restrictions (days)
- Slow and steady approach for trip limits
 - Some interest in trip limit changes



Questions



Spiny Dogfish 2016-2018 Specifications

Presented to the ASMFC Spiny Dogfish Board
November 4, 2015



The Mid-Atlantic Council's risk policy dictates a 32.6% probability of overfishing for spiny dogfish at 87% of its target, which resulted in the 36,960,498 lbs. (16,765 mt) dogfish ABC approved by the Mid-Atlantic Council/ recommended by SSC.

SSC received a request to determine an OFL and ABC using averaged data to fill in the missing 2014 data point.

MAFMC Selected Management Measures for 2016-2018 fishing years

Specs	Basis	2016 (pounds)	2016 (mt)	2017 (pounds)	2017 (mt)	2018 (pounds)	2018 (mt)
OFL	Projected Catch at Fmsy	53,455,485	24,247	55,313,982	25,090	56,824,148	25,775
ABC	Council Risk Policy	36,960,498	16,765	36,433,593	16,526	36,676,102	16,636
Canadian Landings	= avg last 3 years (10,11,12)	143,300	65	143,300	65	143,300	65
Domestic ABC	= ABC - Canadian Landings	36,817,198	16,700	36,290,293	16,461	36,532,801	16,571
ACL	= Domestic ABC	36,817,198	16,700	36,290,293	16,461	36,532,801	16,571
Mgt Uncert. Buffer	Avg. pct overage since 2011	0	0	0	0	0	0
ACT	= ACL - mgt uncertainty	36,817,198	16,700	36,290,293	16,461	36,532,801	16,571
U.S. Discards	= 3 year average (12,13,14)	11,494,167	5,214	11,494,167	5,214	11,494,167	5,214
TAL	ACT - Discards	25,323,030	11,486	24,796,126	11,247	25,038,634	11,357
U.S. Rec Landings	= 2014 Estimate	68,343	31	68,343	31	68,343	31
Comm Quota	TAL - REC Landings	25,254,687	11,455	24,727,782	11,216	24,970,291	11,326

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ASMFC Management Measures

- Northern states (ME – CT): maximum possession limit of 5,000 pounds per day
- Southern states can set their own possession limits



Questions