New England Fishery Management Council
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MEMORANDUM

DATE: **August 3, 2017**

TO: Science and Statistical Committee

FROM: Skate Plan Development Team (PDT)

SUBJECT: **NE Skate Complex ABCs for FY 2018 - 2019**

This memorandum forwards the Skate PDT recommendation for ABC for the NE Skate Complex for FY 2018 and FY 2019 (Table 1). The Skate PDT also recommends incorporating newly available skate discard mortality rate estimates for winter (14%) skate in sink gillnet gear into the specifications. This would replace the assumed 50% discard mortality rate in this gear type. The stock was last assessed at the Data Poor Stocks Working Group in 2009, but trawl survey biomass updates are provided annually.

The ABC is based on the current default ABC control rule established in Amendment 3. The control rule uses the median catch/biomass ratio as an estimate of exploitation rate applied to the three-year moving average of fall (spring for little skate) survey stratified mean weight per tow.

Survey Data

Specifications for FY 2018 and 2019 incorporate the most recent three years of the fall survey data (spring for little skate); older survey years drop out of the calculation. Based on the updated survey data, thorny skate remains overfished (0.04 B_{MSY}) but overfishing is no longer occurring (overfishing was occurring during 2013 and 2014 according to previous stock updates). Winter skate (1.17 B_{MSY}) is also no longer experiencing overfishing (overfishing was occurring during 2013 and 2014 according to previous stock updates). The B_{MSY} proxy for each skate species is the 75th percentile of the appropriate survey biomass index time series for that species. A species is overfished if its three-year moving average survey mean weight per tow is less than ½ B_{MSY} proxy. Survey indices for three of the seven species have decreased (Table 2). Figure 1 shows the long-term survey trends and biomass reference proxies for all seven species. Little skate and winter skate continue to dominate the survey biomass. The 2014-2016 3-year average for winter skate has increased and is no longer affected by the low survey index in 2013. The 2015-2017 3-year average for little skate decreased because of a low spring survey index in 2016.

Landings

The overall TAL was not exceeded for the skate fisheries. 2015 skate wing landings were 8,911 mt (81.8% of the wing TAL), and skate bait landings were 5,541 mt (100.9% of the bait TAL). Historic catch and landings are provided in Figure 1. State landings were 941 mt. State landings have been variable over recent fishing years (Table 2), and the PDT used a preliminary three-year average (FY 2013-2015) for

specifying the assumed amount of state landings to deduct from the TAL for 2018-2019 (3.5%). ACL accounting has not been finalized for FY2016 but preliminary estimates indicate that the wing fishery achieved 98% of its TAL; the bait fishery reached 101% of its TAL. State landings for FY2016 were not available in time for the SSC meeting.

Discards

Discards were estimated through calendar year 2016 by gear (Table 5). Discards are estimated for a calendar year, rather than the fishing year, because they rely on the NMFS area allocation landings tables to expand observed discard/kept-all ratios to total based on landings by gear, area and quarter. The observed D/K-all ratios were derived from the NEFOP and the At Sea Monitoring programs and included both sector and non-sector vessels, but were not stratified on that basis. The hindcasted discard estimates are calculated using a three-year average of the discards of skates/landings of all species. An assumed discard mortality rate of 50% is applied for all gears and species, except for otter trawl gear, scallop dredge and sink gillnet.

Total estimated discards for 2016 were 33,271 mt (Table 5). Total discards decreased by only 13% over the 2015 estimates. The weighted aggregate mean discard mortality rate (across all species and gear types) was estimated to be 31 %. The assumed dead discard rate (dead discards/total catch) for 2018-2019 is 42%, including the new sink gillnet discard mortality rate estimate for winter skates. Applying this rate to the updated specifications results in projected dead discards for FY2018 and 2019 of 9,769 mt.

Northeast Skate Complex Annual Catch Limit Accounting

Only 79.2% of the 35,479 mt skate complex ACL was caught in 2015; accordingly, no Accountability Measures (AMs) were triggered (Table 4). The total catch for 2015 was 28,111 mt composed of 11,189 mt of dead discards and 15,564 mt of landings (including state landings). Total catch was higher than the ACT (75% of ACL), but less than the ACL.

Discard mortality rates

The baseline discard mortality rate estimates are set at 50% for all species and all gear types, where new research has not allowed for the revision of that number. This was established in Amendment 3 to the NE Skate Complex FMP. Currently, revised discard mortality rates have only been implemented for little, smooth, thorny, and winter skates in otter trawl gear, and little and winter skate in scallop dredge gear. Specifications for FY 2014-2015 incorporated final trawl gear discard mortality rate estimates for little (22%), smooth (60%), thorny (23%) and winter (9%) skate as determined by Mandelman *et al*. (2013). For these 4 species, the 50% discard mortality rate estimate is assumed for remaining gear (scallop dredge, longline, and gillnet). Specifications for FY2016 – 2017 incorporated final discard mortality rate estimates for little (51%) and winter (35%) skate in scallop dredge gear.

Recent research has provided revised discard mortality rate estimates for winter skate (14%) in sink gillnet gear (see Sulikowski et al., in review). The models estimated a discard mortality rate of 11% and 17% for females and males, respectively. It is not currently possible to determine the sex ratio of winter skate catch. The PDT recommended using an average between the two rates to apply an overall discard mortality rate estimate of 14%, an approach that was supported by the principal investigators. The revised sink gillnet discard mortality rate estimate combined with the updated survey and catch data decreased the assumed dead discard rate for 2018 to 41% (from 42%). Changes to the discard mortality rate estimates affect the catch history and therefore the catch/biomass medians. The revised sink gillnet discard mortality rate estimates were applied to the entire catch time series despite changes in gear configuration during this time period.

Specifications

The proposed specifications for FY 2018 and 2019 use the updated discard mortality rate estimate for winter skate in sink gillnet gear, as well as the revised catch history and the catch/biomass medians. The revised catch/biomass medians have standardized years from 1969-2016. Table 1 shows a comparison of the proposed specifications for FY 2018 and 2019 including the revised scallop dredge discard mortality estimates (PDT recommendation) with both the previous specifications package (FY2016 – 2017) and a revised specifications based on existing discard mortality rate estimates. The changes in survey indices and revised medians contribute to slightly increasing the ABC. Discards have decreased in the last two years, however, the higher 2014 discard data point is still influencing the three year moving average. The proportion of dead discards therefore remains high, further impacting the available TAL.

MSY is defined as the catch resulting from the application of the catch/biomass medians to the target skate biomass levels. MSY, based on the revised catch/biomass medians, is estimated to be 36,794 mt (MSY was estimated in the FY2016 – 2017 specifications to be 36,806 mt).

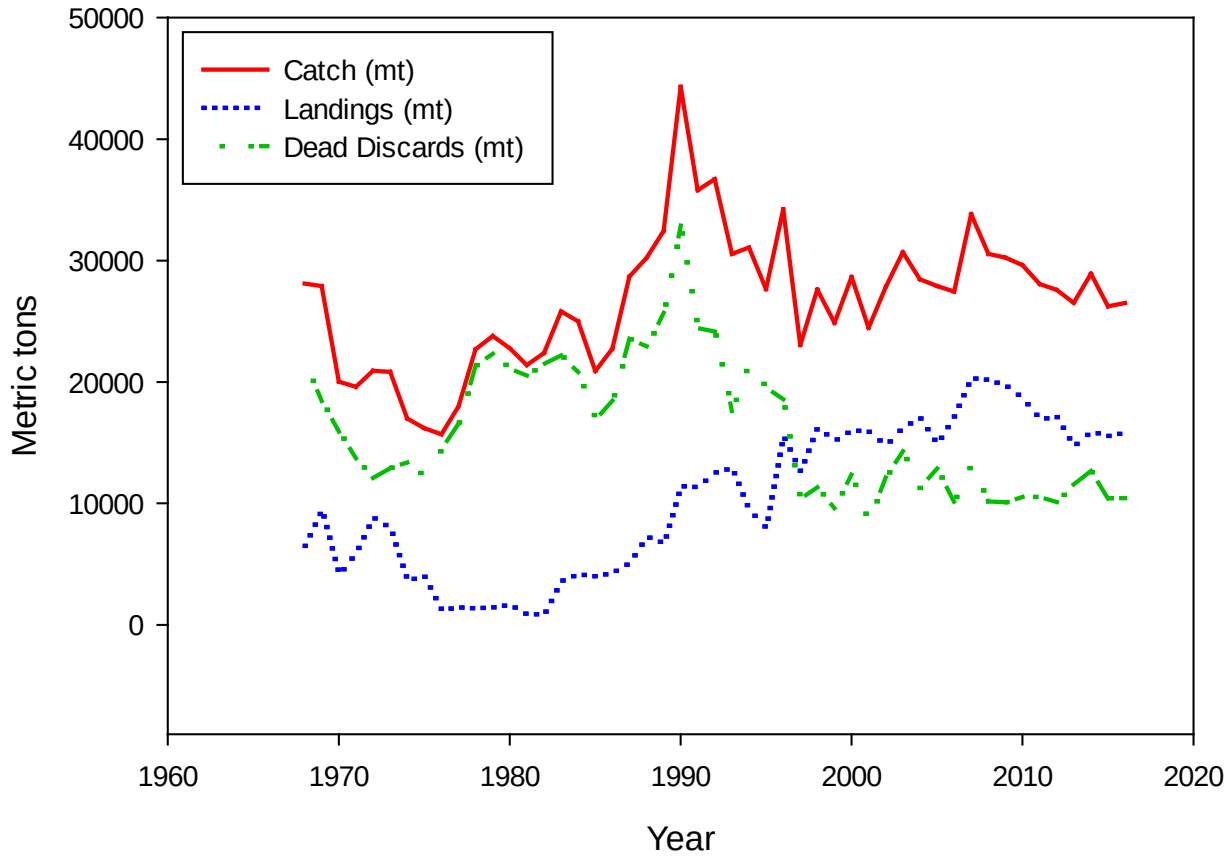

Figure 1 - Historic catch (in mt) from 1968 to 2016 compared to landings and dead discards

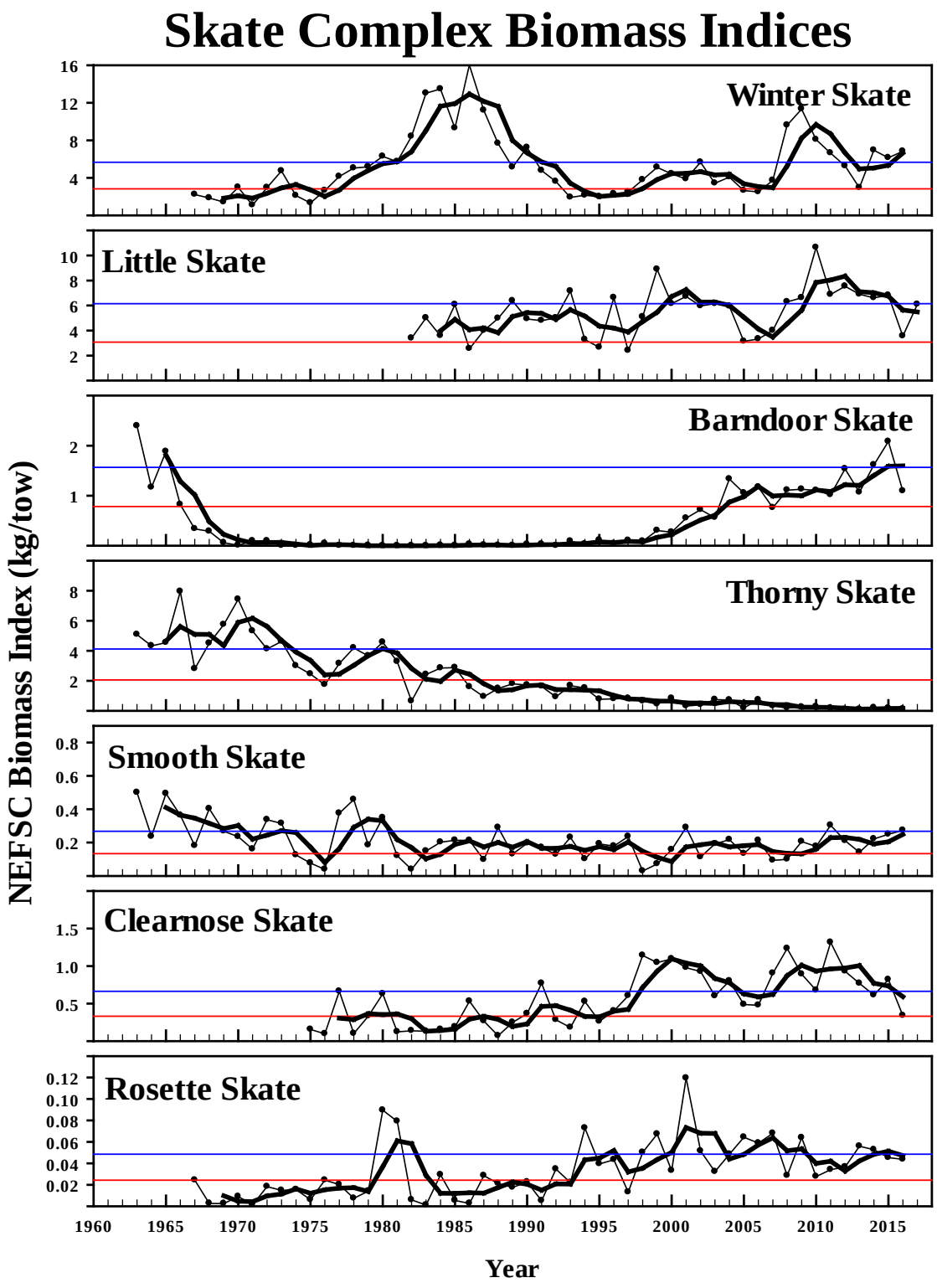

Figure 2 - NEFSC survey biomass indices (kg/tow). Thin lines with symbols are annual indices, thick lines are 3-year moving averages, and the thin horizontal lines are the biomass thresholds using consistent FSV Albatross/Bigelow strata.

Table 1 – Comparison of PDT recommended revised specifications for FY2018 and FY2019, with revised specifications for FY2018 & FY 2019 based on status quo discard mortality estimates, and specifications for FY2016 and YF2017.

	PDT recommendation including sink gillnet discard estimates	Status Quo discard mortality rate estimates	FY 2016-17 specifications
ABC	31,327	31,913	31,081 mt
ACT	23,495	23,935	23,311 mt
TAL	13,762	13,914	12,926 mt
Federal TAL	13,281	13,427	12,872 mt
Wing TAL	8,832	8,929	8,560 mt
Bait TAL	4,449	4,498	4,312 mt

Table 2 – State-only landings for Fishing years 2013 - 2015

Fishing Year	State landings (mt)
2013	190
2014	329
2015	941

Table 3 - NEFSC trawl survey indices

	Barndoor	Clearnose	Little	Rosette	Smooth	Thorny	Winter
2013	1.07	0.77	6.9	0.056	0.14	0.11	2.95
2014	1.62	0.61	6.54[a]	0.053	0.22	0.21	6.95
2015	2.08	0.82	6.82	0.045	0.25	0.19	6.15
2016	1.09	0.339	3.56[b]	0.044	0.27	0.13	6.84
2017			6.09				
			Three Year Moving Averages				
2011-2013	1.21	1.01	7.11	0.042	0.22	0.12	4.96
2012-2014	1.41	0.77	6.99[a]	0.048	0.19	0.13	5.06
2013-2015	1.59	0.73	6.75[a]	0.051	0.21	0.17	5.35
2014-2017	1.60	0.59	5.64[b]	0.047	0.25	0.18	6.65
2015-2017			5.49				

Table 4 - FY2014 and 2015 catch and landings of skates compared to management specifications

	2014		2015	
Management Specification	Specification Amount	Catch/Landings (mt)	Specification Amount	Catch/Landings
ABC/ACL	35,479	28,032	35,479	28,111
ACT	26,609	28,032	26,609	28,111
Assumed Discards + State Landings	16,385	11,781	10,224	11,781
TAL Bait	5,489	4,499	5,489	5,541
TAL Wings	10,896	10,605	10,896	8,911

Table 5 - Estimated discards (mt) of skates (all species) by gear type from all areas combined, 1964 – 2016

	Half 1							Half 2							
Year	Line Trawl	Otter Trawl	Shrimp Trawl	Sink Gill Net	Scallop Dredge	Total Half 1		Line Trawl	Otter Trawl	Shrimp Trawl	Sink Gill Net	Scallop Dredge	Total Half 2		Grand Total
1964	361	53,514	0	12	6,434	60,321		402	37,992	0	7	8,288	46,690		107,011
1965	425	58,644	0	17	5,029	64,115		491	41,212	0	5	8,940	50,647		114,762
1966	311	62,821	0	26	5,543	68,701		625	35,869	0	7	6,524	43,025		111,726
1967	319	56,872	0	22	2,882	60,095		470	35,053	0	8	4,735	40,267		100,362
1968	224	56,209	0	37	3,672	60,142		414	34,010	0	10	4,890	39,324		99,466
1969	296	54,979	0	32	2,294	57,602		669	29,299	0	6	3,017	32,991		90,593
1970	331	43,878	0	22	1,838	46,069		584	26,802	0	7	2,742	30,135		76,204
1971	519	34,509	0	21	1,916	36,965		769	20,097	0	8	2,552	23,426		60,391
1972	525	32,161	0	31	2,000	34,718		711	17,965	0	13	2,559	21,248		55,966
1973	618	34,382	0	31	2,103	37,134		724	19,738	0	15	1,846	22,323		59,457
1974	697	36,349	0	58	1,994	39,099		778	17,754	0	24	2,845	21,401		60,499
1975	727	25,197	283	61	2,615	28,883		744	17,313	36	26	4,757	22,875		51,758
1976	514	22,435	66	99	4,086	27,200		441	19,650	0	37	8,313	28,441		55,641
1977	329	26,817	39	169	7,210	34,564		314	21,679	0	47	10,106	32,146		66,710
1978	829	35,094	0	190	9,048	45,161		661	23,484	0	66	14,452	38,662		83,823
1979	1,019	38,530	26	157	9,186	48,918		971	27,982	0	67	13,540	42,560		91,478
1980	1,056	39,819	23	195	9,900	50,993		354	29,633	0	96	11,104	41,186		92,179
1981	503	43,186	92	264	9,502	53,547		257	26,460	0	93	12,818	39,628		93,175
1982	400	43,461	117	95	7,779	51,853		197	37,880	7	84	12,572	50,740		102,593
1983	471	49,354	116	118	8,655	58,714		226	33,711	22	70	11,965	45,994		104,708
1984	378	48,449	152	126	8,337	57,442		87	31,261	53	94	9,903	41,398		98,840
1985	321	40,153	214	119	6,821	47,628		173	23,506	70	81	9,483	33,314		80,941
1986	406	36,913	256	173	7,821	45,569		171	25,517	83	88	12,080	37,938		83,508
1987	692	36,141	264	143	12,687	49,927		364	21,178	46	86	18,953	40,627		90,554
1988	638	35,353	158	166	13,791	50,106		341	21,180	46	91	19,077	40,734		90,840
1989	542	37,663	73	74	18,206	56,558		264	20,260	17	111	19,452	40,104		96,661
1990	390	49,863	223	347	17,162	67,986		273	39,008	71	73	23,458	62,883		130,869
1991	839	22,882	232	99	19,314	43,366		297	17,478	44	113	18,812	36,744		80,110
1992	2,050	13,819	255	269	13,679	30,072		1,270	19,609	0	107	22,823	43,809		73,881
1993	42	7,886	35	211	11,268	19,442		28	26,825	1	110	12,700	39,663		59,105
1994	33	57,447	11	190	6,484	64,165		28	17,856	1	230	5,621	23,735		87,900
1995	30	21,980	8	443	7,385	29,846		30	11,215	1	350	19,481	31,077		60,922
1996	28	16,222	26	414	8,376	25,066		27	30,622	8	125	11,258	42,039		67,105
1997	30	7,584	34	388	10,130	18,166		30	7,398	4	90	6,059	13,581		31,747
1998	25	6,103	9	218	9,069	15,425		30	10,488	1	252	8,543	19,314		34,739
1999	23	2,655	4	598	8,542	11,823		24	9,857	0	261	6,149	16,291		28,113
2000	14	6,783	6	181	9,024	16,009		26	18,175	0	791	4,959	23,951		39,960
2001	20	20,075	0	404	3,615	24,114		22	8,449	0	207	3,249	11,927		36,040
2002	21	12,168	1	392	6,655	19,237		25	10,067	0	2,718	8,046	20,857		40,094

Table 5 (continued)

	Half 1							Half 2							
year	Line Trawl	Otter Trawl	Shrimp Trawl	Sink Gill Net	Scallop Dredge	Total Half 1		Line Trawl	Otter Trawl	Shrimp Trawl	Sink Gill Net	Scallop Dredge	Total Half 1		Grand Total
2003	38	18,258	8	522	7,222	26,048		18	17,728	0	442	7,965	26,154		52,203
2004	9	14,324	4	450	5,544	20,331		16	21,736	0	503	4,236	26,491		46,822
2005	88	14,304	2	1,041	6,412	21,848		51	19,269	0	559	4,746	24,626		46,473
2006	55	10,552	0	854	4,779	16,241		18	12,368	1	362	5,574	18,323		34,564
2007	70	14,566	0	990	5,812	21,438		22	16,214	0	756	6,488	23,481		44,919
2008	119	10,391	2	1,232	4,810	16,553		56	13,138	0	744	4,539	18,478		35,030
2009	164	11,054	1	1,634	4,903	17,756		185	14,698	0	609	4,193	19,685		37,441
2010	269	9,461	0	1,058	7,655	18,443		209	11,872	0	1,344	4,896	18,322		36,765
2011	172	11,768	3	1,976	5,063	18,982		171	14,760	0	1,205	3,642	19,777		38,759
2012	46	9,941	3	1,657	4,215	15,861		53	13,386	0	825	4,149	18,412		34,274
2013	308	14,444	0	1,401	3,647	19,800		454	16,940	0	523	4,957	22,874		42,673
2014	14	12,634	0	1,675	7,514	21,837		111	14,427	0	880	5,502	20,919		42,757
2015	60	11,596	0	976	6,099	18,731		307	14,605	0	696	3,556	19,164		37,895
2016	86	8,090	0	1,248	4,821	14,245		132	12,228	0	614	6,051	19,025		33,270