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MEMORANDUM

DATE: **July 14, 2021**

TO: Science and Statistical Committee

FROM: Northeast Skate Complex Plan Development Team (Skate PDT)

SUBJECT: **Northeast Skate Complex ABC for FY 2022 – 2023**

This memorandum forwards an approach developed by the Skate PDT for setting the Northeast Skate Complex Acceptable Biological Catch (ABC) for Fishing Years (FY) 2022 and FY 2023 (Table 5). The ABC approach is based on the ABC control rule established in Amendment 3 to the Northeast Skate Complex Fishery Management Plan (Skate FMP). This memo includes a response to the SSC recommendations made in 2019 during FY 2020-2021 ABC setting, an explanation of survey and fishery data updates, and a summary of the approach to ABC setting developed by the PDT.

The ABC control rule for the Northeast Skate Complex, established through Amendment 3 is:

> *The skate ABC is the median ratio of catch/biomass of each of the seven skate species multiplied by its three-year moving average stratified mean biomass (weight/tow) for skates, summed over the seven skate species in the management unit. This method is considered an interim proxy for an ABC until an OFL and its uncertainty can be quantified.*

More simply, the long-term median catch of each species (landings plus discards) is adjusted by its ratio of short-term over long-term trawl survey biomass (kg/tow). The results are then summed for a complex-wide ABC. Due to recent trawl survey data limitations (e.g., no 2020 data), the PDT is recommending that a modification to the control rule be used, as explained on page 9.

Using the modification, the ABC would be 37,236 mt for FY 2022-2023. This would be a 14% increase over the FY 2020-2021 ABC of 32,715 mt.

BACKGROUND

The Skate FMP specifies the management measures for seven skate species (barndoor, clearnose, little, rosette, smooth, thorny, and winter skate) off the New England and Mid-Atlantic coasts. The New England Fishery Management Council (Council) sets specifications every two years for the skate complex and the skate wing and bait fisheries. These fisheries have different seasonal management structures and are subject to effort controls (e.g., possession limits) and accountability measures (AM).

Principally due to problems with species identification in commercial catches, the Original Skate FMP (implemented in 2003) did not derive or propose an absolute Maximum Sustainable Yield (MSY) estimate for skate species or for the skate complex. Catch histories for individual species were unreliable and probably underreported. Furthermore, the population dynamics of skates was largely unknown, so measures of carrying capacity or productivity were not available on which to base estimates of MSY. Likewise, an OFL is undetermined in the Skate FMP. In their February 11, 2009 report, the SSC

recommended that an OFL "cannot be determined, because overfishing reference points are survey proxies, and estimates of fishing mortality or fishing mortality reference points are not available." These issues are largely why skate specifications apply to the entire complex and are not set for individual species. Skates were last assessed at the Data Poor Stocks Working Group in 2008 (NDPSWG 2009), but trawl survey biomass updates are provided annually.

RESPONSE TO SSC RECOMMENDATIONS MADE IN 2019

In September 2019, the SSC concluded that the "overfishing limit for the Northeast remains unknown" and "cannot be determined in the absence of analytical assessment." The SSC supported the PDT recommendation for ABC based on a modification to the use of survey indices due to trawl survey data gaps in 2017 and 2018. The SSC made several other comments and recommendations, which the PDT responds to here:

SSC Comment: "The SSC recommends that thorny skate research currently underway be presented to the SSC when completed, so that the SSC can evaluate the research findings in the context of the poor stock status of this species."

PDT Response: Several recently completed and ongoing research projects have focused on thorny skates (Appendix I). The PDT continues to track the progress of research on this species and outcomes will be considered at the next skate assessment in 2023.

Schwieterman et al. (2019) studied the impact of temperature change and elevated pCO_2 on the metabolic rates and hypoxia tolerances of clearnose skate, summer flounder, and thorny skate. All three species showed decreased tolerance to elevated temperature and pCO_2, and the authors suggest that climate change may push species beyond their physiological limits. This work was funded by the National Science Foundation and NOAA Fisheries.

Pennino et al. (2019) modeled thorny skate distribution in the southern Grand Banks (Newfoundland, Canada). Declines in occurrence and biomass were found, partly due to increasing water temperature, decreasing availability of prey (snow crab), and fishing effort. This work was funded by the European Union.

Knotek et al. (2019) evaluated thorny skate discard mortality in the Gulf of Maine groundfish trawl fishery using pop-up satellite archival transmitting tags. Discard mortality was estimated at 24.5% and smaller thorny skate were more vulnerable. The authors suggests that other sources of mortality besides discard mortality may be impeding population recovery. This work was funded by the Bycatch Reduction Engineering Program (BREP).

Kneebone et al. (2020) assessed thorny skate horizontal movements and habitat use in the Gulf of Maine and found a potential lack of connectivity between thorny skate in the Gulf of Maine and the rest of this species in the North Atlantic. A project blog is available in addition to the publication. This work was funded by the Saltonstall-Kennedy grant program, BREP, and the Northeast Consortium.

Grieve et al. (2020) modeled climate change impacts on thorny skate on the Northeast US shelf using trawl and longline survey data and suggest that "climate change will continue to negatively impact thorny skate populations by reducing the amount of thermally suitable habitat in the southern extent of their range." This work was funded by NOAA Fisheries.

Mandelman et al. (in prep) are working to identify thorny skate bycatch hotspots in the Gulf of Maine by fishery and time of year. A manuscript is in preparation. This work was funded by BREP.

Naylor et al. (ongoing) are using high-resolution genomics to explore spatial population structure of the thorny skate population in the North Atlantic. This work is funded by the Lenfest Ocean Program.

SSC Comment: "The SSC also discussed calculating an ABC for the complex, excluding thorny skate. As thorny skate is already a prohibited species, removing this species from the skate ABC calculation would appropriately discount the overall amount of skates allowed to be harvested."

PDT Response: Due to the prohibition on landings, any thorny skate caught must be discarded. The discard mortality assumptions for thorny skate are 50% for gillnet, longline, and scallop dredge gear and 23% for otter trawl (Affected Environment, Section 1.2.6). Because there is some assumed fishing mortality for this species, it is appropriate to keep thorny skate within the ABC calculation, from which expected dead discards are subtracted when the total allowable landings are calculated. However, this is an issue that will be examined more closely in the next assessment scheduled for 2023.

SSC Comment: "...the SSC felt there was a need for a more systematic approach to address non-sampled strata in the trawl surveys, rather than using a case-by-case approach. Non-sampled strata may become more common in the future due to both natural and anthropogenic events (e.g. offshore wind energy areas; adverse weather conditions; etc.). Evaluating approaches that are robust to missing values is therefore important."

PDT Response: The PDT agrees, and this issue is even more pronounced for setting the FY 2022-2023 ABC. The NEFSC is engaging in a broader consideration about how to address survey gaps, but decisions are pending. This topic will be considered at the next skate assessment in 2023.

SSC Comment: "The SSC also discussed the potential for alternative abundance indices for skates, including the possibility of using longline survey data for these species."

PDT Response: This topic will be considered at the next skate assessment in 2023.

SSC Comment: "The SSC requests the following be added to the NEFMC's 2020 research priorities: (a) an evaluation of setting ABC for the Northeast Skate Complex, excluding thorny skate; (b) an examination of using alternative abundance indices for skates (i.e., obtained from longline surveys); and (c) development of a more systematic approach to account for non-sampled strata in trawl surveys.

PDT Response: This recommendation was considered in spring 2020 during research priority setting. The PDT did not agree with the SSC recommendation to add those items as research priorities, because they are all tasks that could and should be addressed in an assessment rather than through research. As noted above, the PDT expects all these issues will be considered during the 2023 management track assessment.

SURVEY DATA

Indices of relative abundance (stratified mean weight/tow) have been developed from Northeast Fisheries Science Center's (NEFSC) bottom trawl surveys for the seven species in the skate complex. These indices and their rates of change form the basis for all the conclusions about the status of the complex. The spring NEFSC survey data is used for little skate and the fall NEFSC survey data is used for the other managed skate species, due to survey catchability.

In early 2021, the NEFSC determined that only survey data through 2019 will be used for specifications set in 2021 due to survey disruptions in 2020. Thus, the survey indices and stock status determinations for the skate species remain as reported in the 2020 Annual Monitoring Report, based on the updated survey data (through fall 2019, Table 2, Figure 1). Information beyond what is provided below is in the Skate Affected Environment document (Section 1.2).

Survey Indices

In 2019, for the FY 2020-2021 specifications setting (Framework 8), gaps in survey coverage precluded the exact application of the ABC control rule. Ideally, spring survey data for 2017-2019 would have been used for little skate and fall 2016-2018 data would have been used for all other species. In the 2017 fall survey, there was no sampling in Southern New England of the Mid-Atlantic, resulting in no survey indices for rosette and clearnose skate that year. The PDT explored approaches to calculating stock status given these data gaps and determined that a two- year average (2016 and 2018) for rosette and smooth skate performed well. To a lesser degree, the missed stations in 2017 also impacted the time series for barndoor, thorny, smooth, and winter skate species, and there were missed stations in the 2018 fall survey that impacted the time series for these species as well. For these species, a three-year average (2016-2018) was used, but the surveys were adjusted to account for the missing strata, using an average of the ratio between the series with all strata and the series with the missing strata dropped. This was consistent with how missing data in the 2017 fall survey were handled for these species in the 2018 stock status update.

NEFSC trawl survey indices for 2020 are not available given the lack of surveys that year, so the latest survey data available was from 2019 (Table 1). Given the adjustments, for each of the seven skate species, the 2017-2019 moving average of the survey index increased relative to 2016-2018.

Stock Status

A skate species is *overfished* if the three-year moving average of the survey biomass index is below its biomass threshold reference point ($B_{threshold}$), ½ $B_{MSY\ proxy}$. For all skate species except barndoor, $B_{MSYproxy}$ = B_{target} = the 75th percentile of its survey biomass index. For barndoor skate, $B_{MSYproxy}$ = B_{target} = the average of its survey biomass index. The survey biomass index is measured in kg/tow during a specific set of years for each species (Table 2).

Overfishing is occurring on a skate species if the three-year moving average of the survey biomass index for the species declines by more than the average coefficient of variation (CV) of the survey time series, then fishing mortality is assumed to be greater than F_{MSY}.

One skate species is overfished (thorny) and has a rebuilding plan, which is to prohibit possession of thorny skate throughout the management unit. Also, if the 3-year moving average of the thorny skate survey mean weight per tow declines below the average for the previous three years, then the Council must take management action to ensure that stock rebuilding will achieve target levels. As of the 2020 Annual Monitoring Report, 17 years into the rebuilding period, the survey biomass had continued to be low overall for thorny skate with no significant signs of rebuilding. The stock had a small uptick in biomass index from 0.14 in FY 2018 to 0.18 in FY 2019, but this is just 4% of $B_{MSYproxy}$. The Skate Affected Environment document provides more information on the rebuilding plan (Section 1.2.3).

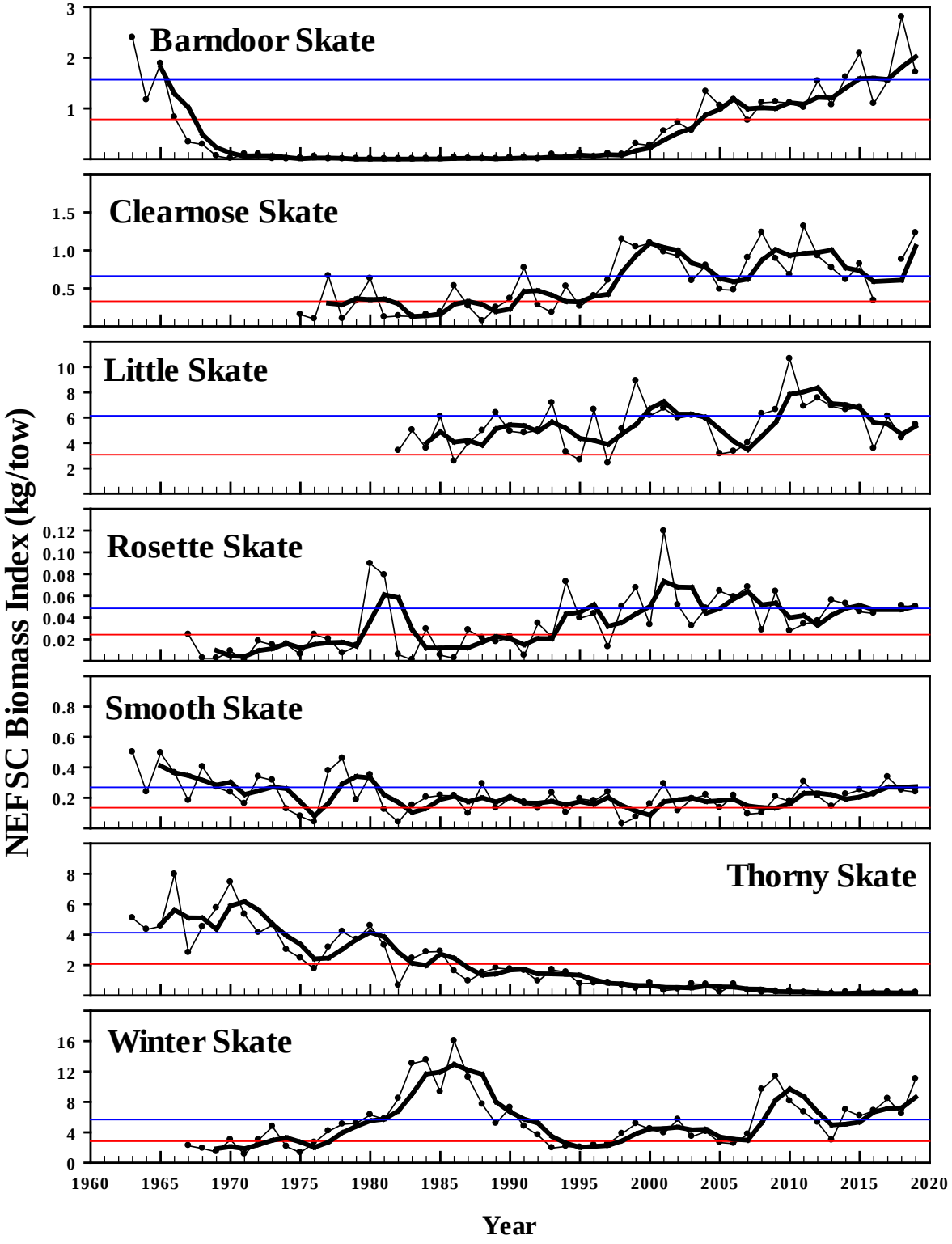
Overfishing is not occurring for any of the seven skate species. Little skate and winter skate continue to dominate the survey biomass.

Table 1. Recent survey indices, survey strata used, and biomass reference points of skate species.

	BARNDOOR	CLEARNOSE	LITTLE	ROSETTE	SMOOTH	THORNY	WINTER
Annual survey	**Autumn**	**Autumn**	**Spring**	**Autumn**	**Autumn**	**Autumn**	**Autumn**
Time Series Basis	**1963-1966**	**1975-2007**	**1982-2008**	**1967-2007**	**1963-2007**	**1963-2007**	**1967-2007**
Strata Set	**Offshore 1-30, 34-40**	**Offshore 61-76, Inshore 17,20,23,26,29, 32,35,38,41,44**	**Offshore 1-30, 34-40, 61-76, Inshore 2,5,8,11,14,17,20,23,26,29,32,35,38,41,44-46,56,59-61,64-66**	**Offshore 61-76**	**Offshore 1-30, 34-40**	**Offshore 1-30, 34-40**	**Offshore 1-30, 34-40, 61-76**
Biomass Target	1.57	0.66	6.15	0.048	0.27	4.13	5.66
Biomass Threshold	0.78	0.33	3.07	0.024	0.13	2.06	2.83
Survey Indices (kg/tow)							
2012	1.54	0.93	7.54	0.040	0.21	0.08	5.29
2013	1.07	0.77	6.90	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	0.34	3.56[b]	0.044	0.27	0.13	6.84
2017	1.54[c]	[c]	6.09	[c]	0.34[c]	0.21[c]	8.40[c]
2018	2.80[e]	0.88	4.41	0.051	0.25[e]	0.14[e]	6.41[e]
2019	1.71	1.23	5.45	0.050	0.24	0.18	11.00
OVERFISHED METRIC (If 3-year moving average of survey biomass index < $B_{threshold}$ then overfished)							
2012-2014 3-year average	1.41	0.77	6.99[a]	0.048	0.19	0.13	5.06
2013-2015 3-year average	1.59	0.73	6.75[a]	0.051	0.21	0.17	5.35
2014-2016 3-year average	1.60	0.59	5.64[a,b]	0.047	0.23	0.176	6.65
2015-2017 3-year average	1.57[c]	[c]	5.49[b]	[c]	0.27[c]	0.18[c]	7.13[c]
2016-2018 3-year average	1.81[c,e]	0.61[d]	4.69[b]	0.047[d]	0.27[c,e]	0.16[c,e]	7.22[c,e]
2017-2019 3-year average	2.02[c,e]	1.05[d]	5.32	0.050[d]	0.27[c,e]	0.18[c,e]	8.61[c,e]
OVERFISHING METRIC (If % change in 3-year moving average of survey biomass index > average coefficient of variation (CV) of the survey time series then overfishing is occurring.)							
% change 2013-2015 vs. 2012-2014	+12.9	-4.8	-3.4	+6.0	+6.8	+26.3	+5.7
% change 2014-2016 vs. to 2013-2015	+0.5	-19.5	-16.8	-7.9	+13.2	+3.7	+24.2
% change 2015-2017 vs. 2014-2016	-0.1.5		-2.6		+16.3	-0.6	+7.3
% change 2016-2018 vs. 2015-2017	+15.3	+3.1[d]	-14.6	+0.1[d]	-0.2	-8.4	+1.2
% change 2017-2019 vs. 2016-2018	+11.4	+73.1	+13.4	+6.4	+1.7	+11.4	+19.2
% change for overfishing status determination[f]	-30	-40	-20	-60	-30	-20	-20

a. No survey tows completed south of Delaware in spring 2014. Values for 2014 were adjusted for missing strata (Offshore 61-68, Inshore 32, 35, 38, 41, 44) but may not be fully comparable to other surveys which sampled all strata.
b. The 2016 spring survey was later than usual. c. No survey tows completed south of Georges Bank in fall 2017. Values either missing or were adjusted for missing strata (Offshore 1-12, 61-76). d. Two-year average due to missing 2017 survey. e. Values were adjusted for missing Offshore strata 30, 34 and 35.
f. This is the average CV of the survey time series.
Notes: The full value of the fishing mortality calculations not used in the table, thus, the values used in the calculation are more precise than those in table.
Grey shading indicates an overfished species.

Figure 1. NEFSC survey biomass indices (kg/tow) through fall 2019. Thin lines with symbols are annual indices, thick lines are 3-year moving averages, and the thin horizontal lines are the biomass thresholds and targets developed through 2007/2008 with consistent strata sets.



FISHERY DATA

Provided here are recent fishery data for the in-season monitoring of landings against the Total Allowable Landings (TAL) for wing and bait fisheries and the year-end catch accounting against the Annual Catch Limit, both conducted by the Greater Atlantic Regional Fisheries Office. The Skate Affected Environment document provides more fishery data (Section 1.6).

Federal Landings – In-season Quota Monitoring

During the fishing year, the Greater Atlantic Regional Fisheries Office (GARFO) monitors skate landings against the wing and bait TALs, which are managed in season, and produces weekly landing reports on-line. This tally includes skate landings from vessels with a federal fishing permit on the day of landing. Skate landings excluded from TAL monitoring are those by vessels that do not have any federal fishing permits on the day of landing, landings from research, and recreational landings.

From FY 2017-2020, the overall federal skate TAL was not exceeded. Federal landings were 99% of the TAL in FY 2017 and decreased to 71-79% in subsequent years. The TAL increased for FY 2018 and 2019 over FY 2017 by about 25%, then increased again in FY 2020, yet landings were relatively constant across these years (Section 1.6.1.2 of the Affected Environment has data tables).

Discards

For assessment and ABC setting purposes, discards are estimated on a calendar year basis, rather than the fishing year, because they rely on the NMFS area allocation landings tables to expand observed discard/kept (D/K)-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. An assumed discard mortality rate of 50% is applied for all gears and species, except in cases where research has provided species and gear specific rates. The Affected Environment document has more information about discard calculation methods.

Total discards for 2019 were 21,086 mt, and dead discards were 6,594 mt, a decrease by 13% from 2018 (Affected Environment Table 5). The weighted aggregate mean discard mortality rate (across all species and gear types) was estimated to be 34%. The assumed dead discard rate (dead discards/total catch) for 2022-2023 is 35% (a three-year average of the rates for 2017-2019; Section 1.6.1.2 of the Affected Environment has data tables).

Total Catch – Year-End ACL Accounting

At the end of each fishing year, GARFO tabulates skate catches into a few bins and compares the total to the annual catch limit (ACL, Table 13). The “commercial landings” bin includes all skate landings by vessels with a permit number greater than zero. This includes landings by: 1) vessels with a federal fishing permit on the day of landing, 2) vessels with a federal fishing permit at any time of the year, and 3) vessels without a federal fishing permit that year but had one in the past. The “state-permitted only vessel landings” bin includes landings from vessels that never had a federal fishing permit (so the permit # = 0) that were reported to the federal database; the “recreational catch” bin includes landings from private angler and party/charter and dead discards from MRIP; and the “estimated dead discards” bin is based on landings of all species and skate discards on observed trips (Table 13). The year-end calculation of dead discards is estimated on a fishing year basis, with different methods than those used to estimate the calendar year discards for stock assessment and specification setting purposes.

Excluded from the year-end ACL accounting are the vessel-to-vessel skate transfers reported via VTRs (though included in TAL monitoring), skate for personal use/home consumption, and any skate landings by state-only permitted vessels not reported to the federal database but reported by state dealers to the Atlantic Coastal Cooperative Statistics Program (ACCSP) at varying frequencies, updated daily (likely minor, but possible).

NMFS estimates Federal commercial skate landings from the dealer weigh-out database and reports total skate landings according to live weight (i.e., the weight of the whole skate). This means that a conversion factor (most commonly 2.27) is applied to all wing landings so that the estimated weight of the entire skate is reported and not just the wings. While live weight must be considered from a biological and stock

assessment perspective, vessel revenue from skate landings are for landed weight (vessels in the wing fishery only make money for the weight of wings they sell, not the weight of the entire skate from which the wings came).

From FY 2017-2020, the ACL was not exceeded (and has never been). Total Northeast skate catch (elements as defined above) was 81% of the ACL in FY 2017 (25,294 mt) and decreased to 78%, 66%, and 69% in FY 2018 - 2020, respectively. State landings, defined as vessels that have never had a federal fishing permit, has decreased from 795 mt in FY 2017. Recreational catch has been higher than state landings since FY 2017 (1,528 mt in FY 2017). Dead discards have been about 19-27% of total catch since FY 2017. In FY 2018, the uncertainty buffer was reduced from 25% to 10%, redefining the ACT as 90% of the ACL (Section 1.6.1.2 of the Affected Environment has data tables).

MAXIMUM SUSTAINABLE YIELD

The skate complex MSY_{proxy} is calculated by first calculating the catch/biomass index of each species, which is the median catch/biomass ratio over the entire time series. Here, "catch" is measured (thousand mt) and is the total landings from dealer data, vessel to vessel transfers from VTR data and dead discards. "Biomass" is the survey biomass index (kg/tow). Then, the MSY_{proxy} for each species is calculated, which is its catch/biomass index multiplied by the B_{target} (multiplied by 1,000 so the units are in mt). The MSY_{proxy} for each species is then summed over all seven skate species to calculate the skate complex MSY_{proxy}.

Note that in 2019, for the FY 2020-2021 specifications setting, the MSY_{proxy} was unchanged from the level set in 2017 for the FY 2018-2019 specifications. For both, the Catch/Biomass Indices were calculated using the time series of data through 2016. This resulted in a MSY_{proxy} of 36,794 mt (Table 2). This was a slight decrease relative to MSY_{proxy} was calculated in 2015 for the FY 2016 – 2017, 36,806 mt, due to an update in discard mortality rate assumptions that changed data in the time series. For the FY 2022-2023, the PDT is recommending that a MSY_{proxy} of 36,794 mt continue to be used. Rationale includes:

- The NEFSC has determined that only data through 2019 will be used for these specifications due to survey disruptions in 2020.
- Adding three more years of data (2017-2019) to a 50+ year time series for most species (44 for clearnose, 37 for little) is unlikely to substantially change the MSY_{proxy}.
- The approach to calculating MSY will be one of many topics reviewed during the next stock assessment scheduled for 2023, the outcomes of which will inform the development of the FY 2024-2025 specifications.

Table 2. The Catch/Biomass Index, B_{target} and MSY_{proxy} used for FY 2018-2021 specifications and proposed for FY 2022-2023

Species	Catch/Biomass Index (thousand mt/kg per tow)	B_{target} (kg/tow)	MSY_{proxy} (mt)
Barndoor	2.76	1.57	4,332
Clearnose	2.94	0.66	1,941
Little	2.14	6.15	13,132
Rosette	2.25	0.048	108
Smooth	2.68	0.27	723
Thorny	1.44	4.13	5,966
Winter	1.87	5.66	10,592
			Total MSY_{proxy} = 36,794

FY 2022-2023 Acceptable Biological Catch

For the FY 2022-2023 specifications, if following the ABC control rule exactly, spring survey data for 2019-2021 would be used for little skate and fall 2018-2020 data would be used for all other species (Table 4). Given the NEFSC determination that only survey data through 2019 may be used, and there were missed stations during the fall 2018 survey, the PDT has developed a modification to the control rule. This modification continues to use a three-year moving average where possible. For little skate, this means that the 2017-2019 spring survey data would continue to be used. Barndoor, thorny, smooth, and winter skate data would be updated to using fall 2017-2019 survey data. Due to lack of data for rosette and clearnose in the fall 2017 survey, 2018-2019 data would be used. As noted above, the PDT recommends continuing to use data through 2016 for the catch/biomass time series. Finally, and not applicable to ABC setting, data for FY 2017-2019 would be used to calculate the deductions for state landings and dead discards from the Annual Catch Target. While FY 2020 is available, the PDT felt it more appropriate to maintain consistency in the years used across all data where possible.

Table 3. Data used for setting FY 2020-2021 specifications, if following the control rule exactly, and the PDT proposal for FY 2022-2023

		Alternative 1 (No Action, FY 2020-21)	Control Rule (ideal)	Alternative 2 (PDT proposal)
Spring	**Little**	2017-2019	2019-2021	2017-2019
Fall	**Rosette & clearnose**	2016 & 2018	2018-2020	2018-2019
	Barndoor, thorny, smooth, winter	2016-2018		2017-2019
Time series for catch/biomass		Time series to 2016	Not always updated	Times series to 2016
State & discard deductions		FY 2016-2018	FY 2018-2020	FY 2017-2019

Using this control rule modification, the resulting ABC would be 37,236 mt for FY 2022-2023. This would be a 14% increase over the FY 2020-2021 ABC of 32,715 mt.

RESULTING FY 2022 – 2023 SPECIFICATIONS

Although the charge of the SSC is to recommend an ABC, provide here are the resultant fishery limits that stem from the ABC, per the formula established through Amendment 3 (Figure 3, Table 7).

Annual Catch Limit (ACL). The skate ACL is equal to the ABC. The ACL is a limit that will trigger accountability measures if catch exceeds this amount.

Annual Catch Target (ACT). The skate ACT is 90% of the ACL. There is a 10% uncertainty buffer between the ACL and ACT to account for scientific and management uncertainty (NEFMC 2018). This buffer is further explained in Section 1.2.4 (in Affected Environment document).

Federal Total Allowable Landings (TAL). The skate TAL is set by subtracting expected dead discards and expected state landings from the ACT. These values are calculated as follows:

- Expected dead discards are calculated by applying the weighted discard mortality rate to the average discards from the most recent three fishing years (using observer and ASM data).
- Expected state landings is equal to the average of the most recent three years of landings by vessels that have never had a federal fishing permit (permit # = 0) from data reported to the federal database. The landings from these vessels are the "state-permitted only vessel landings" in the year-end ACL accounting (Table 14 in Affected Environment document).

Wing and Bait TALs. The Wing and Bait TALs are 66.5% and 33.5% of the Federal TAL, respectively.

Figure 2. Formula for skate specifications setting used since Amendment 3.

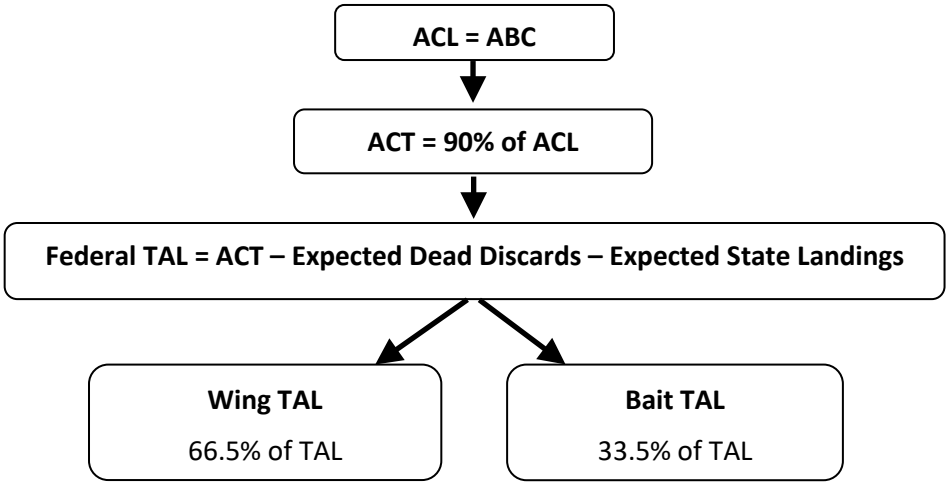


Table 4. Specification alternatives for FY 2022-2023 (mt).

	Alternative 1 No Action	Draft Alternative 2	% change
ABC = ACL	**32,715**	**37,236**	**14%**
ACT (90% of ACL)	**29,444**	**33,513**	**14%**
Expected Dead Discards	10,942	11,856	8%
Expected State Landings	638	515	-19%
Federal TAL (ACT – dead discards – state landings)	**17,864**	**21,142**	**18%**
Wing TAL (66.5% of TAL)	**11,879**	**14,059**	**18%**
Bait TAL (33.5% of TAL)	**5,984**	**7,082**	**18%**

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