Northeast Skate Complex

Fishery Management Plan

DRAFT Affected Environment for 2022 – 2023 Specifications And Amendment 5

DRAFT

for July 29, 2021, SSC meeting

Prepared by the

New England Fishery Management Council

In consultation with the

National Marine Fisheries Service

TABLE OF CONTENTS

Table of Tables

Table of Figures

Table of Maps

1.0 AFFECTED ENVIRONMENT

1.1 INTRODUCTION

The Affected Environment is described in this action based on valued ecosystem components (VECs), including target species, non-target species, predator species, physical environment and Essential Fish Habitat (EFH), protected resources, and human communities. VECs represent the resources, areas and human communities that may be affected by the alternatives under consideration in this amendment. VECs are the focus since they are the “place” where the impacts of management actions occur.

1.2 TARGET SPECIES (NORTHEAST SKATE COMPLEX)

The following species of skates comprise the NE skate complex: winter skate, barndoor skate, thorny skate, smooth skate, little skate, clearnose skate, and rosette skate. These are considered the target species for this action.

1.2.1 Species Distribution

Skates are not known to undertake large-scale migrations but move seasonally with changing water temperature, moving offshore in summer and early autumn and returning inshore during winter and spring. Skates lay eggs that are enclosed in a hard, leathery case commonly called a mermaid’s purse. Incubation time is six to twelve months. The young have an adult form at the time of hatching (Bigelow & Schroeder 1953).

Barndoor skate are generally found along the deeper portions of the Southern New England continental shelf and the southern portion of Georges Bank, extending into Canadian waters (<150 - 750 m). The NEFSC surveys catch them far south as NJ during the spring. The survey catches **clearnose** skate in shallower water along the Mid-Atlantic coastline but are known to extend into non-surveyed shallower areas and into the estuaries, particularly in Chesapeake and Delaware Bays. These inshore areas are surveyed by state surveys and the Mid-Atlantic NEAMAP Survey. **Little skate** are found along the Mid-Atlantic, Southern New England, and Gulf of Maine coastline, in shallower waters than barndoor, rosette, smooth, thorny, and winter skates. **Rosette** (590-5,905 m)**, smooth (**46 - 914 m**), and thorny** skate (20-1,000 m) are typically deep-water species. The survey catches rosette skate along the shelf edge in the Mid-Atlantic region, while smooth and thorny are found in the Gulf of Maine and along the northern edge of Georges Bank. **Winter** skate are found on the continental shelf of the Mid-Atlantic and Southern New England regions, as well as Georges Bank and into Canadian waters. Winter skate are typically caught in deeper waters than little skate (both found typically <90 m), but partially overlap the distributions of little and barndoor skates.

1.2.2 Stock Status

The last benchmark assessment for skate was in 2007 (SAW 44; NEFSC 2007a; b). Because the analytic models did not produce reliable results, the skate fishing mortality reference points and stock status determinations rely on changes in survey biomass indices. A skate species is *overfished* if the three-year moving average of the survey biomass index is below its biomass threshold[1] reference point ($B_{threshold}$, Table 1). An overfished determination triggers the need for a rebuilding plan. A skate species is *rebuilt* if its survey biomass index is equal to or greater than its B_{MSY} proxy. *Overfishing* is occurring on a skate

[1] $B_{MSYproxy} = B_{target}$ = 75th percentile (average for barndoor) of the survey biomass index. $B_{threshold}$ = ½ B_{target}

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} (NEFSC 2007a). Details about the overfishing reference points and how they were chosen are given in Amendment 3 (NEFMC 2009).

Except for little skates, the abundance and biomass trends are best represented by the fall survey, which has been updated through 2019. Little skate abundance and biomass trends are best represented by the spring survey, which has not been updated through 2020 given only one leg of the spring 2020 survey could be completed due to COVID-19.

Based on survey data updates, only thorny skate remains overfished and overfishing is not occurring on any skate species (Table 1). Details about long term trends in abundance and biomass are in the SAW 44 Report (NEFSC 2007a) and in the Amendment 3 FEIS (Section 7.1.2).

Barndoor: For barndoor skate, the 2017-2019 NEFSC autumn average survey biomass index (2.02 kg/tow) is above $B_{threshold}$ (0.78 kg/tow) and the B_{MSY} proxy (1.57 kg/tow). The 2017-2019 average index is above the 2016-2018 index by 11.4%. It is recommended that this stock is not overfished, and overfishing is not occurring.

Clearnose: For clearnose skate, the 2018 and 2019 NEFSC autumn average biomass index (no data for 2017; 1.05 kg/tow) is above the $B_{threshold}$ (0.33 kg/tow) but below the B_{MSY} proxy (0.66 kg/tow). The 2018 and 2019 two-year average index is below the 2016 and 2018 index by 73.1%. It is recommended that this stock is not overfished, and overfishing is not occurring.

Little: For little skate, the 2017-2019 NEFSC spring average biomass index (5.32 kg/tow) is above the $B_{threshold}$ (3.07 kg/tow) but below the B_{MSY} proxy (6.15 kg/tow). The 2017-2019 average index is above the 2016-2018 average by 13.4%. It is recommended that this stock is not overfished, and overfishing is not occurring.

Rosette: For rosette skate, the 2018 and 2019 NEFSC autumn average biomass index (no data for 2017; 0.050 kg/tow) is above the $B_{threshold}$ (0.024 kg/tow) but below the B_{MSY} proxy (0.048 kg/tow). The 2018 and 2019 two-year average index is above the 2016 and 2018 index by 6.4%. It is recommended that this stock is not overfished, and overfishing is not occurring.

Smooth: For smooth skate, the 2017-2019 NEFSC autumn average biomass index (0.27 kg/tow) is above the $B_{threshold}$ (0.134 kg/tow) and equal to the B_{MSY} proxy (0.27 kg/tow). The 2017-2019 index is about equal to the 2016-2018 index. It is recommended that this stock is not overfished and is rebuilt, and overfishing is not occurring.

Thorny: For thorny skate, the 2017-2019 NEFSC autumn average biomass index (0.18 kg/tow) is well below the $B_{threshold}$ (2.06 kg/tow). The 2017-2019 index is above the 2016-2018 index by 11.4%. It is recommended that this stock is **overfished** but overfishing is not occurring.

Winter: For winter skate, the 2017-2019 NEFSC autumn average biomass index (8.61 kg/tow) is above the $B_{threshold}$ (2.83 kg/tow) and above the B_{MSY} proxy (5.66 kg/tow). The 2017-2019 average index is above the 2016-2018 index by 19.2%. It is recommended that this stock is not overfished, and overfishing is not occurring.

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.

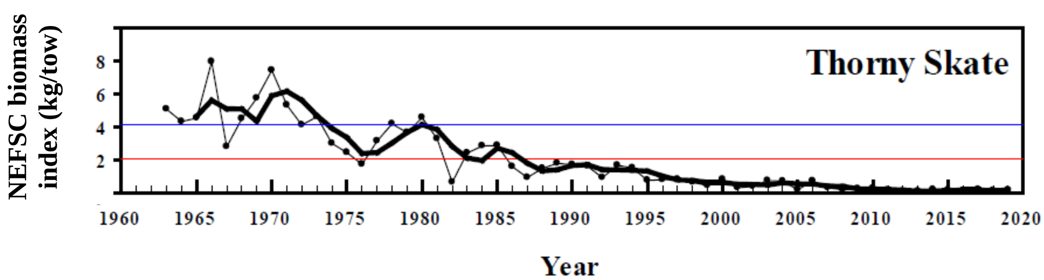
1.2.3 Thorny Skate Rebuilding Plan

Thorny skate is the one species in the Northeast Skate Complex which remains overfished. The Original Skate FMP (implemented in 2003) established a rebuilding plan for thorny skate but did not adopt a rebuilding schedule due to the lack of critical life history information. Through Amendment 3 (implemented in 2010), based on new life history parameter estimates, it was estimated that thorny skate would take longer than 10 years to rebuild; the Council estimated that it takes a female thorny skate 15 years to replace its own spawning capacity, i.e., its mean generation time. The maximum rebuilding period allowed by the MSA was 25 years (10 years plus one mean generation time). Amendment 3 established a 25-year rebuilding period for thorny skate, or by 2028 when counted from the start of the rebuilding period in 2003. It was estimated in Amendment 3 that, based on biomass at the time (0.42 kg/tow in 2007), it would take an average annual increase of 13.2% to rebuild to the B_{MSY} target of 4.41 kg/tow by 2028 (the target since changed to 4.13). At the time, the PDT advised that the best estimate of the maximum intrinsic rate of population growth was 0.17, so achieving the biomass target within the rebuilding schedule seemed achievable.

The rebuilding plan 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.

The Annual Catch Limit is set for skates as a complex; there is no ACL set for thorny skate. However, the ACL has never been exceeded. 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 $B_{MSYproxy}$.

Figure 1. Thorny skate NEFSC survey biomass indices (kg/tow), 1963 - 2019.



Note: Thin lines with symbols are annual indices, thick lines are three-year moving averages, and the thin horizontal lines are the biomass thresholds and targets developed through 2007/2008 with consistent strata sets.

A 2016 update of thorny skate commercial and survey data (Sosebee et al. 2016) indicated that indices from other surveys are generally in agreement with either a decline since the 1980s or a flat survey during the 2000s. There is evidence that thorny skate may be more readily caught on rough bottom than on smooth. Thorny skate landings were around 1,000-2,000 mt in the mid-1990s and declined below 250 mt in years just prior to the update, and thorny skate comprised about 1% of discards or 400-600 mt with 100-200 mt estimated to be dead discards.

1.2.4 Uncertainty Buffer

Amendment 3 established the annual catch limit framework currently used to set specifications for the NE Skate Complex (NEFMC 2009). The uncertainty buffer was set at 25% through Amendment 3 but was decreased to 10% through Framework Adjustment 6 (implemented February 2019; NEFMC 2018b). Other sources of uncertainty have not been identified; Table 5 in Framework 6 has the full list of the sources of uncertainty, both management and scientific, considered to affect the NE Skate Complex and any improvements made since Amendment 3 was implemented.

There is a buffer between the ACL and the ACT to account for scientific and management uncertainty. It was set at 10% through Framework Adjustment 6 (implemented February 2019; NEFMC 2018b), reduced from 25%, the level originally set through Amendment 3. For FY 2020-2021, the buffer was 3,271 mt.

Several sources of uncertainty have been identified (NEFMC 2009). The skate complex has proven unsuitable for traditional stock assessment models to be used, resulting in an empirical assessment based on the NEFSC trawl survey indices that are used as biomass proxies. This contributes to the uncertainty surrounding the specifications process. The calculation of ABC uses the median C/B, which is more risk-averse relative to MSY at the 75^{th} percentile. This helps account for the scientific uncertainty in the catch/biomass relationship. Other sources of uncertainty within the ABC calculation include species-specific landings, species-specific estimates of discards, estimates of discards, discard mortality rates, recreational catch, and skate landings by state-only permitted vessels not reported to the Federal database. Skates are encountered by many fisheries and gear types, and a large portion of biomass is set aside to account for expected dead discards.

A low buffer is likely to increase the risk of the ACL being exceeded. However, the effort controls currently in place in the skate fishery have proven effective at preventing the TAL and therefore the ACL from being exceeded. Current effort controls do not prohibit discarding, which could result in discards more than projected dead discards accounted for in specifications.

It is difficult to quantify the level of uncertainty each source causes relative to a buffer percentage. However, some sources are more quantifiable than others.

Recreational Catch is from private anglers and party/charter vessels and includes landings and dead discards. This catch is included in the total catch used to calculate the ABC, but it is not specified in the ABC flow chart or monitored in-season. It is included in the year-end accounting of catch relative to the Annual Catch Limit, as a separate line-item (Table 14). In FY2017-2019, the average recreational catch was 1,209 mt (2.67M lb) or 37% of the buffer.

Research Landings are from research conducted under Experimental Fishing Permits. This catch is included in the total catch used to calculate the ABC, but it is not specified in the ABC flow chart or monitored in-season. It is included in the year-end accounting of catch relative to the Annual Catch Limit, within the "commercial landings" line-item (Table 14). In FY2017-2019, the average research landings were 38.9 mt, or 0.1% of the ACL.

1.2.5 Biological and Life History Characteristics

The Northeast Fisheries Science Center (NEFSC) prepared the Essential Fish Habitat Source Documents for each of the seven skate species provide most available biological and habitat information on skates. These technical documents are available at http://www.nefsc.noaa.gov/nefsc/habitat/efh/ and contain the following information for each skate species in the Northeast complex:

- Life history, including a description of the eggs and reproductive habits
- Average size, maximum size, and size at maturity
- Feeding habits

- Predators and species associations
- Geographical distribution for each life history stage
- Habitat characteristics for each life history stage
- Status of the stock
- A description of research needs for the stock
- Graphical representations of stock abundance from NEFSC trawl survey and Massachusetts inshore trawl survey data
- Graphical representations of percent occurrence of prey from NEFSC trawl survey data

The seven species of the northeast skate complex follow a similar life history strategy but differ in their biological characteristics. A detailed summary of the biological and life history characteristics was in the FEIS for Amendment 3 (NEFMC 2009). Framework 5 (NEFMC 2018a) also contains updated life history information on the seven skate species.

1.2.6 Discards

Discard estimation method: Estimates of total skate removals are sensitive to the discard mortality rate assumption (Table 2). Data on immediate- and delayed (i.e., post-release) mortality rates of discarded skates and rays is extremely limited. Benoit (2006) estimated acute discard mortality rates of winter skates caught in Canadian bottom trawl surveys, the SSC in 2009 decided to use a 50% discard mortality rate assumption for all skates and gears for setting the Skate ACL, based on this paper. This mortality rate continues to be used unless research has improved our understanding of discard mortality for the specific skate species in various gear types (Table 2). Mandelman *et al.* (2013) examined the immediate and short-term discard mortality rate of little, smooth, thorny and winter skates in the Gulf of Maine for otter trawl gear. The SSC approved revising the discard mortality rate estimates for little (22%), smooth (60%), thorny (23%) and winter (9%) skates for otter trawl. Knotek (2018) examined the immediate and short-term discard mortality rate of little, winter, and barndoor skates in scallop dredge gear by evaluating reflex impairment and injury indexes. The SSC approved revising the discard mortality rate estimates for only little (48%) and winter skate (34%) for scallop dredge gear based on this study, as the researchers considered the sample size was insufficient for an accurate estimate for barndoor skate. Sulikowski *et al.* (2018) estimated the discard mortality of winter skate in commercial sink gillnets, and SSC approved revising the discard mortality rate estimate for winter skate (14%) for sink gillnet gear based on this study.

Table 2. Assumed and estimated discard mortality rates of the seven skate species by gear type.

Gear Type	Barndoor	Clearnose	Little	Rosette	Smooth	Thorny	Winter
Gillnet	50%	50%	50%	50%	50%	50%	14%
Longline	50%	50%	50%	50%	50%	50%	50%
Otter Trawl	50%	50%	22%	50%	60%	23%	9%
Scallop Dredge	50%	50%	48%	50%	50%	50%	34%
Source: Various. See paragraph.							

Estimating skate discards (and by species) is challenging, and methods will be thoroughly reviewed during the next stock assessment, currently scheduled for 2023. Skate discards are calculated for each species, calendar year, and gear type (longline, otter trawl, sink gillnet, scallop dredge), by extrapolating observed skate discard/kept-all ratios to total based on landings by gear, area, and quarter. Calendar year, rather than fishing year, is used because the NMFS area allocation landings tables are used. The observed D/K-all ratios are derived from the Northeast Fisheries Observer Program, the scallop IFM program, and

the groundfish At Sea Monitoring program data. However, discards are calculated back to 1964 (NEFOP began in 1994, Scallop IFM in 2006, and Groundfish ASM in 2010).
Dead discards are calculated by multiplying the discard mortality rate for each gear and species (Table 2) to the species discards by gear type. Because there are four gear types, a weighted average discard mortality for each species is calculated to determine the total discards and dead discards for the complex.

For specification setting, the expected dead discards are subtracted from the annual catch target to calculate the total allowable landings. The expected dead discards are calculated by applying the most recent three-year average dead discard mortality rate (dead discards divided by total catch) to the ACT.

Since the 1960s, skate discards have decreased substantially and have been under 100,000 mt since 1990 (Table 3; Framework 8 has data back to 1964).[2] Between 2013 and 2018, total and dead skate discards peaked in 2014 and have been declining since despite no large changes occurring in the distribution of pounds of skate landed in recent fishing years. Total discards for 2019 were 21,086 mt, and dead discards were 6,594 mt, a decrease by 13% from 2018. Skate discards are primarily caught in otter trawl and scallop dredge gear (Table 4).

On a species basis, dead discards are largely winter and little skate. In scallop dredge gear, dead discards are almost exclusively little and winter skate (Figure 2), whereas the speciation using otter trawl gear (Figure 3), sink gillnet (Figure 4), and longline (Figure 5) is more mixed. Regardless of gear type, dead discards of thorny skate (the only skate species that is overfished in the complex) are minimal.

Table 3. Landings, and total and dead discards of skates (all species) for all gear types, calendar year 2000 – 2019.

Year	Landings (mt)	Discards (mt)				Year	Landings (mt)	Discards (mt)		
		Total	Dead	% Dead				Total	Dead	% Dead
2000	16,012	39,961	12,369	31%		2010	18,683	36,766	10,523	29%
2001	15,888	36,041	8,475	24%		2011	16,963	38,760	10,508	27%
2002	14,740	40,094	12,132	30%		2012	17,144	34,274	10,087	29%
2003	16,254	52,204	14,283	27%		2013	14,698	42,674	11,551	27%
2004	17,063	46,823	11,249	24%		2014	15,904	42,758	12,673	30%
2005	14,885	46,474	12,866	28%		2015	15,532	37,894	10,417	27%
2006	17,168	34,565	10,134	29%		2016	15,799	33,271	10,435	31%
2007	20,342	44,920	13,182	29%		2017	14,470	25,884	8,544	33%
2008	20,191	35,031	10,160	29%		2018	14,341	23,000	7,580	33%
2009	19,731	37,441	10,070	27%		2019	12,559	21,086	6,594	31%

Sources: ASM (2010-present), IFM (2006-present), NEFOP (1989-present), CFLEN (1994-present), CFAGE (1994-2020), WOLEN (1969-1993), WOAGE (1961, 1965-1993), INTVCRD3 (1964-1981), VTR have an element for discards (1994-present).

[2] Data in this section start in 2000 because 2003 was the beginning of ACL setting using a recent three-year average of discards.

Table 4. Total Discards (mt) of skates (all species) by gear type from all areas combined, calendar year 2000 – 2019.

Year	First half of calendar year (mt)						Second half of calendar year (mt)						Grand Total (mt)
	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	
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
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
2017	55	5,505	0	1,000	4,929	11,489	76	7,606	0	684	5,509	13,876	25,365
2018	34	4,124	0	1,316	4,588	10,063	31	6,937	0	564	5,404	12,936	22,999
2019	67	4,827	0	284	3,989	9,167	20	7,772	0	259	3,868	11,918	21,085

Sources: ASM (2010-present), IFM (2006-present), NEFOP (1989-present), CFLEN (1994-present), CFAGE (1994-2020), WOLEN (1969-1993), WOAGE (1961, 1965-1993), INTVCRD3 (1964-1981), VTR have an element for discards (1994-present).

Figure 2. Estimated skate dead discards by species in scallop dredge gear, CY 2000-2019

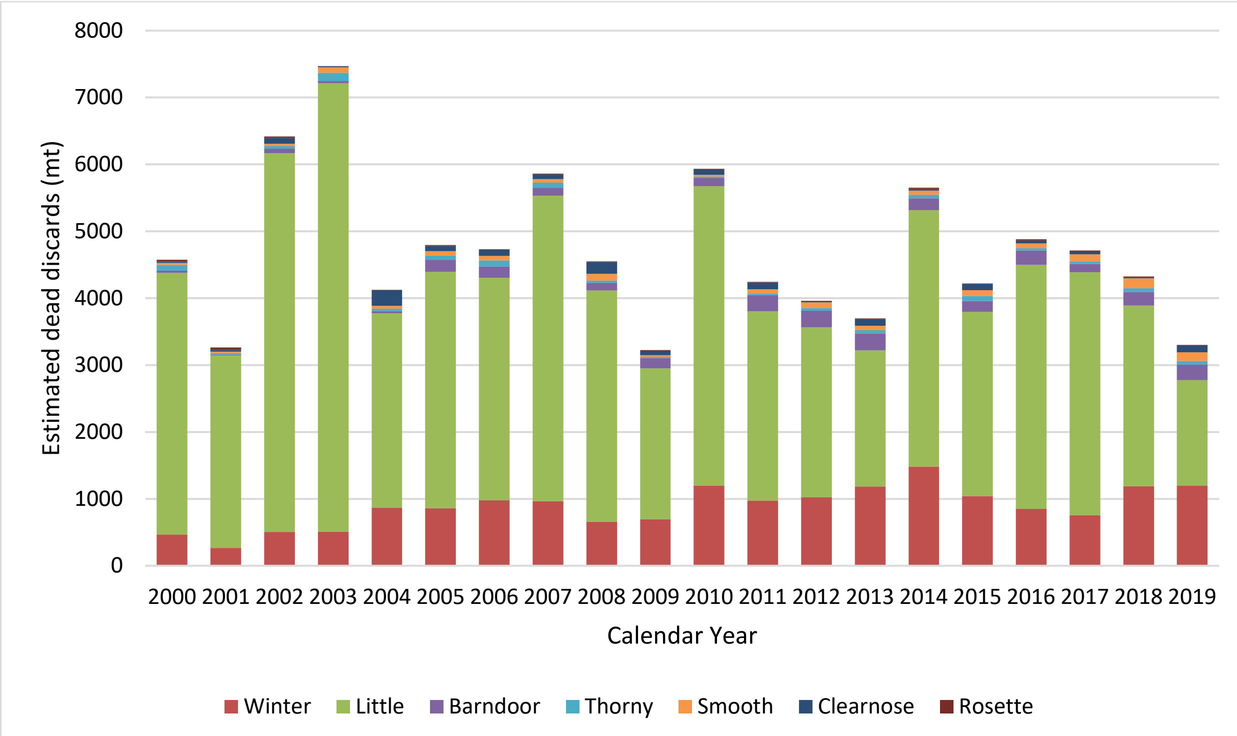


Figure 3. Estimated skate dead discards by species in otter trawl gear, CY 2000-2019

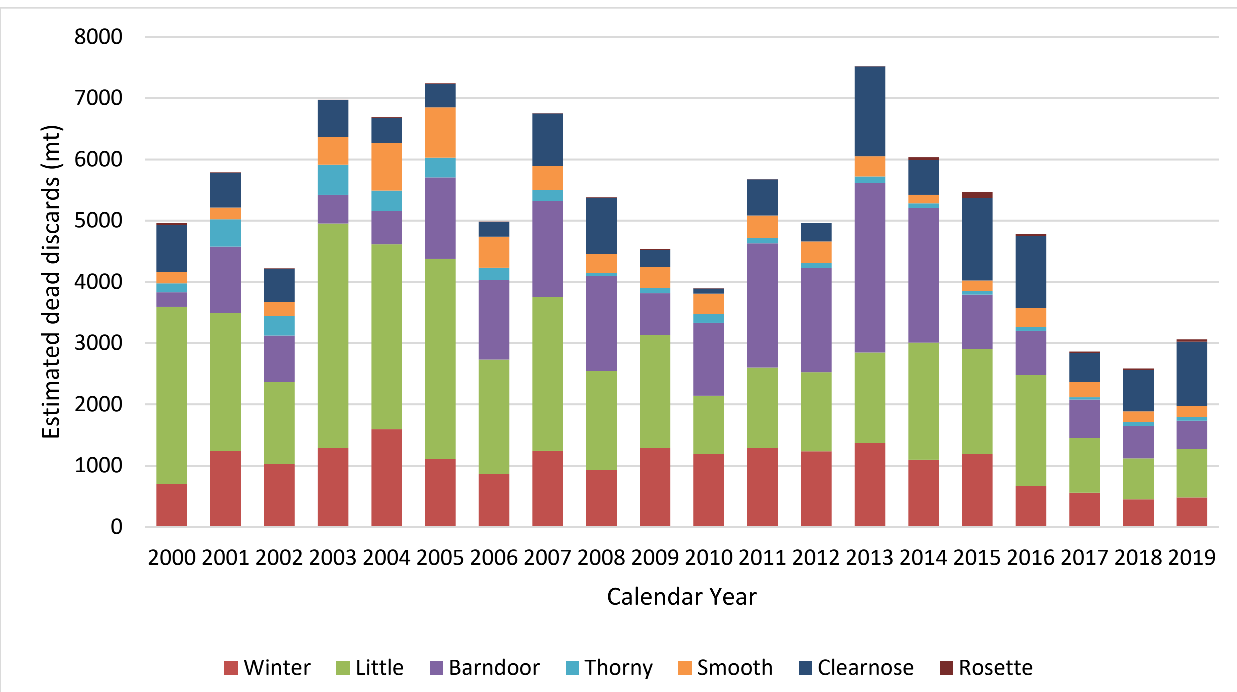


Figure 4. Estimated skate dead discards by species in sink gillnet gear, CY 2000-2019

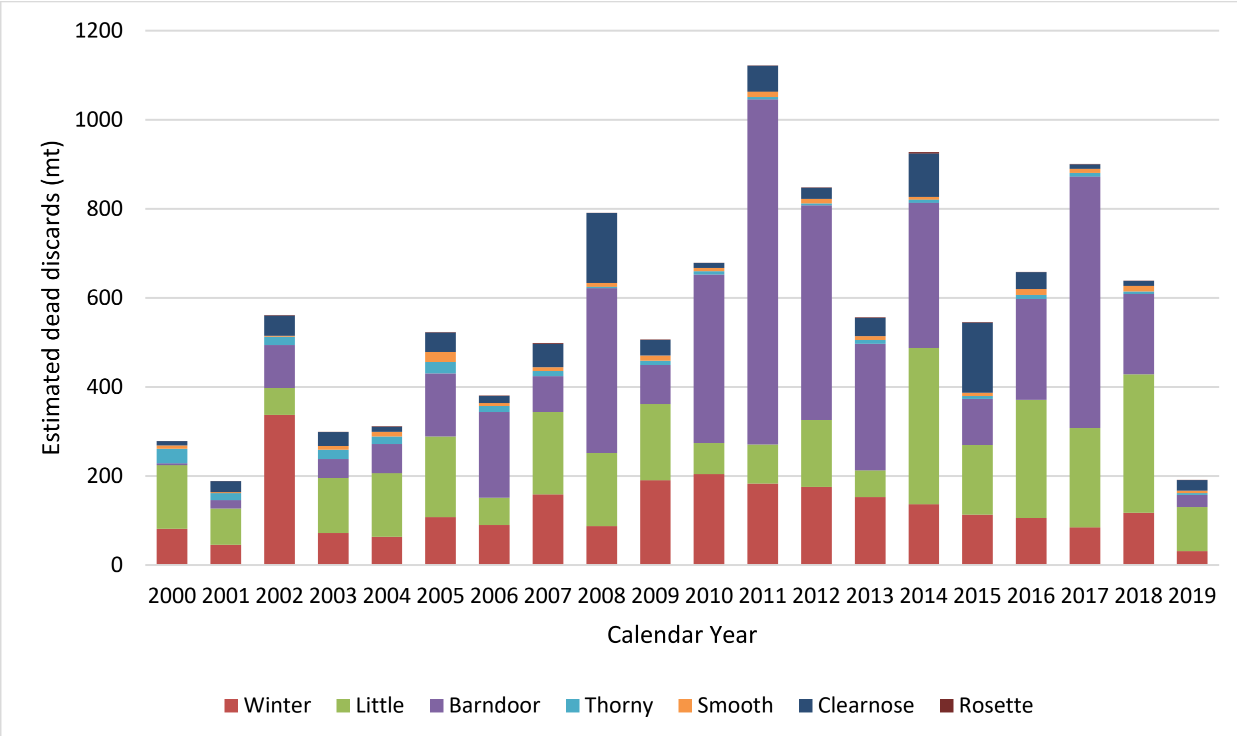
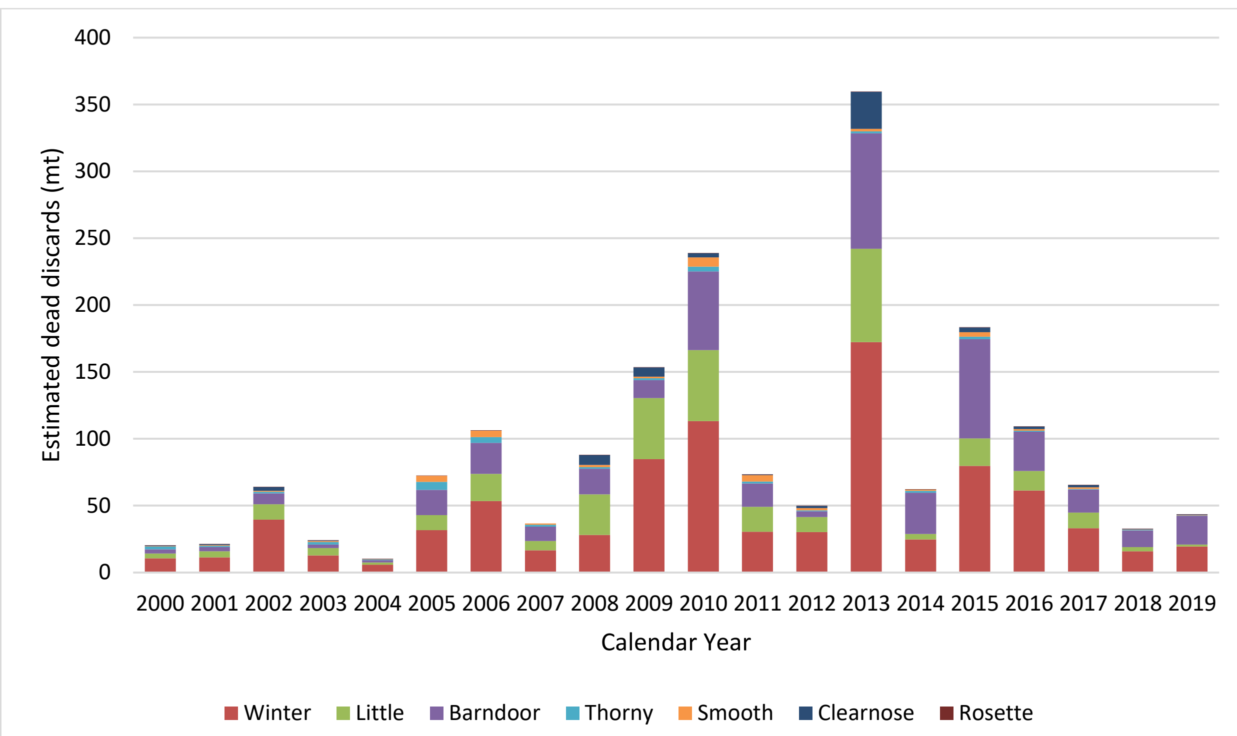


Figure 5. Estimated skate dead discards by species in longline gear, CY 2000-2019



1.3 NON-TARGET SPECIES

Non-target species, in this action, refers to species other than Northeast skate which are caught/landed by federally permitted vessels while fishing for skate. The MSA defined *bycatch* as fish that are harvested in a fishery, but are not retained (sold, transferred, or kept for personal use), including economic discards and regulatory discards (16 U.S.C. § 1802(2)). The MSA mandates the reduction of bycatch, as defined, to the extent practicable (16 U.S.C.§ 1851(a)(9)). Incidental catch, on the other hand, is typically considered to be non-targeted species that are harvested while fishing for a target species and is retained and/or sold. In contrast to bycatch, there is no statutory mandate to reduce incidental catch. When non-target species are encountered in the Northeast skate fishery, they are either discarded (bycatch) or they are retained and sold as part of the catch (incidental catch). Because effort in the skate wing and bait fisheries are primarily controlled by other fisheries DAS the vessel is fishing on, the discards and bycatch will be like what is described in those fisheries (NE multispecies FW 59, Monkfish FW12). This section further discusses the relationship of the skate fishery with the three fisheries in which skates are primarily landed: NE multispecies, monkfish, and spiny dogfish fisheries.

The skate wing fishery is largely an incidental fishery, with a small portion of the vessels directing on skate wings (Section 1.6.1.6); fishing effort is focused on targeting more profitable species managed under separate FMPs, e.g., NE multispecies and Monkfish. These fisheries have ACLs, effort controls (DAS), possession limits, gear restrictions, and other measures that indirectly constrain overall effort on skates. Framework 59 to the NE Multispecies FMP (NEFMC 2020b) and Framework 12 of the Monkfish FMP (NEFMC 2020c) have full descriptions of the fishing impacts on trips targeting NE multispecies and monkfish (www.nefmc.org). A comparatively small number of trips could be described as targeting skates, and bycatch on these trips is limited. Monkfish and dogfish comprise most of this bycatch and are described below.

The skate bait fishery is typically more of a directed fishery than the wing fishery; however, there are other effort controls in place, and a DAS from a different fishery is still required on most trips. Skate bait can be landed in one of the skate exemption areas in Southern New England or the Mid-Atlantic and be exempt from DAS requirements. However, NE multispecies may not be retained on these trips, thus, any that are caught are discarded. These are more directed bait trips; thus, non-target species landings are limited relative to the skate wing fishery. Table 24 has the amount of skate bait and wings landed on various DAS declarations.

NE Multispecies

The Northeast Multispecies FMP manages twenty stocks (stock status in Table 5) under a management system which breaks the commercial fishery into two components: sectors and the common pool. For stocks on which fishing is permitted, each sector is allotted a share of each stock's ACL that consists of the sum of individual sector member's potential sector contribution based on their annual catch entitlements. Sector allocations are strictly controlled as hard total allowable catch limits and retention is required for all stocks managed under an ACL. Overages are subject to accountability measures including payback from the sector's allocation for the following year. Common pool vessels are allocated a set number of days at sea (DAS), and their effort further is controlled by a variety of measures including trip limits, closed areas, minimum fish size and gear restrictions varying between stocks. Only a very small portion of the ACL is allotted to the common pool. Details on biology and control of fishing effort on NE Multispecies are in Framework 59 to the NE Multispecies FMP.

Table 5. Status of groundfish stocks, determined by NOAA Fisheries, based on 2017 and 2019 operational assessments.

	Status	
Stock	**Overfishing?**	**Overfished?**
Georges Bank Cod	Yes	Yes
Gulf of Maine Cod	Yes	Yes
Georges Bank Haddock	No	No
Gulf of Maine Haddock	No	No
Georges Bank Yellowtail Flounder	Yes	Yes
Southern New England/Mid-Atlantic Yellowtail Flounder	No	Yes
Cape Cod/Gulf of Maine Yellowtail Flounder	No	No
American Plaice	No	No
Witch Flounder	Unknown	Yes
Georges Bank Winter Flounder	No	Yes
Gulf of Maine Winter Flounder	No	Unknown
Southern New England/Mid-Atlantic Winter Flounder	No	Yes
Acadian Redfish	No	No
White Hake	No	Yes
Pollock	No	No
Northern Windowpane Flounder	No	Yes
Southern Windowpane Flounder	No	No
Ocean Pout	No	Yes
Atlantic Halibut	No	Yes
Atlantic Wolffish	No	Yes

Source: Northeast Multispecies Framework 59 found at: https://s3.amazonaws.com/nefmc.org/200410_Groundfish_FW59_Environmental-Assessment-CORRECTED-200515.pdf

Monkfish

The Monkfish FMP included measures to stop overfishing and rebuild the stocks through limiting the number of vessels with access to the fishery and allocating DAS to those vessels; setting trip limits for vessels fishing for monkfish; minimum fish size limits; gear restrictions; mandatory time out of the fishery during the spawning season; and a framework adjustment process.

The Monkfish FMP defines two management areas for monkfish (northern and southern), divided roughly by an east-west line bisecting Georges Bank. Monkfish in both areas are not overfished and overfishing is not occurring. In recent years, the monkfish fishery has fallen far short of reaching its TAL (except for FY 2017 in the NFMA), despite a healthy stock status. More information on monkfish management is at: http://www.nefmc.org/management-plans/monkfish.

Dogfish

Based upon the NEFSC 2018 stock assessment, The spiny dogfish stock is presently not overfished, and overfishing is not occurring. The spiny dogfish fishery is managed with an ACL, commercial quota, and possession limits (currently 6,000 lb per trip). Like skates, there is a large degree of spatial overlap between spiny dogfish and NE Multispecies trips where spiny dogfish are landed incidentally to groundfish; and monkfish trips where spiny dogfish are landed incidentally to monkfish. More information on the fishery and biology of the species can be found in the Spiny Dogfish 2019-2021 draft Environmental Assessment at: https://www.mafmc.org/dogfish.

1.4 PROTECTED SPECIES

1.4.1 Species Present in the Area

Numerous protected species occur in the affected environment of the skate fishery (Table 6) and have the potential to be affected by the proposed action (i.e., there have been observed/documented interactions in the fishery or with gear type(s) like those used in the fishery (bottom trawl or gillnet gear)). These species are under NMFS jurisdiction and are afforded protection under the Endangered Species Act (ESA) of 1973 and/or the Marine Mammal Protection Act (MMPA) of 1972.

Table 6. Species protected under the ESA and/or MMPA that may occur in the affected environment of the skate fishery.

Species	Status[2]	Potentially affected by this action?
Note: Marine mammal species (cetaceans and pinnipeds) italicized and in bold are considered MMPA strategic stocks.[1]		
Cetaceans		
North Atlantic right whale (Eubalaena glacialis)	***Endangered***	***Yes***
Humpback whale, West Indies DPS (*Megaptera novaeangliae*)	Protected (MMPA)	Yes
Fin whale (Balaenoptera physalus)	***Endangered***	***Yes***
Sei whale (Balaenoptera borealis)	***Endangered***	***Yes***
Blue whale (Balaenoptera musculus)	***Endangered***	***No***
Sperm whale (Physeter microcephalus	***Endangered***	***No***
Minke whale (*Balaenoptera acutorostrata*)	Protected (MMPA)	Yes
Pilot whale (*Globicephala spp.*)[3]	Protected (MMPA)	Yes
Risso's dolphin (*Grampus griseus*)	Protected (MMPA)	Yes
Atlantic white-sided dolphin (*Lagenorhynchus acutus*)	Protected (MMPA)	Yes
Short Beaked Common dolphin (*Delphinus delphis*)	Protected (MMPA)	Yes
Spotted dolphin (*Stenella frontalis*)	Protected (MMPA)	No
Bottlenose dolphin (Tursiops truncatus[4]	***Protected (MMPA)***	***Yes***
Harbor porpoise (*Phocoena phocoena*)	Protected (MMPA)	Yes
Sea Turtles		
Leatherback sea turtle (*Dermochelys coriacea*)	Endangered	Yes
Kemp's ridley sea turtle (*Lepidochelys kempii*)	Endangered	Yes
Green sea turtle, North Atlantic DPS (*Chelonia mydas*)	Threatened	Yes
Loggerhead sea turtle (*Caretta caretta*), Northwest Atlantic Ocean DPS	Threatened	Yes
Hawksbill sea turtle (*Eretmochelys imbricate*)	Endangered	No
Fish		
Giant Manta Ray (*Manta birostris*)	Threatened	Yes

Shortnose sturgeon (*Acipenser brevirostrum*)	Endangered	No
Atlantic salmon (*Salmo salar*)	Endangered	Yes
Atlantic sturgeon *(Acipenser oxyrinchus)*		
Gulf of Maine DPS	Threatened	Yes
New York Bight DPS, Chesapeake Bay DPS, Carolina DPS & South Atlantic DPS	Endangered	Yes
Cusk (*Brosme brosme)*	Candidate	Yes
Pinnipeds		
Harbor seal (*Phoca vitulina*)	Protected (MMPA)	Yes
Gray seal (*Halichoerus grypus*)	Protected (MMPA)	Yes
Harp seal (*Phoca groenlandicus*)	Protected (MMPA)	Yes
Hooded seal (*Cystophora cristata*)	Protected (MMPA)	Yes
Critical Habitat		
North Atlantic Right Whale	ESA (Protected)	No
Northwest Atlantic DPS of Loggerhead Sea Turtle	ESA (Protected)	No

Notes:

[1] A strategic stock is defined under the MMPA as a marine mammal stock for which: (1) the level of direct human-caused mortality exceeds the potential biological removal level; (2) based on the best available scientific information, is declining and is likely to be listed as a threatened species under the ESA within the foreseeable future; and/or (3) is listed as a threatened or endangered species under the ESA, or is designated as depleted under the MMPA (Section 3, 1972).

[2] The status of the species is defined by whether the species is listed under the ESA as endangered (species are at risk of extinction) or threatened (species at risk of endangerment) or protected under the MMPA. Note, marine mammals listed under the ESA are also protected under the MMPA. Candidate species are those species in which ESA listing may be warranted.

[3] There are two species of pilot whales: short finned (*G. melas melas*) and long finned (*G. macrorhynchus*). Due to the difficulties in identifying the species at sea, they are often just referred to as *Globicephala spp*.

[4] This includes the following Stocks of Bottlenose Dolphins: Western North Atlantic Offshore, Northern Migratory Coastal (strategic stock), and Southern Migratory Coastal (strategic stock).

Cusk are NMFS "candidate species" under the ESA. Candidate species are those petitioned species for which NMFS has determined that listing may be warranted under the ESA and those species for which NMFS has initiated an ESA status review through an announcement in the *Federal Register*. If a species is proposed for listing the conference provisions under Section 7 of the ESA apply (50 CFR 402.10); however, candidate species receive no substantive or procedural protection under the ESA. Thus, this species will not be discussed further in this action; however, NMFS recommends that project proponents consider implementing conservation actions to limit the potential for adverse effects on candidate species from any proposed action. Additional information on cusk is at: https://www.fisheries.noaa.gov/endangered-species-conservation/candidate-species-under-endangered-species-act.

1.4.2 Species and Critical Habitat Not Likely Affected by the Proposed Action

Based on available information, it has been determined that this action is unlikely to affect multiple ESA listed and/or marine mammal protected species or any designated critical habitat (Table 6). This determination has been made because either the occurrence of the species is not known to overlap with the area primarily affected by the action and/or based on the most recent 10 years of observer, stranding, and/or marine mammal serious injury and mortality reports, there have been no observed or documented interactions between the species and the primary gear type (i.e., gillnet and bottom trawl) used to prosecute the skate fishery (see Greater Atlantic Region Marine Animal Incident Database, unpublished data; Marine Mammal Stock Assessment Reports (SAR) for the Atlantic Region: https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-region; NEFSC observer/sea sampling database, unpublished data; NMFS NEFSC reference documents (marine mammal serious injury and mortality reports): https://apps-nefsc.fisheries.noaa.gov/rcb/publications/center-reference-documents.html; MMPA List of Fisheries (LOF): https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-protection-act-list-fisheries NMFS (2021a)[3]. In the case of critical habitat, this determination has been made because the action will not affect the essential physical and biological features of critical habitat identified in Table 9 and therefore, will not result in the destruction or adverse modification of any species critical habitat (NMFS 2021a).

1.4.3 Species Potentially Affected by the Proposed Action

Table 6 lists protected species of sea turtle, marine mammal, and fish species present in the affected environment of the skate fishery, and that may also be affected by the operation of this fishery; that is, have the potential to become entangled or bycaught in the fishing gear used to prosecute the fishery. To help identify MMPA protected species potentially affected by the action, NMFS (2021b); the MMPA List of Fisheries and marine mammal stock assessment reports for the Atlantic Region were referenced. To help identify ESA listed species potentially impacted by the action, we queried the Northeast Fisheries Observer Program (2010-2019), Sea Turtle Disentanglement Network (2010-2019), and the Marine Animal Incident (2010-2019) databases for interactions, and reviewed the May 27, 2021, Biological Opinion (Opinion) issued by NMFS (2021a). The 2021 Opinion considered the effects of the NMFS' authorization of ten fishery management plans (FMP), NMFS' North Atlantic Right Whale Conservation Framework, and the New England Fishery Management Council's Omnibus Essential Fish Habitat Amendment 2, on ESA-listed species and designated critical habitat. The Opinion determined that the proposed action may adversely affect, but is not likely to jeopardize, the continued existence of North Atlantic right, fin, sei, or sperm whales; the Northwest Atlantic Ocean distinct population segment (DPS) of loggerhead, leatherback, Kemp's ridley, or North Atlantic DPS of green sea turtles; any of the five DPSs of Atlantic sturgeon; Gulf of Maine DPS Atlantic salmon; or giant manta rays. The Opinion also concluded that the proposed action is not likely to adversely affect designated critical habitat for North Atlantic right whales, the Northwest Atlantic Ocean DPS of loggerhead sea turtles, U.S. DPS of smalltooth sawfish, Johnson's seagrass, or elkhorn and staghorn corals. An Incidental Take Statement (ITS) was issued in the Opinion. The ITS includes reasonable and prudent measures and their implementing terms and conditions, which NMFS determined are necessary or appropriate to minimize impacts of the incidental take in the fisheries assessed in this Opinion.

[3] For marine mammals protected under the MMPA the most recent 10 years of observer, stranding, and/or marine mammal serious injury and mortality reports are from 2009-2018; however, entanglement data is available for 2019. For ESA listed species, information on observer or documented interactions with fishing gear is from 2010-2019.

1.4.3.1 Sea Turtles

Green (North Atlantic DPS), Kemp's ridley, leatherback, and loggerhead (Northwest Atlantic Ocean DPS) sea turtle are the four ESA listed species of sea turtles that occur in the area of operation for the 13 GAR fisheries (Table 6). Three of the four species are considered hard-shelled turtles (i.e., green, loggerhead, and Kemp's ridley). Additional background information on the range-wide status of the other four species, as well as a description and life history of the species, is in several published documents, including sea turtle status reviews and biological reports (Conant et al. 2009; NMFS & USFWS 1995; 2013; 2015; Seminoff et al. 2015; TEWG 1998; 2000; 2007; 2009), and recovery plans for the loggerhead sea turtle (Northwest Atlantic DPS; NMFS & USFWS 2008), leatherback sea turtle (NMFS & USFWS 1992), Kemp's ridley sea turtle (NMFS & USFWS 2011), and green sea turtle (NMFS & USFWS 1991).

Hard-shelled sea turtles

Distribution

In U.S. Northwest Atlantic waters, hard-shelled turtles commonly occur throughout the continental shelf from Florida (FL) to Cape Cod, Massachusetts (MA), although their presence varies with the seasons due to changes in water temperature (Braun-McNeill et al. 2008; Braun & Epperly 1996; Epperly, Braun & Chester 1995; Epperly, Braun, Chester, et al. 1995; Mitchell et al. 2003; Shoop & Kenney 1992; TEWG 2009). While hard-shelled turtles are most common south of Cape Cod, MA, they are known to occur in the Gulf of Maine (GOM). Loggerheads, the most common hard-shelled sea turtle in the GAR, feed as far north as southern Canada. Loggerheads have been observed in waters with surface temperatures of 7-30°C, but water temperatures ≥11°C are most favorable (Epperly, Braun, Chester, et al. 1995; Shoop & Kenney 1992). Sea turtle presence in U.S. Atlantic waters is also influenced by water depth. While hard-shelled turtles occur in waters from the beach to beyond the continental shelf, they are most commonly found in neritic waters of the inner continental shelf (Blumenthal et al. 2006; Braun-McNeill & Epperly 2002; Griffin et al. 2013; Hawkes et al. 2006; Hawkes et al. 2011; Mansfield et al. 2009; McClellan & Read 2007; Mitchell, et al. 2003; Morreale & Standora 2005).

Seasonality

Hard-shelled sea turtles occur year-round in waters off Cape Hatteras, North Carolina (NC) and south. As coastal water temperatures warm in the spring, loggerheads begin to migrate to inshore waters of the southeast United States and move up the Atlantic Coast (Braun-McNeill & Epperly 2002; Epperly, Braun & Chester 1995; Epperly, Braun, Chester, et al. 1995; Epperly, Braun & Veishlow 1995; Griffin, et al. 2013; Morreale & Standora 2005), occurring in Virginia (VA) foraging areas as early as late April and on the most northern foraging grounds in the GOM in June (Shoop & Kenney 1992). The trend is reversed in the fall as water temperatures cool. The large majority leave the GOM by September, but some remain in Mid-Atlantic and Northeast areas until late fall. By December, sea turtles have migrated south to waters offshore of NC, particularly south of Cape Hatteras, and further south (Epperly, Braun, Chester, et al. 1995; Griffin, et al. 2013; Hawkes, et al. 2011; Shoop & Kenney 1992).

Leatherback sea turtles

Leatherback sea turtles also routinely migrate between northern, temperate, and tropical waters (Dodge et al. 2014; James et al. 2005; James et al. 2006; NMFS & USFWS 1992). Leatherbacks, a pelagic species, are known to use coastal waters of the U.S. continental shelf (Dodge, et al. 2014; Eckert et al. 2006; James, et al. 2005; Murphy et al. 2006). They have a greater tolerance for cold water than hard-shelled sea turtles (NMFS & USFWS 2013) and are found in northern waters later in the year, with most leaving the Northwest Atlantic by mid-November (Dodge, et al. 2014; James, et al. 2005; James, et al. 2006).

1.4.3.2 Marine Mammals

1.4.3.2.1 Large Cetaceans

As North Atlantic right, humpback, fin, sei, and minke whales are found throughout the waters of the Northwest Atlantic Ocean (Table 7), these species will occur in the affected environment of the skate fishery. In general, these species follow an annual pattern of migration between low latitude (south of 35ºN) wintering/calving grounds and high latitude spring/summer foraging grounds (primarily north of 41ºN) (Hayes et al. 2019; NMFS 1991; 2005; 2010; 2011; 2012). This, however, is a simplification of whale movements, particularly as it relates to winter movements. It remains unknown if all individuals of a population migrate to low latitudes in the winter, although, increasing evidence suggests that for some species (e.g., right and humpback whales), some portion of the population remains in higher latitudes throughout the winter (Brown et al. 2002; Clapham et al. 1993; Cole et al. 2013; Hayes, et al. 2019; Khan et al. 2010; 2011; 2012; Khan et al. 2009; NOAA 2008; Swingle et al. 1993; Vu et al. 2012). Although further research is needed to provide a clearer understanding of large whale movements and distribution in the winter, the distribution, and movements of large whales to foraging grounds in the spring/summer is well understood. Movements of whales into higher latitudes coincide with peak productivity in these waters. Thus, the distribution of large whales in higher latitudes is strongly governed by prey availability and distribution, with large numbers of whales coinciding with dense patches of preferred forage (Baumgartner et al. 2003; Baumgartner & Mate 2003; Brown, et al. 2002; Kenney & Hartley 2001; Kenney et al. 1986; Kenney et al. 1995; Mayo & Marx 1990; Payne et al. 1986; Payne et al. 1990; Schilling et al. 1992). Additional information on the biology, status, and range wide distribution of each whale species is in the marine mammal stock assessment reports.

To further assist in understanding how the skate fishery may overlap in time and space with the occurrence of large whales, a general overview on species occurrence and distribution in the area of operation for the skate fishery is in Table 7.

Table 7. Large whale occurrence, distribution and habitat use in the affected environment of the skate fishery.

Species	Occurrence/Distribution/Habitat Use in the Affected Environment
North Atlantic Right Whale	• Occur and are distributed throughout all continental shelf waters along the U.S. eastern seaboard throughout the year. Although whales can regularly be found in particular locations throughout their range, there is a high interannual variability in right whale use of some habitats. • Starting in 2010, acoustic and visual surveys indicate an apparent shift in habitat use patterns (e.g., shift from previously prevalent northern grounds (greater GOM) to spending more time in the Mid-Atlantic regions (waters off south of Martha's Vineyard and Nantucket Islands, New Jersey, and Virginia); increased use of Cape Cod Bay and decreased use of Great South Channel). • New England waters = **Foraging Grounds.** Seasonally important aggregating/foraging grounds include, but not limited to: › Massachusetts and Cape Cod Bays; › Great South Channel; › Jordan Basins; and, › Georges Basin (along the northeastern edge of GB). • Mid-Atlantic waters: Migratory corridor to/from northern (high latitude) foraging and southern calving grounds. • Passive acoustic and telemetry data shows excursions into deeper water off the continental shelf (e.g., shelf edge along southern Georges Bank and Mid-Atlantic) • Location of much of the population unknown in winter; however, increasing evidence of wintering areas (~November – January) in: › Cape Cod Bay; › Jeffreys and Cashes Ledges; › Jordan Basin; and › Massachusetts Bay (e.g., Stellwagen Bank).
Humpback	• Distributed throughout all continental shelf waters of the Mid-Atlantic (SNE included), GOM, and GB throughout the year. • New England waters (GOM and GB regions) **= Foraging Grounds** (~March-November). • Mid-Atlantic waters: Migratory pathway to/from northern (high latitude) foraging and southern (West Indies) calving grounds. • Increasing visual and acoustic evidence of whales remaining in mid- and high-latitudes throughout the winter (e.g., *Mid- Atlantic*: waters near Chesapeake and Delaware Bays, peak presence about January through March; *Massachusetts Bay*: peak presence about March-May and September-December).

Fin	• Distributed throughout all continental shelf waters of the Mid-Atlantic (SNE included), GOM, and GB throughout the year; recent review of sighting data shows evidence that, while densities vary seasonally, fin whales are present in every season throughout most of the EEZ north of 35°N. • Mid-Atlantic waters: › Migratory pathway to/from northern (high latitude) foraging and southern (low latitude) calving grounds; and › Possible offshore calving area (October-January). • New England (GOM and GB)/SNE waters = Foraging Grounds (greatest densities March-August; lower densities September-November). Important foraging grounds include, but are not limited to: › Massachusetts Bay (esp. Stellwagen Bank); › Great South Channel; › Waters off Cape Cod (~40-50 meter contour); › GOM; › Perimeter (primarily eastern) of GB; and › Mid-shelf area off the east end of Long Island. • Evidence of wintering areas in mid-shelf areas east of New Jersey (NJ), Stellwagen Bank; and eastern perimeter of GB.
Sei	• Uncommon in shallow, inshore waters of the Mid-Atlantic (SNE included), GB, and GOM; however, occasional incursions during peak prey availability and abundance. • Primarily found in deep waters along the shelf edge, shelf break, and ocean basins between banks. • Spring through summer, found in greatest densities in offshore waters of the Gulf of Maine and Georges Bank; sightings concentrated along the northern, eastern (into Northeast Channel) and southwestern (in the area of Hydrographer Canyon) edge of Georges Bank.
Minke	• Widely distributed within the U.S. EEZ. • Spring to Fall: widespread (acoustic) occurrence on the continental shelf; however, most abundant in New England waters during this period of time. • September to April: high (acoustic) occurrence in deep-ocean waters.
Sources: Baumgartner et al. (2007); Baumgartner et al. (2011); Baumgartner and Mate (2005); Bort et al. (2015); Brown et al. (2002); CETAP (1982); Clapham et al. (1993); Cole et al. (2013); Davis et al. (2017); Good ; Hain et al. (1992); Hamilton and Mayo (1990); Hayes et al. (2017; 2018; 2019); Kenney et al. (1986; 1995); Khan et al. (2010; 2011; 2012; 2009); Leiter et al. (2017); Mate et al. (1997); McLellan et al. (2004); NMFS (1991; 2005; 2010; 2011; 2012; 2015); NOAA (2008); Pace and Merrick (2008); Payne et al. (1984; 1990); Pendleton et al. (2009); Record et al. (2019); Risch et al. (2013); Schevill et al. (1986); Swingle et al. (1993); Vu et al. (2012); Watkins and Schevill (1982); Winn et al. (1986); 50 CFR 224.105; 81 FR 4837 (January 27, 2016).	

1.4.3.2.2 Cetaceans

As Atlantic white sided dolphins, short and long finned pilot whales, Risso's dolphins, short beaked common dolphins, harbor porpoise, and several stocks of bottlenose dolphins are found throughout the year in the Northwest Atlantic Ocean (Table 8), these species will occur in the affected environment of the skate fishery (Hayes, et al. 2017; 2018; 2019). Within this range, however, there are seasonal shifts in species distribution and abundance. To help understand how fisheries may overlap in time and space with the occurrence of small cetaceans, a general overview of species occurrence and distribution in the area of operation for the skate fishery is in Table 8. Additional information on the biology, status, and range wide distribution of each species is in the marine mammal stock assessment reports.

Table 8. Small cetacean, distribution and habitat use in the affected environment of the skate fishery.

Species	Occurrence/Distribution/Habitat Use in the Affected Environment
Atlantic White Sided Dolphin	• Distributed throughout the continental shelf waters (primarily to 100 m) of the Mid-Atlantic (north of 35°N), SNE, GB, and GOM; however, most common in continental shelf waters from Hudson Canyon (~ 39°N) to GB, and into the GOM. • **January-May**: low densities found from GB to Jeffreys Ledge. • **June-September**: Large densities found from GB, through the GOM. • **October-December**: intermediate densities found from southern GB to southern GOM. • South of GB (SNE and Mid-Atlantic), particularly around Hudson Canyon, low densities found year-round, • Virginia (VA) and North Carolina (NC) waters represent southern extent of species range during winter months.
Short Beaked Common Dolphin	• Regularly found throughout the continental shelf-edge-slope waters (primarily between 100-2,000 m) of the Mid-Atlantic, SNE, and GB (esp. in Oceanographer, Hydrographer, Block, and Hudson Canyons). • Less common south of Cape Hatteras, NC, although schools have been reported as far south as the Georgia/South Carolina border. • **January-May**: occur from waters off Cape Hatteras, NC, to GB (35° to 42°N). • **Mid-summer-autumn**: Occur in the GOM and on GB; *Peak abundance* found on GB in the autumn.
Risso's Dolphin	• **Spring through fall**: Distributed along the continental shelf edge from Cape Hatteras, NC, to GB. • **Winter**: distributed in the Mid-Atlantic Bight, extending into oceanic waters. • Rarely seen in the GOM; primarily a Mid-Atlantic continental shelf edge species (can be found year-round).
Harbor Porpoise	• Distributed throughout the continental shelf waters of the Mid-Atlantic, SNE, GB, and GOM. • **July-September**: Concentrated in the northern GOM (<150 m); low numbers can be found on GB. • **October-December**: widely dispersed in waters from New Jersey (NJ) to Maine (ME); seen from the coastline to deep waters (>1,800 m). • **January-March**: intermediate densities in waters off NJ to NC; low densities found in waters off New York (NY) to GOM. • **April-June**: widely dispersed from NJ to ME; seen from the coastline to deep waters (>1,800 meters).

<table>
<tr><th>Species</th><th>Occurrence/Distribution/Habitat Use in the Affected Environment</th></tr>
<tr><td>Bottlenose Dolphin</td><td><u>Western North Atlantic Offshore Stock</u>
• Distributed primarily along the outer continental shelf and continental slope in the Northwest Atlantic from GB to Florida (FL).
• Depths of occurrence: ≥40 meters
<u>Western North Atlantic Northern Migratory Coastal Stock</u>
• Most common in coastal waters <20 m deep.
• Warm water months (e.g., July-August): distributed from the coastal waters from the shoreline to about the 20 m depth between the Assateague, VA, to Long Island, NY.
• Late summer and fall, and during cold water months (e.g., January-March): stock occupies coastal waters from Cape Lookout, NC, to the NC/VA border.
<u>Western North Atlantic Southern Migratory Coastal Stock</u>
• Most common in coastal waters <20 m deep.
• October-December: appears stock occupies waters of southern NC (south of Cape Lookout)
• January-March: appears stock moves as far south as northern FL.
• April-June: stock moves north to waters of NC.
• July-August: stock is presumed to occupy coastal waters north of Cape Lookout, NC, to the eastern shore of VA (as far north as Assateague).</td></tr>
<tr><td>Pilot Whales: Short- and Long-Finned</td><td><u>Short- Finned Pilot Whales</u>
• Except for area of overlap (below), primarily occur south of 40°N (Mid-Atlantic and SNE waters); although low numbers have been found along the southern flank of GB, but no further than 41°N.
• May through December (about): distributed primarily near the continental shelf break of the Mid-Atlantic and SNE; individuals begin shifting to southern waters (i.e., 35°N and south) beginning in the fall.
<u>Long-Finned Pilot Whales</u>
• Except for area of overlap (below), primarily occur north of 42oN.
• Winter to early spring (November - April): primarily distributed along the continental shelf edge-slope of the Mid-Atlantic, SNE, and GB.
• Late spring through fall (May - October): movements and distribution shift onto/within GB, the Great South Channel, and the GOM.
<u>Area of Species Overlap:</u> between about 38°N and 40°N.</td></tr>
<tr><td colspan="2">Notes: Information is representative of small cetacean occurrence in the Northwest Atlantic continental shelf waters out to 2,000 m depth
Sources: Hayes et al. (2017; 2018; 2019); Payne and Heinemann (1993); Payne et al. (1984); Jefferson et al. (2009).</td></tr>
</table>

1.4.3.2.3 Pinnipeds

Harbor, gray, harp, and hooded seals will occur in the affected environment of the skate fishery (Table 9). Specifically, pinnipeds are found in the nearshore, coastal waters of the Northwest Atlantic Ocean. They are primarily found throughout the year or seasonally from New Jersey to Maine; however, increasing evidence indicates that some species (e.g., harbor seals) may be extending their range seasonally into waters as far south as Cape Hatteras, North Carolina (35°N) (Hayes, et al. 2019; Waring et al. 2007). To help understand how the skate fishery may overlap in time and space with the occurrence of pinnipeds, a general overview of species occurrence and distribution in the area of operation of the skate fishery is in Table 9. Waring *et al.* (2007), and Hayes *et al.* (2019) have additional information on the biology, status, and range wide distribution of each species.

Table 9. Pinniped occurrence, distribution and habitat use in the affected environment of the skate fishery.

Species	Occurrence/Distribution/Habitat Use in the Affected Environment
Harbor Seal	• Primarily distributed in waters from New Jersey to Maine; however, increasing evidence indicates that their range is extending into waters as far south as Cape Hatteras, NC (35°N). • **Year Round**: Waters of Maine • **September-May**: Waters from MA to NJ.
Gray Seal	• **Year Round**: Waters from Maine to just south of Cape Cod, MA. • **September-May**: Waters from southern MA to NJ. • Stranding records: Southern NJ to Cape Hatteras, NC
Harp Seal	• Winter-Spring (approx. January-May): Waters from New Jersey to Maine.
Hooded Seal	• Winter-Spring (approx. January-May): Waters of New England.
Sources: Hayes *et al*. (2019); Waring *et al*. (2007, for hooded seals).	

1.4.3.2.4 Atlantic Sturgeon

Table 6 lists the five DPSs of Atlantic sturgeon that occur in the affected environment of the skate fishery and that may be affected by the operation of this fishery. The marine range of U.S. Atlantic sturgeon extends from Labrador, Canada, to Cape Canaveral, Florida. All five DPSs of Atlantic sturgeon have the potential to be located anywhere in this marine range; in fact, results from genetic studies show that, regardless of location, multiple DPSs can be found at any one location along the Northwest Atlantic coast (ASMFC 2017; ASSRT 2007; Dadswell 2006; Dadswell et al. 1984; Dovel & Berggren 1983; Dunton et al. 2012; Dunton et al. 2015; Dunton et al. 2010; Erickson et al. 2011; Kynard et al. 2000; Laney et al. 2007; O'Leary et al. 2014; Stein et al. 2004a; Waldman et al. 2013; Wirgin, Breece, et al. 2015; Wirgin, Maceda, et al. 2015; Wirgin et al. 2012).

Based on fishery-independent and dependent data, as well as data collected from tracking and tagging studies, in the marine environment, Atlantic sturgeon appear to primarily occur inshore of the 50 meter depth contour (Dunton, et al. 2010; Erickson, et al. 2011; Stein, et al. 2004a; Stein et al. 2004b); however, Atlantic sturgeon are not restricted to these depths, as excursions into deeper continental shelf waters have been documented (Collins & Smith 1997; Dunton, et al. 2010; Erickson, et al. 2011; Stein, et al. 2004a; b; Timoshkin 1968). Data from fishery-independent surveys and tagging and tracking studies also indicate that some Atlantic sturgeon may undertake seasonal movements along the coast (Dunton, et al. 2010; Erickson, et al. 2011; Wippelhauser 2012). For instance, tagging and tracking studies found that satellite-tagged adult sturgeon from the Hudson River concentrated in the southern part of the Mid-Atlantic Bight, at depths greater than 20 m, during winter and spring, while in the summer and fall, Atlantic sturgeon concentrations shifted to the northern portion of the Mid-Atlantic Bight at depths less than 20 meters (Erickson, et al. 2011).

Within the marine range of Atlantic sturgeon, several marine aggregation areas have been identified adjacent to estuaries and/or coastal features formed by bay mouths and inlets along the U.S. eastern seaboard (i.e., waters off North Carolina, Chesapeake Bay; Delaware Bay; New York Bight; Massachusetts Bay; Long Island Sound; and Connecticut and Kennebec River Estuaries); depths in these areas are generally no greater than 25 meters (Bain et al. 2000; Dunton, et al. 2010; Erickson, et al. 2011; Laney, et al. 2007; O'Leary, et al. 2014; Oliver et al. 2013; Savoy & Pacileo 2003; Stein, et al. 2004a; Waldman, et al. 2013; Wippelhauser 2012; Wippelhauser & Squiers Jr. 2015). Although additional studies are still needed to clarify why these sites are chosen by Atlantic sturgeon, there is some indication that they may serve as thermal refuge, wintering sites, or marine foraging areas (Dunton, et al. 2010; Erickson, et al. 2011; Stein, et al. 2004a).

1.4.3.2.5 Atlantic Salmon (Gulf of Maine DPS)

The wild populations of Atlantic salmon are listed as endangered under the ESA. Their freshwater range occurs in the watersheds from the Androscoggin River northward along the Maine coast to the Dennys River, while the marine range of the GOM DPS extends from the GOM (primarily northern portion of the GOM) to the coast of Greenland (Fay et al. 2006; NMFS & USFWS 2005; 2016). In general, smolts, post- smolts, and adult Atlantic salmon may be present in the GOM and coastal waters of Maine in the spring (beginning in April), and adults may be present throughout the summer and fall months (Baum 1997; Fay, et al. 2006; Hyvärinen et al. 2006; Lacroix & Knox 2005; Lacroix & McCurdy 1996; Lacroix et al. 2004; NMFS & USFWS 2005; Reddin 1985; Reddin & Friedland 1993; Reddin & Short 1991). For additional information on the biology, status, and range wide distribution of the GOM DPS of Atlantic salmon, refer to NMFS and USFWS (2005; 2016); and Fay et al. (2006). Thus, as the multispecies fishery operates throughout the year, and operates in the GOM, the fishery could overlap in time and space with Atlantic salmon migrating northeasterly between U.S. and Canadian waters.

1.4.4 Interactions Between Gear and Protected Species

Protected species are vulnerable to interactions with various types of fishing gear, with interaction risks associated with gear type, quantity, and soak or tow time. Available information on gear interactions with a given species (or species group) is in the sections below. These sections are not a comprehensive review of all fishing gear types known to interact with a given species; emphasis is only being placed on the primary gear types used to prosecute the skate fishery (i.e., sink gillnet and bottom trawl gear).

1.4.4.1 Marine Mammals

Depending on species, marine mammals have been observed seriously injured or killed in bottom trawl and/or sink gillnet gear. Pursuant to the MMPA, NMFS publishes a List of Fisheries (LOF) annually, classifying U.S. commercial fisheries into one of three categories based on the relative frequency of incidental serious injuries and/or mortalities of marine mammals in each fishery (i.e., Category I=frequent; Category II=occasional; Category III=remote likelihood or no known interactions). In the Northwest Atlantic, the 2021 LOF (86 FR 3028 (January 14, 2021)) categorizes commercial gillnet fisheries (Northeast or Mid-Atlantic) as Category I fisheries and commercial bottom trawl fisheries (Northeast or Mid-Atlantic) as Category II fisheries.

1.4.4.1.1 Large Whales

Bottom Trawl Gear

Except for minke whales, there have been no observed interactions with large whales and bottom trawl gear (marine mammal stock assessment reports; https://www.nefsc.noaa.gov/fsb/take_reports/nefop.html; https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-protection-act-list-fisheries; https://www.nefsc.noaa.gov/publications/crd/). However, since 2009, serious injury and mortality records for minke whales in U.S. waters have shown zero interactions with bottom trawl (northeast or Mid-Atlantic) gear (86 FR 3028; Hayes, et al. 2019; Henry et al. 2017; Henry et al. 2015;

Henry et al. 2020). Thus, large whale interactions with bottom trawl gear are expected to be rare to nonexistent.

Fixed Fishing Gear (e.g., Sink Gillnet Gear)

Large whale interactions (entanglements) with fishing gear have been documented in the waters of the Northwest Atlantic.[4] Information available on interactions with large whales comes from NMFS (2021a; b), reports documented in the Greater Atlantic Region (GAR) Marine Animal Incident Database (unpublished data), as well as the NEFSC's baleen whale serious injury and mortality reports. Review of the most recent ten years (i.e., 2010-2019) of validated data indicates that, in terms of confirmed incidences of human interactions (e.g., ship strike, entanglement), entanglement in fishing gear accounts for most all large whale interactions reported and documented for humpback, North Atlantic right, fin, and minke whales. Albeit to a lesser extent, the best available data also shows that sei whales have been reported and documented entangled in fishing gear.

Based on the best available information, the greatest entanglement risk to large whales is posed by fixed gear used in trap/pot or sink gillnet fisheries (Angliss & DeMaster 1998; Cassoff et al. 2011; Hamilton & Kraus 2019; Hartley et al. 2003; Henry, et al. 2017; Henry et al. 2014; Henry, et al. 2015; Henry et al. 2016; Henry, et al. 2020; Henry et al. 2019; Johnson et al. 2005; Knowlton et al. 2012; Knowlton & Kraus 2001; NMFS 2014a; 2021a; b; Sharp et al. 2019; Whittingham, Garron, et al. 2005; Whittingham, Hartley, et al. 2005) (Marine Mammal SARs). Specifically, while foraging or transiting, large whales are at risk of becoming entangled in vertical endlines, buoy lines, or groundlines of gillnet and pot/trap gear, as well as the net panels of gillnet gear that rise into the water column (Baumgartner et al. 2017; Cassoff, et al. 2011; Hamilton & Kraus 2019; Hartley, et al. 2003; Henry, et al. 2017; Henry, et al. 2015; 2016; Henry, et al. 2020; Henry, et al. 2019; Henry & Olson 2014; Johnson, et al. 2005; Kenney & Hartley 2001; Knowlton, et al. 2012; Knowlton & Kraus 2001; NMFS 2014b; Whittingham, Garron, et al. 2005; Whittingham, Hartley, et al. 2005) (NMFS Marine Mammal SARs).[5] Large whale interactions (entanglements) with these features of trap/pot and/or sink gillnet gear often result in the serious injury or mortality to the whale (Angliss & DeMaster 1998; Cassoff, et al. 2011; Henry, et al. 2017; Henry, et al. 2015; 2016; Henry, et al. 2020; Henry, et al. 2019; Henry & Olson 2014; Knowlton, et al. 2012; Knowlton & Kraus 2001; Moore & van der Hoop 2012; NMFS 2014b; 2021a; b; Pettis et al. 2018; Sharp, et al. 2019; van der Hoop et al. 2016; van der Hoop et al. 2017). As many entanglements, and therefore, serious injury or mortality events, go unobserved, and because the gear type, fishery, and/or country of origin for reported entanglement events are often not traceable, the rate of large whale entanglement, and thus, rate of mortality and serious injury due to entanglement, are likely underestimated (Hamilton et al. 2019; Knowlton, et al. 2012; Pace III et al. 2017; Robbins et al. 2009).

As in Section 1.4.4.1, pursuant to the MMPA, NMFS publishes a LOF annually, classifying U.S. commercial fisheries into one of three categories based on the relative frequency of incidental serious injuries and mortalities of marine mammals in each fishery. Large whales, especially humpback, fin, minke, and North Atlantic right whales, are known to interact with Category I and II fisheries in the (Northwest) Atlantic Ocean. As fin and North Atlantic right whales are listed as endangered under the ESA, these species are considered strategic stocks under the MMPA; Humpback whales are also

[4] NMFS Atlantic Large Whale Entanglement Reports: https://www.fisheries.noaa.gov/new-england-mid-atlantic/marine-mammal-protection/atlantic-large-whale-take-reduction-plan (for years prior to 2014, contact David Morin, Large Whale Disentanglement Coordinator, David.Morin@NOAA.gov; GAR Marine Animal Incident Database (unpublished data); NMFS Marine Mammal SARs for the Atlantic Region; NMFS NEFSC Marine Mammal Serious Injury and Morality Reference Documents: https://apps-nefsc.fisheries.noaa.gov/rcb/publications/center-reference-documents.html; MMPA List of Fisheries; NMFS (2021a; b).

[5] Through the ALWTRP, regulations have been implemented to reduce the risk of entanglement in in vertical endlines, buoy lines, or groundlines of gillnet and pot/trap gear, as well as the net panels of gillnet gear. For ALWTRP regulations currently implemented: see https://www.fisheries.noaa.gov/action/atlantic-large-whale-take-reduction-plan-regulations-1997-2015.

considered strategic stocks as the detected level of U.S. fishery caused mortality and serious injury exceeds the PBR level (Hayes, et al. 2019). MMPA Section 118(f)(1) requires the preparation and implementation of a Take Reduction Plan (TRP) for any strategic marine mammal stock that interacts with Category I or II fisheries. In response to its obligations under the MMPA, in 1996, NMFS established the Atlantic Large Whale Take Reduction Team (ALWTRT) to develop a plan (Atlantic Large Whale Take Reduction Plan (ALWTRP) to reduce serious injury to, or mortality of large whales, specifically, humpback, fin, and North Atlantic right whales, due to incidental entanglement in U.S. commercial fishing gear[6]. In 1997, the ALWTRP was implemented; however, since 1997, the ALWTRP has been modified; recent adjustments include the Sinking Groundline Rule and Vertical Line Rules (72 FR 57104, October 5, 2007; 79 FR 36586, June 27, 2014; 79 FR 73848, December 12, 2014; 80 FR 14345, March 19, 2015; 80 FR 30367, May 28, 2015).

The ALWTRP consists of regulatory (e.g., universal gear requirements, modifications, and requirements; area- and season-specific gear modification requirements and restrictions; time/area closures) and non-regulatory measures (e.g., gear research and development, disentanglement, education and outreach) that, in combination, aim to help recover North Atlantic right, humpback, and fin whales by addressing and mitigating the risk of entanglement in gear employed by commercial fisheries, specifically trap/pot and gillnet fisheries (http://www.greateratlantic.fisheries.noaa.gov/Protected/whaletrp/; 73 FR 51228; 79 FR 36586; 79 FR 73848; 80 FR 14345; 80 FR 30367). The ALWTRP recognizes trap/pot and gillnet Management Areas in Northeast, Mid-Atlantic, and Southeast regions of the U.S, and identifies gear modification requirements and restrictions for Category I and II gillnet and trap/pot fisheries in these regions; these Category I and II fisheries must comply with all regulations of the ALWTRP.[7]

1.4.4.1.2 Small Cetaceans and Pinnipeds

Sink Gillnet and Bottom Trawl Gear

Small cetaceans and pinnipeds are vulnerable to interactions with bottom trawl gear.[8] Reviewing marine mammal stock assessment and serious injury reports that cover the most recent 10 years data (i.e., 2009-2018), as well as the MMPA LOF's covering this time frame (i.e., issued between 2017 and 2021), Table 11 is a list of species that have been observed (incidentally) seriously injured and/or killed by MMPA LOF Category I (frequent interactions) gillnet and/or Category II (occasional interactions) bottom trawl fisheries that operate in the affected environment of the skate fishery. Of the species in Table 10, gray seals, followed by harbor seals, harbor porpoises, short beaked common dolphins, and harps seals are the most frequently bycaught small cetacean and pinnipeds in sink gillnet gear in the Greater Atlantic Region (GAR) (Hatch & Orphanides 2014; 2015; 2016; Orphanides 2019; 2020; Orphanides & Hatch 2017). In terms of bottom trawl gear, short-beaked common dolphins, Risso's dolphins, and Atlantic white-sided dolphins are the most frequently observed bycaught marine mammal species in the GAR, followed by gray seals, long-finned pilot whales, bottlenose dolphin (offshore), harbor porpoise, harbor seals, and harp seals (Chavez-Rosales, et al. 2017; Lyssikatos 2015; Lyssikatos, et al. 2021).

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[6] The measures identified in the ALWTRP are also beneficial to the survival of the minke whale, which are also known to be incidentally taken in commercial fishing gear.

[7] The fisheries currently regulated under the ALWTRP include: Northeast/Mid-Atlantic American lobster trap/pot; Atlantic blue crab trap/pot; Atlantic mixed species trap/pot; Northeast sink gillnet; Northeast anchored float gillnet; Northeast drift gillnet; Mid-Atlantic gillnet; Southeastern U.S. Atlantic shark gillnet; and Southeast Atlantic gillnet (Josephson et al. 2021; Lyssikatos et al. 2021; NMFS 2014a).

[8] For additional information on small cetacean and pinniped interactions, see: Chavez-Rosales et al. (2017), Josephson et al. (2017; 2019), Lyssikatos (2015), Read et al. (2006), Waring et al. (2015), Hatch and Orphanides (2014; 2015; 2016; 2017); Lyssikatos et al. (2020); Orphanides (2019; 2020); Marine Mammal SARS: MMPA LOF.

As noted above, numerous species of small cetaceans and pinnipeds interact with Category I and II fisheries in the GAR; however, several species (Table 10) have experienced such great losses to their populations due to interactions with Category I and/or II fisheries that they are now considered strategic stocks under the MMPA. These include several stocks of bottlenose dolphins, pilot whales, and until recently, the harbor porpoise.[9] MMPA Section 118(f)(1) requires the preparation and implementation of a TRP for any strategic marine mammal stock that interacts with Category I or II fisheries. Thus, the Harbor Porpoise TRP (HPTRP) and the Bottlenose Dolphin TRP (BDTRP) were developed and implemented for these species.[10] Also, due to the incidental mortality and serious injury of small cetaceans, incidental to bottom and midwater trawl fisheries operating in both the Northeast and Mid-Atlantic regions, the Atlantic Trawl Gear Take Reduction Strategy (ATGTRS) was implemented. Additional information on each TRP or Strategy is at: https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-take-reduction-plans-and-teams.

Table 10. Small cetacean and pinniped species observed seriously injured and/or killed by Category I and II sink gillnet or bottom trawl fisheries in the affected environment of the skate fisheries.

Fishery	Category	Species Observed or reported Injured/Killed
Northeast Sink Gillnet	I	Bottlenose dolphin (offshore)
		Harbor porpoise
		Atlantic white sided dolphin
		Short-beaked common dolphin
		Risso's dolphin
		Long-finned pilot whales
		Harbor seal
		Hooded seal
		Gray seal
		Harp seal
Mid-Atlantic Gillnet	I	Bottlenose dolphin (Northern Migratory coastal)
		Bottlenose dolphin (Southern Migratory coastal)
		Bottlenose dolphin (offshore)
		Harbor porpoise
		Short-beaked common dolphin
		Harbor seal
		Harp seal
		Gray seal
Northeast Bottom Trawl	II	Harp seal
		Harbor seal
		Gray seal
		Long-finned pilot whales
		Short-beaked common dolphin
		Atlantic white-sided dolphin

[9] In the most recent U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessment (Hayes, et al. 2018); harbor porpoise is no longer designated as a strategic stock.

[10] Although the most recent U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessment (Hayes, et al. 2018) no longer designates harbor porpoise as a strategic stock, HPTRP regulations are still in place per the mandates in Section 118(f)(1).

		Harbor porpoise
		Bottlenose dolphin (offshore)
		Risso's dolphin
Mid-Atlantic Bottom Trawl	II	White-sided dolphin
		Short-beaked common dolphin
		Risso's dolphin
		Bottlenose dolphin (offshore)
		Gray seal
		Harbor seal
Source: MMPA 2017-2021 LOF.		

1.4.4.2 Sea Turtles

Bottom Trawl Gear

Bottom trawl gear poses an injury and mortality risk to sea turtles (NMFS Observer Program, unpublished data; Sasso & Epperly 2006). Since 1989, the date of our earliest observer records for federally managed fisheries, sea turtle interactions with trawl gear have been observed in the Gulf of Maine, Georges Bank, and/or the Mid-Atlantic; however, most of the observed interactions have been observed south of the Gulf of Maine (Murray 2008; 2015; 2020; Warden 2011a; Warden 2011b) (NMFS Observer Program, unpublished data). As few sea turtle interactions have been observed in the Gulf of Maine, there is insufficient data available to conduct a robust model-based analysis and bycatch estimate of sea turtle interactions with trawl gear in this region. As a result, the bycatch estimates and discussion below are for trawl gear in the Mid-Atlantic and Georges Bank.

Murray (2020) provided information on sea turtle interaction rates from 2014-2018 (the most recent five-year period that has been statistically analyzed for trawls). Interaction rates were stratified by region, latitude zone, season, and depth. The highest loggerhead interaction rate (0.43 turtles/day fished) was in waters south of 37º N during November to June in waters greater than 50 meters deep. The greatest number of estimated interactions occurred in the Mid-Atlantic region north of 39º N, during July to October in waters less than 50 meters deep. Within each stratum, interaction rates for non-loggerhead species were lower than rates for loggerheads (Murray 2020).

Based on Murray (2020)[11], from 2014-2018, 571 loggerhead (CV=0.29, 95% CI=318-997), 46 Kemp's ridley (CV=0.45, 95% CI=10-88), 20 leatherback (CV=0.72, 95% CI = 0-50), and 16 green (CV=0.73, 95% CI=0-44) sea turtle interactions were estimated to have occurred in bottom trawl gear in the Mid-Atlantic region over the five-year period. On Georges Bank, 12 loggerheads (CV=0.70, 95% CI=0-31) and 6 leatherback (CV=1.0, 95% CI=0-20) interactions were estimated to have occurred from 2014-2018. An estimated 272 loggerhead, 23 Kemp's ridley, 13 leatherback, and 8 green sea turtle interactions resulted in mortality over this period (Murray 2020).

[11] (Murray 2018; 2020) estimated interaction rates for each sea turtle species with stratified ratio estimators. This method differs from previous approaches (Murray 2015; Murray & Orphanides 2013; Warden 2011b), where rates were estimated using generalized additive models (GAMs). Ratio estimator results may be like those using GAM or generalized linear models (GLM) if ratio estimators are stratified based on the same explanatory variables in a GAM or GLM model (Murray 2007; Murray & Orphanides 2013; Orphanides 2010).

Sink Gillnet Gear

Interactions between sink gillnet gear and green, Kemp's ridley, loggerhead, and leatherback sea turtles have been observed in the Greater Atlantic region since 1989 (NEFSC observer/sea sampling database, unpublished data). Specifically, sea turtle interactions with gillnet gear have been observed in the Gulf of Maine, Georges Bank, and/or the Mid-Atlantic; however, most of the observed interactions have been observed south of the Gulf of Maine (Murray 2009; 2013; 2018; NEFSC observer/sea sampling database, unpublished data)(Murray 2009). As few sea turtle interactions have been observed in the Gulf of Maine, there is insufficient data available to conduct a robust model-based analysis and bycatch estimate of sea turtle interactions with sink gillnet gear in this region. As a result, the bycatch estimates and discussion below are for sink gillnet gear in the Mid-Atlantic and Georges Bank.

From 2012-2016 (the most recent five-year period that has been statistically analyzed for gillnets), Murray (2018) estimated that sink gillnet fisheries in the Mid-Atlantic and Georges Bank bycaught 705 loggerheads (CV=0.29, 95% CI over all years: 335-1116), 145 Kemp's ridleys (CV =0.43, 95% CI over all years: 44-292), 27 leatherbacks (CV =0.71, 95% CI over all years 0-68), and 112 unidentified hard-shelled turtles (CV=0.37, 95% CI over all years (64-321).[12] Of these, mortalities were estimated at 557 loggerheads, 115 Kemp's ridley, 21 leatherbacks, and 88 unidentified hard-shelled sea turtles. Total estimated loggerhead bycatch was equivalent to 19 adults. The highest bycatch rate of loggerheads occurred in the southern Mid-Atlantic stratum in large mesh gear during November to June. Though only one sea turtle was observed in this stratum, observed effort was low, leading to a high bycatch rate. Bycatch rates of all other species were lower relative to loggerheads. Highest estimated loggerhead bycatch occurred in the northern mid-Atlantic from July to October in large mesh gears due to the higher levels of commercial effort in the stratum. Mean loggerhead bycatch rates were ten times those of Kemp's ridley bycatch rates in large mesh gear in the northern Mid-Atlantic from July to October (Murray 2018). Although interactions between sink gillnet gear and green sea turtles have been observed (NEFSC observer/sea sampling database, unpublished data); green sea turtles were excluded from the bycatch rate calculations in Murray (2018)(2018) because the observed interaction occurred in waters of North Carolina, and therefore, outside the study region.

1.4.4.3 Atlantic Sturgeon

Sink Gillnet and Bottom Trawl Gear

Atlantic sturgeon interactions (i.e., bycatch) with sink gillnet and bottom trawl gear have frequently been observed in the Greater Atlantic Region since 1989; these interactions have the potential to result in the injury or mortality of Atlantic sturgeon (NEFSC observer/sea sampling database, unpublished data). For sink gillnets, higher levels of Atlantic sturgeon bycatch have been associated with depths of less than 40 meters, mesh sizes of greater than 10 inches, and the months of April and May (ASMFC 2007). For otter trawl fisheries, the highest incidences of Atlantic sturgeon bycatch have been associated with depths less than 30 meters (ASMFC 2007). More recently, over all gears and observer programs that have encountered Atlantic sturgeon, the distribution of haul depths on observed hauls that caught Atlantic sturgeon was significantly different from those that did not encounter Atlantic surgeon, with Atlantic sturgeon encountered primarily at depths less than 20 meters (ASMFC 2017).

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[12] (Murray 2018; 2020) estimated interaction rates for each sea turtle species with stratified ratio estimators. This method differs from previous approaches (Murray 2015; Murray & Orphanides 2013; Warden 2011b), where rates were estimated using generalized additive models (GAMs). Ratio estimator results may be like to those using GAM or generalized linear models (GLM) if ratio estimators are stratified based on the same explanatory variables in a GAM or GLM model (Murray 2007; Murray & Orphanides 2013; Orphanides 2010).

The ASMFC (2017) Atlantic sturgeon benchmark stock assessment represents the most accurate predictor of annual Atlantic sturgeon interactions in fishing gear (e.g., otter trawl, gillnet). The stock assessment analyzes fishery observer and VTR data to estimate Atlantic sturgeon interactions in fishing gear in the Mid-Atlantic and New England regions from 2000-2015, the timeframe which included the most recent, complete data at the time of the report. The total bycatch of Atlantic sturgeon from bottom otter trawls ranged between 624-1,518 fish over the 2000-2015 time series, while the total bycatch of Atlantic sturgeon from gillnets ranged from 253-2,715 fish. Focusing on the most recent five-year period of data provided in the stock assessment report[13], the estimated average annual bycatch during 2011-2015 of Atlantic sturgeon in bottom otter trawl gear is 777.4 individuals and in gillnet gear is 627.6 individuals.

1.4.4.4 Atlantic Salmon

Sink Gillnet and Bottom Trawl Gear

Atlantic salmon are at risk of interacting with bottom trawl or gillnet gear (Kocik et al. 2014; NEFSC observer/sea sampling database, unpublished data). NEFOP data from 1989-2019 show records of incidental bycatch of Atlantic salmon in seven of the 31 years, with a total of 15 individuals caught, nearly half of which (seven) occurred in 1992 (NEFSC observer/sea sampling database, unpublished data).[14] Of the observed incidentally caught Atlantic salmon, ten were listed as “discarded,” which is assumed to be a live discard (Kocik, pers comm.; February 11, 2013). Five of the 15 were documented as lethal interactions. The incidental takes of Atlantic salmon occurred in bottom otter trawls (4) and gillnets (11). Observed captures occurred in March (2), April (2), May (1), June (3), August (1), and November (6). Given the very low number of observed Atlantic salmon interactions in gillnet and bottom trawl gear, interactions with these gear types are believed to be rare in the Greater Atlantic Region.

1.5 Physical Environment and Essential Fish Habitat

1.5.1 Physical Environment

The Northeast U.S. Shelf includes the area from the Gulf of Maine south to Cape Hatteras, extending from the coast seaward to the edge of the continental shelf, including the slope sea offshore to the Gulf Stream. Four distinct sub-regions comprise the NOAA Fisheries Northeast Region: The Gulf of Maine, Georges Bank, the Mid-Atlantic Bight, and the continental slope (Map 1, Map 2). The Gulf of Maine is an enclosed coastal sea, characterized by relatively cold waters and deep basins, with a patchwork of various sediment types. Georges Bank is a relatively shallow coastal plateau that slopes gently from north to south and has steep submarine canyons on its eastern and southeastern edge. It is characterized by highly productive, well-mixed waters and strong currents. The Mid-Atlantic Bight is comprised of the sandy, relatively flat, gently sloping continental shelf from southern New England to Cape Hatteras. The continental slope begins at the continental shelf break and continues eastward with increasing depth, to about 2,000 m, where it transitions to the less steeply sloping continental rise. Much of the slope and rise consists of soft sediments, with exceptions at the shelf break, in the canyons, in the Hudson Shelf Valley, and in areas of glacially rafted hard bottom. Pertinent physical characteristics of the sub-regions that

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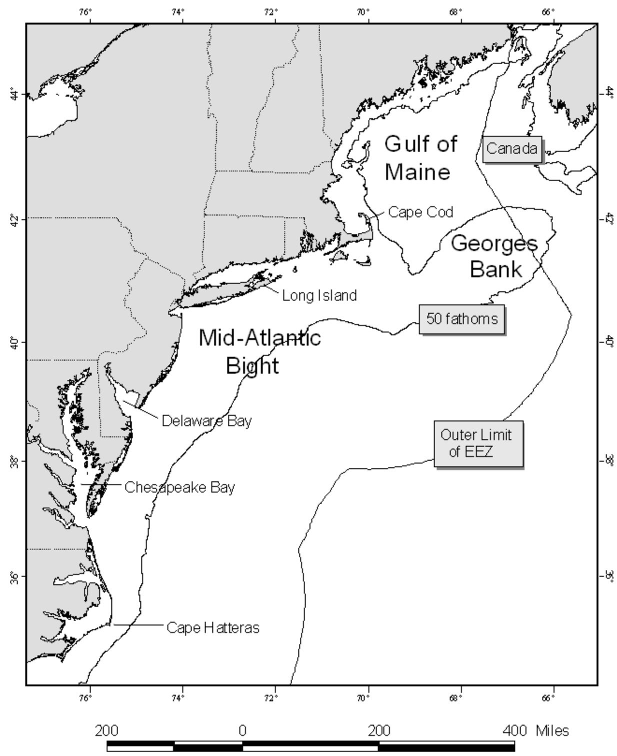
[13] The period of 2011-2015 is the period within the stock assessment that most accurately resembles the current trawl fisheries in the region.

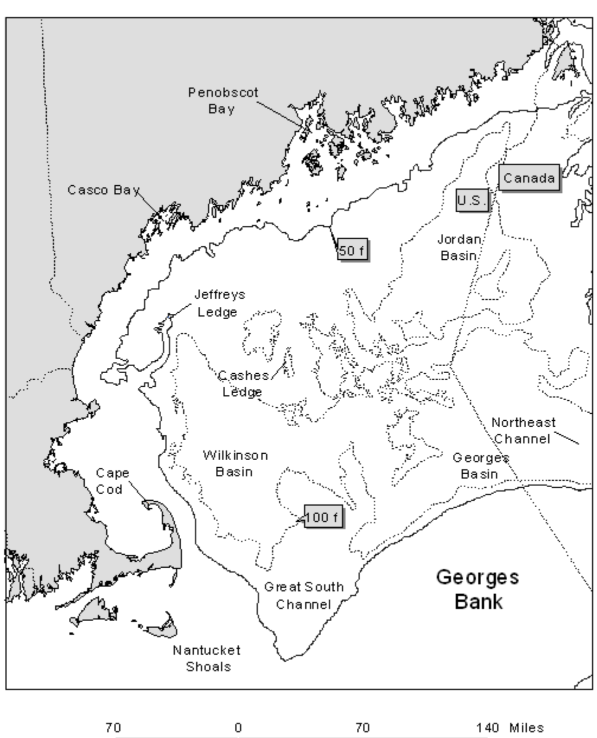
[14] There is no information available on the genetics of these bycaught Atlantic salmon, so it is not known how many of them were part of the GOM DPS. It is likely that some of these salmon, particularly those caught south of Cape Cod, may have originated from the stocking program in the Connecticut River. Those Atlantic salmon caught north of Cape Cod and/or in the Gulf of Maine are more likely to be from the GOM DPS.

could potentially be affected by this action are described in this section. Information is from Stevenson *et al.* (2004).

Map 1. Northeast shelf ecosystem



Map 2. Gulf of Maine



Gulf of Maine

The Gulf of Maine (GOM) is bounded on the east by Browns Bank, on the north by the Nova Scotian (Scotian) Shelf, on the west by the New England states, and on the south by Cape Cod and Georges Bank. The GOM was glacially derived, and is characterized by a system of deep basins, moraines and rocky protrusions with limited access to the open ocean. This geomorphology influences complex oceanographic processes that result in a rich biological community.

The GOM is topographically unlike any other part of the continental border along the U.S. Atlantic coast. The GOM's geologic features, when coupled with the vertical variation in water properties, result in a great diversity of habitat types. It has twenty-one distinct basins separated by ridges, banks, and swells. The three largest basins are Wilkinson, Georges, and Jordan. Depths in the basins exceed 250 m, with a maximum depth of 350 m in Georges Basin, just north of Georges Bank. The Northeast Channel between Georges Bank and Browns Bank leads into Georges Basin, and is one of the primary avenues for exchange of water between the GOM and the North Atlantic Ocean.

High points within the Gulf include irregular ridges, such as Cashes Ledge, which peaks at 9 m below the surface, as well as lower flat-topped banks and gentle swells. Some of these rises are remnants of the sedimentary shelf that was left after most of it was removed by the glaciers. Others are glacial moraines and a few, like Cashes Ledge, are outcroppings of bedrock. Very fine sediment particles created and eroded by the glaciers have collected in thick deposits over much of the GOM, particularly in its deep basins. These mud deposits blanket and obscure the irregularities of the underlying bedrock, forming topographically smooth terrains. Some shallower basins are covered with mud as well, including some in coastal waters. In the rises between the basins, other materials are usually at the surface. Unsorted glacial till covers some morainal areas, as on Sewell Ridge to the north of Georges Basin and on Truxton Swell to the south of Jordan Basin. Sand predominates on some high areas and gravel, sometimes with boulders, predominates on others.

Coastal sediments exhibit a high degree of small-scale variability. Bedrock is the predominant substrate along the western edge of the GOM north of Cape Cod in a narrow band out to a depth of about 60 m. Rocky areas become less common with increasing depth, but some rock outcrops poke through the mud covering the deeper sea floor. Mud is the second most common substrate on the inner continental shelf. Mud predominates in coastal valleys and basins that often abruptly border rocky substrates. Many of these basins extend without interruption into deeper water. Gravel, often mixed with shell, is common adjacent to bedrock outcrops and in fractures in the rock. Large expanses of gravel are not common but do occur near reworked glacial moraines and in areas where the seabed has been scoured by bottom currents. Gravel is most abundant at depths of 20 - 40 m, except in eastern Maine where a gravel-covered plain exists to depths of at least 100 m. Bottom currents are stronger in eastern Maine where the mean tidal range exceeds 5 m. Sandy areas are relatively rare along the inner shelf of the western GOM, but are more common south of Casco Bay, especially offshore of sandy beaches.

Georges Bank

Georges Bank is a shallow (3 - 150 m depth), elongate (161 km wide by 322 km long) extension of the continental shelf that was formed by the Wisconsinian glacial episode. It is characterized by a steep slope on its northern edge and a broad, flat, gently sloping southern flank. The Great South Channel lies to the west. Natural processes continue to erode and rework the sediments on Georges Bank. Erosion and reworking of sediments will likely reduce the amount of sand available to the sand sheets and cause an overall coarsening of the bottom sediments (Valentine & Lough 1991).

Glacial retreat during the late Pleistocene deposited the bottom sediments currently observed on the eastern section of Georges Bank, and the sediments have been continuously reworked and redistributed by the action of rising sea level, and by tidal, storm and other currents. The strong, erosive currents affect the character of the biological community. Bottom topography on eastern Georges Bank is characterized by linear ridges in the western shoal areas; a relatively smooth, gently dipping sea floor on the deeper, easternmost part; a highly energetic peak in the north with sand ridges up to 30 m high and extensive gravel pavement; and steeper and smoother topography incised by submarine canyons on the southeastern margin.

The central region of the Bank is shallow, and the bottom is characterized by shoals and troughs, with sand dunes superimposed upon them. The two most prominent elevations on the ridge and trough area are Cultivator and Georges Shoals. This shoal and trough area is a region of strong currents, with average flood and ebb tidal currents greater than 4 km/h, and as high as 7 km/h. The dunes migrate at variable rates, and the ridges may also move. In an area that lies between the central part and Northeast Peak, Almeida *et al.* (2000) identified high-energy areas as between 35 - 65 m deep, where sand is transported daily by tidal currents, and a low-energy area at depths > 65 m that is affected only by storm currents.

The Great South Channel separates the main part of Georges Bank from Nantucket Shoals. Nantucket Shoals is similar in nature to the central region of the Bank. Currents in these areas are strongest where water depth is shallower than 50 m. This type of traveling dune and swale morphology is also found in the Mid-Atlantic Bight, and further described below. Sediments in this region include gravel pavement and mounds, some scattered boulders, sand with storm generated ripples, and scattered shell and mussel beds. Tidal and storm currents range from moderate to strong, depending upon location and storm activity (Valentine, pers. comm.).

Mid-Atlantic Bight

The Mid-Atlantic Bight includes the shelf and slope waters from Georges Bank south to Cape Hatteras, and east to the Gulf Stream. Like the rest of the continental shelf, the topography of the Mid-Atlantic Bight was shaped largely by sea level fluctuations caused by past ice ages. The shelf's basic morphology and sediments derive from the retreat of the last ice sheet, and the subsequent rise in sea level. Since that time, currents and waves have modified this basic structure.

Shelf and slope waters of the Mid-Atlantic Bight have a slow southwestward flow that is occasionally interrupted by warm core rings or meanders from the Gulf Stream. On average, shelf water moves parallel to bathymetry isobars at speeds of 5 - 10 cm/s at the surface and 2 cm/s or less at the bottom. Storm events can cause much more energetic variations in flow. Tidal currents on the inner shelf have a higher flow rate of 20 cm/s that increases to 100 cm/s near inlets.

The shelf slopes gently from shore out to between 100 and 200 km offshore where it transforms to the slope (100 - 200 m water depth and deeper) at the shelf break. In both the Mid-Atlantic and on Georges Bank, numerous canyons incise the slope, and some cut up onto the shelf itself. The primary morphological features of the shelf include shelf valleys and channels, shoal massifs, scarps, and sand ridges and swales. Most of these structures are relic except for some sand ridges and smaller sand-formed features. Shelf valleys and slope canyons were formed by rivers of glacier outwash that deposited sediments on the outer shelf edge as they entered the ocean. Most valleys cut about 10 m into the shelf, except for the Hudson Shelf Valley that is about 35 m deep. The valleys were partially filled as the glacier melted and retreated across the shelf. The glacier also left behind a lengthy scarp near the shelf break from Chesapeake Bay north to the eastern end of Long Island. Shoal retreat massifs were produced by extensive deposition at a cape or estuary mouth. Massifs were also formed as estuaries retreated across the shelf.

Some sand ridges are more modern in origin than the shelf's glaciated morphology. Their formation is not well understood; however, they appear to develop from the sediments that erode from the shore face. They maintain their shape, so it is assumed that they are in equilibrium with modern current and storm regimes. They are usually grouped, with heights of about 10 m, lengths of 10 - 50 km and spacing of 2 km. Ridges are usually oriented at a slight angle towards shore, running in length from northeast to southwest. The seaward face usually has the steepest slope. Sand ridges are often covered with smaller similar forms such as sand waves, megaripples, and ripples. Swales occur between sand ridges. Since ridges are higher than the adjacent swales, they are exposed to more energy from water currents, and experience more sediment mobility than swales. Ridges tend to contain less fine sand, silt and clay while relatively sheltered swales contain more of the finer particles. Swales have greater benthic macrofaunal density, species richness and biomass, due in part to the increased abundance of detrital food and the physically less rigorous conditions.

Sand waves are usually found in patches of 5 - 10 with heights of about 2 m, lengths of 50 - 100 m and 1 - 2 km between patches. Sand waves are primarily found on the inner shelf, and often observed on sides of sand ridges. They may remain intact over several seasons. Megaripples occur on sand waves or separately on the inner or central shelf. During the winter storm season, they may cover as much as 15% of the inner shelf. They tend to form in large patches and usually have lengths of 3 - 5 m with heights of 0.5 - 1 m. Megaripples tend to survive for less than a season. They can form during a storm and reshape the upper 50 - 100 cm of the sediments within a few hours. Ripples are also found everywhere on the shelf, and appear or disappear within hours or days, depending upon storms and currents. Ripples usually have lengths of about 1 - 150 cm and heights of a few centimeters.

Sediments are uniformly distributed over the shelf in this region. A sheet of sand and gravel varying in thickness from 0 - 10 m covers most of the shelf. The mean bottom flow from the constant southwesterly current is not fast enough to move sand, so sediment transport must be episodic. Net sediment movement is in the same southwesterly direction as the current. The sands are mostly medium to coarse grains, with finer sand in the Hudson Shelf Valley and on the outer shelf. Mud is rare over most of the shelf but is common in the Hudson Shelf Valley. Occasionally relic estuarine mud deposits are re-exposed in the swales between sand ridges. Fine sediment content increases rapidly at the shelf break, which is sometimes called the “mud line,” and sediments are 70 - 100% fines on the slope. On the slope, silty sand, silt, and clay predominate.

The northern portion of the Mid-Atlantic Bight is sometimes referred to as southern New England. Most of this area was discussed under Georges Bank; however, one other formation of this region deserves note. The mud patch is located just southwest of Nantucket Shoals and southeast of Long Island and Rhode Island. Tidal currents in this area slow significantly, which allows silts and clays to settle out. The mud is mixed with sand and is occasionally resuspended by large storms. This habitat is an anomaly of the outer continental shelf.

Artificial reefs are another significant Mid-Atlantic habitat, formed much more recently on the geologic time scale than other regional habitat types. These localized areas of hard structure have been formed by shipwrecks, lost cargoes, disposed solid materials, shoreline jetties and groins, submerged pipelines, cables, and other materials (Steimle & Zetlin 2000). While some of materials have been deposited specifically for use as fish habitat, most have an alternative primary purpose; however, they have all become an integral part of the coastal and shelf ecosystem. It is expected that the increase in these materials has had an impact on living marine resources and fisheries, but these effects are not well known. In general, reefs are important for attachment sites, shelter, and food for many species, and fish predators such as tunas may be attracted by prey aggregations or may be behaviorally attracted to the reef structure.

1.5.2 Essential Fish Habitat

The New England and Mid-Atlantic Councils designate essential fish habitat (EFH) for managed species distributed throughout the range of the skate fishery, which is primarily prosecuted north and east of Cape Cod, on Georges Bank, and in Southern New England. Skate fishing grounds generally correspond to the distribution of little and winter skate. Species and life stages that occur in benthic habitats at depths prosecuted by the fishery (Table 11) could be impacted by prosecution of the fishery with bottom trawls and bottom gillnets. The NEFMC EFH designations, including those for skates, were updated via

Omnibus Essential Fish Habitat Amendment 2 (OHA2), implemented in April 2018. In addition to revised EFH designations, OHA2 also included area-based gear restrictions to minimize the impacts of fishing on fish habitats. These measures were designed and implemented on a regional basis and include restrictions on scallop dredges and other types of fishing gears. Information about the amendment is available here: http://www.nefmc.org/library/omnibus-habitat-amendment-2. The approved EFH designations are summarized in a document at: https://www.nefmc.org/library/essential-fish-habitat-efh-information; this page also includes a link to the NOAA EFH mapper which is an interactive viewer for EFH maps.

EFH impacts are related to the amount and location of fishing effort, and the gear type used. A more detailed discussion of habitat types, as well as biological and physical effects of fishing by various gears in the skate fishery is in the 2008 SAFE Report and Skate Amendment 3 (NEFMC 2009, Section 7.4.6). This provides a discussion of the biological and physical effects various gear types may have on EFH. An updated analysis of the effects of all gears used in fisheries managed by the NEFMC on marine habitats in the NE region is included in the NEFMC Omnibus EFH Amendment 2 (Appendix D, Swept Area Seabed Impact Model). This model was updated in 2019 and is now referred to as the Fishing Effects Model (NEFMC 2019a). The gear effects assessment is very similar to the prior work, and Fishing Effects includes updated spatial depictions of habitat disturbance by gear type, through December 2017. The Council's habitat management areas can be viewed on the Northeast Ocean Data Portal, https://www.northeastoceandata.org/, under 'Commercial Fishing', 'Management Areas', and Fishing Effects model outputs can be viewed under 'Habitat', 'Fishing Effects'.

Table 11. Summary of essential fish habitat designations for benthic resources overlapping the skate fishery, as of May 2021. Includes species managed by NEFMC and MAFMC.

Species	Life Stage	Geographic Area	Depth (meters)	Habitat Type and Description
Acadian redfish	Juveniles	Gulf of Maine and the continental slope north of 37°38'N	50-200 in Gulf of Maine, to 600 on slope	Sub-tidal coastal and offshore rocky reef substrates with associated structure-forming epifauna (e.g., sponges, corals), and soft sediments with cerianthid anemones
	Adults	Gulf of Maine and the continental slope north of 37°38'N	140-300 in Gulf of Maine, to 600 on slope	Offshore benthic habitats on finer grained sediments and on variable deposits of gravel, silt, clay, and boulders
American plaice	Juveniles	Gulf of Maine and bays and estuaries from Passamaquoddy Bay to Saco Bay, Maine and from Massachusetts Bay to Cape Cod Bay, Massachusetts Bay	40-180	Sub-tidal benthic habitats on mud and sand, also found on gravel and sandy substrates bordering bedrock
	Adults	Gulf of Maine, Georges Bank and bays and estuaries from Passamaquoddy Bay to Saco Bay, Maine and from Massachusetts Bay to Cape Cod Bay, Massachusetts Bay	40-300	Sub-tidal benthic habitats on mud and sand, also gravel and sandy substrates bordering bedrock
Atlantic cod	Juveniles	Gulf of Maine, Georges Bank, and Southern New England, including nearshore waters from eastern Maine to Rhode Island and the following estuaries: Passamaquoddy Bay to Saco Bay; Massachusetts Bay, Boston Harbor, Cape Cod Bay, and Buzzards Bay	Mean high water-120	Structurally-complex intertidal and sub-tidal habitats, including eelgrass, mixed sand and gravel, and rocky habitats (gravel pavements, cobble, and boulder) with and without attached macroalgae and emergent epifauna
	Adults	Gulf of Maine, Georges Bank, Southern New England, and the Mid-Atlantic to	30-160	Structurally complex sub-tidal hard bottom habitats with gravel,

Species	Life Stage	Geographic Area	Depth (meters)	Habitat Type and Description
		Delaware Bay, including the following estuaries: Passamaquoddy Bay to Saco Bay; Massachusetts Bay, Boston Harbor, Cape Cod Bay, and Buzzards Bay		cobble, and boulder substrates with and without emergent epifauna and macroalgae, also sandy substrates and along deeper slopes of ledges
Atlantic halibut	Juveniles & Adults	Gulf of Maine, Georges Bank, and continental slope south of Georges Bank	60-140 and 400-700 on slope	Benthic habitats on sand, gravel, or clay substrates
Atlantic wolffish	Eggs	U.S. waters north of 41˚N latitude and east of 71˚W longitude	<100	Sub-tidal benthic habitats under rocks and boulders in nests
	Juveniles	U.S. waters north of 41˚N latitude and east of 71˚W longitude	70-184	Sub-tidal benthic habitats
	Adults	U.S. waters north of 41˚N latitude and east of 71˚W longitude	<173	A wide variety of sub-tidal sand and gravel substrates once they leave rocky spawning habitats, but not on muddy bottom
Haddock	Juveniles	Inshore and offshore waters in the Gulf of Maine, on Georges Bank, and on the continental shelf in the Mid-Atlantic region	40-140 and as shallow as 20 in coastal Gulf of Maine	Sub-tidal benthic habitats on hard sand (particularly smooth patches between rocks), mixed sand and shell, gravelly sand, and gravel
	Adults	Offshore waters in the Gulf of Maine, on Georges Bank, and on the continental shelf in Southern New England	50-160	Sub-tidal benthic habitats on hard sand (particularly smooth patches between rocks), mixed sand and shell, gravelly sand, and gravel and adjacent to boulders and cobbles along the margins of rocky reefs
Ocean pout	Eggs	Georges Bank, Gulf of Maine, and the Mid-Atlantic, including certain bays and estuaries in the Gulf of Maine	<100	Sub-tidal hard bottom habitats in sheltered nests, holes, or rocky crevices
	Juveniles	Gulf of Maine, on the continental shelf north of Cape May, New Jersey, on the southern portion of Georges Bank, and including certain bays and estuaries in the Gulf of Maine	Mean high water-120	Intertidal and sub-tidal benthic habitats on a wide variety of substrates, including shells, rocks, algae, soft sediments, sand, and gravel
	Adults	Gulf of Maine, Georges Bank, on the continental shelf north of Cape May, New Jersey, and including certain bays and estuaries in the Gulf of Maine	20-140	Sub-tidal benthic habitats on mud and sand, particularly in association with structure forming habitat types; i.e. shells, gravel, or boulders
Pollock	Juveniles	Inshore and offshore waters in the Gulf of Maine (including bays and estuaries in the Gulf of Maine), the Great South Channel, Long Island Sound, and Narragansett Bay, Rhode Island	Mean high water-180 in Gulf of Maine, Long Island Sound, and Narragansett Bay; 40-180 on Georges Bank	Intertidal and sub-tidal pelagic and benthic rocky bottom habitats with attached macroalgae, small juveniles in eelgrass beds, older juveniles move into deeper water habitats also occupied by adults
	Adults	Offshore Gulf of Maine waters, Massachusetts Bay and Cape Cod Bay, on the southern edge of Georges Bank, and in Long Island Sound	80-300 in Gulf of Maine and on Georges Bank; <80 in Long Island Sound, Cape Cod Bay, and	Pelagic and benthic habitats on the tops and edges of offshore banks and shoals with mixed rocky substrates, often with attached macro algae

Species	Life Stage	Geographic Area	Depth (meters)	Habitat Type and Description
			Narragansett Bay	
White hake	Juveniles	Gulf of Maine, Georges Bank, and Southern New England, including bays and estuaries in the Gulf of Maine	Mean high water - 300	Intertidal and sub-tidal estuarine and marine habitats on fine-grained, sandy substrates in eelgrass, macroalgae, and un-vegetated habitats
	Adults	Gulf of Maine, including coastal bays and estuaries, and the outer continental shelf and slope	100-400 offshore Gulf of Maine, >25 inshore Gulf of Maine, to 900 on slope	Sub-tidal benthic habitats on fine-grained, muddy substrates and in mixed soft and rocky habitats
Windowpane flounder	Juveniles	Estuarine, coastal, and continental shelf waters from the Gulf of Maine to northern Florida, including bays and estuaries from Maine to Maryland	Mean high water - 60	Intertidal and sub-tidal benthic habitats on mud and sand substrates
	Adults	Estuarine, coastal, and continental shelf waters from the Gulf of Maine to Cape Hatteras, North Carolina, including bays and estuaries from Maine to Maryland	Mean high water - 70	Intertidal and sub-tidal benthic habitats on mud and sand substrates
Winter flounder	Eggs	Eastern Maine to Absecon Inlet, New Jersey (39° 22´N) and Georges Bank	0-5 south of Cape Cod, 0-70 Gulf of Maine and Georges Bank	Sub-tidal estuarine and coastal benthic habitats on mud, muddy sand, sand, gravel, submerged aquatic vegetation, and macroalgae
	Juveniles	Coastal Gulf of Maine, Georges Bank, and continental shelf in Southern New England and Mid-Atlantic to Absecon Inlet, New Jersey, including bays and estuaries from eastern Maine to northern New Jersey	Mean high water - 60	Intertidal and sub-tidal benthic habitats on a variety of bottom types, such as mud, sand, rocky substrates with attached macro algae, tidal wetlands, and eelgrass; young-of-the-year juveniles on muddy and sandy sediments in and adjacent to eelgrass and macroalgae, in bottom debris, and in marsh creeks
	Adults	Coastal Gulf of Maine, Georges Bank, and continental shelf in Southern New England and Mid-Atlantic to Absecon Inlet, New Jersey, including bays and estuaries from eastern Maine to northern New Jersey	Mean high water - 70	Intertidal and sub-tidal benthic habitats on muddy and sandy substrates, and on hard bottom on offshore banks; for spawning adults, see eggs
Witch flounder	Juveniles	Gulf of Maine and outer continental shelf and slope	50-400 and to 1500 on slope	Sub-tidal benthic habitats with mud and muddy sand substrates
	Adults	Gulf of Maine and outer continental shelf and slope	35-400 and to 1500 on slope	Sub-tidal benthic habitats with mud and muddy sand substrates
Yellowtail flounder	Juveniles	Gulf of Maine, Georges Bank, and the Mid-Atlantic, including certain bays and estuaries in the Gulf of Maine	20-80	Sub-tidal benthic habitats on sand and muddy sand
	Adults	Gulf of Maine, Georges Bank, and the Mid-Atlantic, including certain bays and estuaries in the Gulf of Maine	25-90	Sub-tidal benthic habitats on sand and sand with mud, shell hash, gravel, and rocks

Species	Life Stage	Geographic Area	Depth (meters)	Habitat Type and Description
Silver hake	Juveniles	Gulf of Maine, including certain bays and estuaries, and on the continental shelf as far south as Cape May, New Jersey	40-400 in Gulf of Maine, >10 in Mid-Atlantic	Pelagic and sandy sub-tidal benthic habitats in association with sand-waves, flat sand with amphipod tubes, shells, and in biogenic depressions
	Adults	Gulf of Maine, including certain bays and estuaries, the southern portion of Georges Bank, and the outer continental shelf and some shallower coastal locations in the Mid-Atlantic	>35 in Gulf of Maine, 70-400 on Georges Bank and in the Mid-Atlantic	Pelagic and sandy sub-tidal benthic habitats, often in bottom depressions or in association with sand waves and shell fragments, also in mud habitats bordering deep boulder reefs, on over deep boulder reefs in the southwest Gulf of Maine
Red hake	Juveniles	Gulf of Maine, Georges Bank, and the Mid-Atlantic, including Passamaquoddy Bay to Cape Cod Bay in the Gulf of Maine, Buzzards Bay and Narragansett Bay, Long Island Sound, Raritan Bay and the Hudson River, and lower Chesapeake Bay	Mean high water-80	Intertidal and sub-tidal soft bottom habitats, especially those that that provide shelter, such as depressions in muddy substrates, eelgrass, macroalgae, shells, anemone and polychaete tubes, on artificial reefs, and in live bivalves (e.g., scallops)
	Adults	In the Gulf of Maine, the Great South Channel, and on the outer continental shelf and slope from Georges Bank to North Carolina, including inshore bays and estuaries as far south as Chesapeake Bay	50-750 on shelf and slope, as shallow as 20 inshore	Sub-tidal benthic habitats in shell beds, on soft sediments (usually in depressions), also found on gravel and hard bottom and artificial reefs
Monkfish	Juveniles	Gulf of Maine, outer continental shelf in the Mid-Atlantic, and the continental slope	50-400 in the Mid-Atlantic, 20-400 in the Gulf of Maine, and to 1000 on the slope	Sub-tidal benthic habitats on a variety of habitats, including hard sand, pebbles, gravel, broken shells, and soft mud, also seek shelter among rocks with attached algae
	Adults	Gulf of Maine, outer continental shelf in the Mid-Atlantic, and the continental slope	50-400 in the Mid-Atlantic, 20-400 in the Gulf of Maine, and to 1000 on the slope	Sub-tidal benthic habitats on hard sand, pebbles, gravel, broken shells, and soft mud, but seem to prefer soft sediments, and, like juveniles, utilize the edges of rocky areas for feeding
Smooth skate	Juveniles	Offshore Gulf of Maine, some coastal bays in Maine and New Hampshire, and on the continental slope from Georges Bank to North Carolina	100-400 offshore Gulf of Maine, <100 inshore Gulf of Maine, to 900 on slope	Benthic habitats, mostly on soft mud in deeper areas, but also on sand, broken shells, gravel, and pebbles on offshore banks in the Gulf of Maine
	Adults	Offshore Gulf of Maine and the continental slope from Georges Bank to North Carolina	100-400 offshore Gulf of Maine, to 900 on slope	Benthic habitats, mostly on soft mud in deeper areas, but also on sand, broken shells, gravel, and pebbles on offshore banks in the Gulf of Maine
Thorny skate	Juveniles	Offshore Gulf of Maine, some coastal bays in the Gulf of Maine, and on the continental slope from Georges Bank to North Carolina	35-400 offshore Gulf of Maine, <35 inshore Gulf of Maine, to 900 on the slope	Benthic habitats on a wide variety of bottom types, including sand, gravel, broken shells, pebbles, and soft mud

Species	Life Stage	Geographic Area	Depth (meters)	Habitat Type and Description
	Adults	Offshore Gulf of Maine and on the continental slope from Georges Bank to North Carolina	35-400 offshore Gulf of Maine, <35 inshore Gulf of Maine, to 900 on the slope	Benthic habitats on a wide variety of bottom types, including sand, gravel, broken shells, pebbles, and soft mud
Little skate	Juveniles	Coastal waters in the Gulf of Maine, Georges Bank, and the continental shelf in the Mid-Atlantic region as far south as Delaware Bay, including certain bays and estuaries in the Gulf of Maine	Mean high water-80	Intertidal and sub-tidal benthic habitats on sand and gravel, also found on mud
	Adults	Coastal waters in the Gulf of Maine, Georges Bank, and the continental shelf in the Mid-Atlantic region as far south as Delaware Bay, including certain bays and estuaries in the Gulf of Maine	Mean high water-100	Intertidal and sub-tidal benthic habitats on sand and gravel, also found on mud
Winter skate	Juveniles	Coastal waters from eastern Maine to Delaware Bay, including certain bays and estuaries from eastern Maine to Chincoteague Bay, Virginia, and on Georges Bank and the continental shelf in Southern New England and the Mid-Atlantic	0-90	Sub-tidal benthic habitats on sand and gravel substrates, are also found on mud
	Adults	Coastal waters from eastern Maine to Delaware Bay, including certain bays and estuaries in Maine and New Hampshire, and on Georges Bank and the continental shelf in Southern New England and the Mid-Atlantic	0-80	Sub-tidal benthic habitats on sand and gravel substrates, are also found on mud
Barndoor skate	Juveniles and adults	Primarily on Georges Bank and in Southern New England and on the continental slope	40-400 on shelf and to 750 on slope	Sub-tidal benthic habitats on mud, sand, and gravel substrates
Clearnose skate	Juveniles	Inner continental shelf from New Jersey to the St. Johns River in Florida and certain bays and certain estuaries including Raritan Bay, inland New Jersey bays, Chesapeake Bay, and Delaware Bays	0-30	Sub-tidal benthic habitats on mud and sand, but also on gravelly and rocky bottom
	Adults	Inner continental shelf from New Jersey to the St. Johns River in Florida and certain bays and certain estuaries including Raritan Bay, inland New Jersey bays, Chesapeake Bay, and Delaware Bays	0-40	Sub-tidal benthic habitats on mud and sand, but also on gravelly and rocky bottom
Rosette skate	Juveniles and adults	Outer continental shelf from approximately 40˚N to Cape Hatteras, North Carolina	80-400	Benthic habitats with mud and sand substrates
Atlantic herring	Eggs	Coastal Gulf of Maine, Georges Bank, and Southern New England	5-90	Sub-tidal benthic habitats on coarse sand, pebbles, cobbles, and boulders and/or macroalgae
Atlantic sea scallop	Eggs	Gulf of Maine coastal waters and offshore banks, Georges Bank, and the Mid-Atlantic, including the following estuaries: Passamaquoddy Bay to	18-110	Inshore and offshore benthic habitats (see adults)

Species	Life Stage	Geographic Area	Depth (meters)	Habitat Type and Description
		Sheepscot River; Casco Bay, Massachusetts Bay, and Cape Cod Bay		
	Larvae	Gulf of Maine coastal waters and offshore banks, Georges Bank, and the Mid-Atlantic, including the following estuaries: Passamaquoddy Bay to Sheepscot River; Casco Bay, Massachusetts Bay, and Cape Cod Bay	No information	Inshore and offshore pelagic and benthic habitats: pelagic larvae ("spat"), settle on variety of hard surfaces, including shells, pebbles, and gravel and to macroalgae and other benthic organisms such as hydroids
	Juveniles	Gulf of Maine coastal waters and offshore banks, Georges Bank, and the Mid-Atlantic, including the following estuaries: Passamaquoddy Bay to Sheepscot River; Casco Bay, Great Bay, Massachusetts Bay, and Cape Cod Bay	18-110	Benthic habitats initially attached to shells, gravel, and small rocks (pebble, cobble), later free-swimming juveniles found in same habitats as adults
	Adults	Gulf of Maine coastal waters and offshore banks, Georges Bank, and the Mid-Atlantic, including the following estuaries: Passamaquoddy Bay to Sheepscot River; Casco Bay, Great Bay, Massachusetts Bay, and Cape Cod Bay	18-110	Benthic habitats with sand and gravel substrates
Summer flounder	Juveniles	Continental shelf and estuaries from Cape Cod, Massachusetts, to Cape Canaveral, Florida	To maximum 152	Benthic habitats, including inshore estuaries, salt marsh creeks, seagrass beds, mudflats, and open bay areas
	Adults	Continental shelf from Cape Cod, Massachusetts, to Cape Canaveral, Florida, including shallow coastal and estuarine waters during warmer months	To maximum 152 in colder months	Benthic habitats
Scup	Juveniles	Continental shelf between southwestern Gulf of Maine and Cape Hatteras, North Carolina and in nearshore and estuarine waters between Massachusetts and Virginia	No information	Benthic habitats, in association with inshore sand and mud substrates, mussel and eelgrass beds
	Adults	Continental shelf and nearshore and estuarine waters between southwestern Gulf of Maine and Cape Hatteras, North Carolina	No information, generally overwinter offshore	Benthic habitats
Black sea bass	Juveniles and adults	Continental shelf and estuarine waters from the southwestern Gulf of Maine and Cape Hatteras, North Carolina	Inshore in summer and spring	Benthic habitats with rough bottom, shellfish and eelgrass beds, man-made structures in sandy-shelly areas, also offshore clam beds and shell patches in winter
Longfin inshore squid	Eggs	Inshore and offshore waters from Georges Bank southward to Cape Hatteras	Generally <50	Bottom habitats attached to variety of hard bottom types, macroalgae, sand, and mud
Spiny dogfish	Juveniles	Primarily the outer continental shelf and slope between Cape Hatteras and Georges Bank and in the Gulf of Maine	Deep water	Pelagic and epibenthic habitats
	Female sub-adults	Throughout the region	Wide depth range	Pelagic and epibenthic habitats

Species	Life Stage	Geographic Area	Depth (meters)	Habitat Type and Description
	Male sub-adults	Primarily in the Gulf of Maine and on the outer continental shelf from Georges Bank to Cape Hatteras	Wide depth range	Pelagic and epibenthic habitats
	Female adults	Throughout the region	Wide depth range	Pelagic and epibenthic habitats
	Male adults	Throughout the region	Wide depth range	Pelagic and epibenthic habitats
Atlantic surfclam	Juveniles and adults	Continental shelf from southwestern Gulf of Maine to Cape Hatteras, North Carolina	Surf zone to about 61, abundance low >38	In substrate to depth of 3 ft
Ocean quahog	Juveniles and adults	Continental shelf from southern New England and Georges Bank to Virginia	9-244	In substrate to depth of 3 ft

1.6 Human Communities

1.6.1 Commercial Skate Fishery

Skates are harvested in two very different fisheries, one for bait and one for human consumption. As bait, skates are used primarily for the American lobster (*Homarus americanus*) fishery, which prefers small, whole skates. The skate bait fishery is more historic and directed relative to the fishery for human consumption, which harvests skates for their wings. Since 2003, with the implementation of the original Skate FMP, if fishing for skate wings with the intent to land over the 500 lb incidental limit, the vessel must also have a Federal limited access permit for either the Northeast (NE) multispecies, monkfish or scallop fishery, and must declare into and use a day-at-sea (DAS) of one of those fisheries.

Bait fishery: Vessels involved in the bait fishery are primarily from Southern New England ports and target little skates (>90%) and, to a much lesser extent, juvenile winter skates (<10%). Juvenile winter skates and little skates are difficult to differentiate due to their nearly identical appearance. Bait skate is primarily landed by trawlers (Table 8), often as a secondary species while targeting monkfish or groundfish.

The bait fishery, based on FY 2010-2018 averages, is largely based out of Rhode Island (primarily Pt. Judith, also Newport, Tiverton, and Block Island) with other ports in Massachusetts (Fall River, New Bedford, Bourne, and Provincetown), Connecticut (New London, Stonington), New York (Long Island), and New Jersey (Belford, Sea Isle City) also active in the directed bait fishery. The directed skate fishery by Rhode Island vessels occurs primarily in Federal waters less than 40 fathoms from the Rhode Island/Connecticut/New York state waters boundary east to the waters south of Martha’s Vineyard and Nantucket out to about 69°W. The most landings are caught south of Block Island in Federal waters. Effort on skates increases in state waters seasonally to supply increased market demand from the lobster fishery in the spring through fall. Skates caught for lobster bait are landed whole by otter trawlers and either sold 1) fresh, 2) fresh salted, or 3) salted and strung or bagged for bait by the barrel. Inshore lobster boats usually use 2 – 3 skates per string, while offshore boats may use 3 – 5 per string. Offshore boats may actually “double bait” the pots during the winter months when anticipated weather conditions would prevent the gear from being regularly tended. The presence of sand fleas and parasites, water temperature, and anticipated soak time between trips determine the amount of bait per pot. Within the directed monkfish gillnet fishery, there is also a seasonal gillnet incidental skate fishery, in which mostly winter skates are sold for lobster bait and as cut wings for processing.

Fishermen have indicated that the market for skates as lobster bait has been relatively consistent. Size is a factor that drives the dockside price for bait skates. For the lobster bait market, a "dinner plate" is the preferable size to be strung and placed inside lobster pots. Little skate is usually caught incidentally year-round in gillnets, as well, and sold for bait. Several gillnetters indicated that they keep the bodies of the winter skates cut for wings and salt them for bait. Little and winter skates are rarely sorted prior to landing, as fishermen acknowledge that species identification between little skates and small winter skates is very difficult. Quality and cleanliness of the skate also determine the price paid by the dealer, rather than just supply and demand. The quantity of skates landed in a day has little effect on price, because there has been ready supply of skates available for bait from the major dealers, and the demand for lobster bait has been relatively consistent. Numerous draggers and lobster vessels have historically worked out seasonal cooperative business arrangements with a stable pricing agreement for skates.

Lobster bait usage varies regionally and from port to port, based upon preference and availability (Section 1.6.1.7). Some lobstermen in the northern area (north of Cape Cod) prefer herring, mackerel, menhaden, and hakes (whiting and red hake) for bait, which hold up in colder water temperatures; however, the larger offshore lobster vessels still indicate a preference for skates and Acadian redfish in their pots. Some offshore boats have indicated they will use soft bait during the summer months when their soak time is shorter. The Gulf of Maine vessels use skates caught by vessels fishing in the southern New England area.

Wing fishery: The other primary market for skates in the region is the wing market, caught mostly in gillnets (Table 13). Larger skates, mostly captured by trawl gear, have their pectoral flaps, or wings, cut off and sold into this market. The fishery for skate wings evolved in the 1990s as skates were promoted as "underutilized species," and fishermen shifted effort from groundfish and other troubled fisheries to skates and dogfish. Attempts to develop domestic markets were short-lived, and the bulk of the skate wing market remains overseas. Winter, thorny, and barndoor skates are large enough for processing of wings, but due to their overfished status, possession and landing of thorny skates has been prohibited since 2003. Following a rebuilt determination, limited landings of barndoor skate was allowed following FW5 (NEFMC 2018). Winter skate remains the dominant component of the wing fishery, but illegal thorny wings still occasionally occur in landings. The assumed effectiveness of prohibition regulations is thought to be 98% based on recent work that examined port sampling data (90 day finding for thorny skate). That means 98% or more of the skates being landed for the wing market are winter skates, so regulations for the wing fishery primarily have an impact on that species.

The wing fishery is a more incidental fishery than bait and involves a larger number of vessels located throughout the region. Vessels tend to catch skates when targeting other species like groundfish, monkfish, and scallops and land them if the price is high enough. For example, the southern New England sink gillnet fishery targets winter skates seasonally along with monkfish. Highest catch rates are in the early spring and late fall when the boats are targeting monkfish, at about a 5:1 average ratio of numbers of skates to monkfish. Gillnetters have become more dependent upon incidental skate catch due to cutbacks in their fishery mandated by both the Monkfish and Multispecies FMPs. Gillnet vessels use 12-inch mesh when fishing for monkfish and catch larger skates. Southern New England fishermen have reported increased catches of barndoor skates in the last few years.

Skate Wing Fishery Processing, Markets: In 2004, dealers started reporting landings by disposition (wing and bait) and the data on landings by disposition have been improving. Landed skate wings are seldom identified by species by dealers. Skate processors buy whole, hand-cut, and/or onboard machine-cut skates from vessels primarily out of Massachusetts and Rhode Island. Because of the need to cut the wings, it is relatively labor-intensive to fish for skates. Participation in the skate wing fishery, however, has recently grown due to increasing restrictions on other, more profitable groundfish species. It is assumed that more vessels land skate wings as an incidental catch in mixed fisheries than as a targeted species.

New Bedford emerged early-on as the leader in production, both in landed and processed skate wings, although skate wings are landed in ports throughout the Gulf of Maine and extending down into the Mid-Atlantic. Today, Chatham is one of the major ports for skate wings and food skate. Skate wings are also landed significantly in Point Judith and New Bedford. Vessels landing skate wings in ports like Portland, ME; Portsmouth, NH; and Gloucester, MA are likely to land them incidentally while fishing for species like groundfish and monkfish.

The current market for skate wings remains primarily an export market. France, Korea, and Greece are the leading importers. There is a limited domestic demand for processed skate wings from the white tablecloth restaurant business. Winter skates landed by gillnet vessels are reported to go almost exclusively to the wing market. Fishermen indicate that dealers prefer large-sized winter skates for the wing market (over three pounds live weight). Bodies from skates landed for the wing fishery are used as bait in the lobster and Jonah crab fisheries.

1.6.1.1 Permits and Vessels

There is only one type of Federal skate permit category (endorsement), an open-access permit. Anyone with a valid Federal fishing permit can obtain a Federal skate permit. Doing so enables participation in the Federal skate fishery and allows landing wing or bait. To land the higher bait possession limit, a Letter of Authorization is also needed. Vessels with a Federal skate permit may commercially fish for, possess, and land skate caught in Federal waters.

If a vessel has a Federal fishing permit but does not have a Federal skate permit (endorsement), it must fish for skate in state waters under state regulations. If the landings are sold to a Federal dealer (or transferred to another vessel at sea under a bait LOA), they are Federal landings and contribute to the Federal quota monitoring.

Summary points

From FY 2003 to 2019 (data from the last few years may be subject to future corrections), permit activity for skate landings had the following trends:

- Each year, 73-99% of the active vessels have landed only non-bait (wing), 0-4% have landed only bait, and 1-22% have landed non-bait and bait (Table 12).
- The number of vessels landing bait-only or non-bait and bait has generally increased over time, while the non-bait-only vessels have decreased (Table 12, Figure 6).
- The percent of vessels that took at least one trip over the incidental limit has been 50-65% annually (Table 12).
- The number of trawl vessels landing skate wings is greater than that of gillnets each fishing year for FY2003-2019 for all wing vessels; for vessels landing skate wings over the incidental limit at least once throughout the fishing year, the number of gillnet vessels is generally greater than trawl vessels each fishing year since FY 2010 when skate wing possession limits decreased from 10,000 lb/<24 hr and 20,000 lb/>24 hr to 5,000 lb/trip (Table 13).
- The number of Federal skate permits active each year has declined since FY 2011 (567) to 357 in FY 2019 (Table 9).
- The number of Federal fishing permits with a Federal skate permit (endorsement) peaked in FY 2007 (2,686) and has declined by up to 3% annually ever since (2,028 in FY 2019; Table 10).
- Each year since FY 2008, the number of Federal skate permits exiting the fishery for the last time has been more than the number of new Federal skate permits issued (Table 10).
- The number of new active Federal permits landing skate has generally been <10 annually since FY 2012, mostly landing non-bait (Table 11).
- FY 2016 and 2017, the years in which incidental limits were triggered, were not particularly unusual in terms of permit activity (Tables 9, 10, 11, Figure 6, Figure 7, Figure 8).

Permit activity by all vessels landing skate

Since 2003, 50% to 65% of the vessels landing skate landed over 1,135 lb whole weight at least once (Table 12, last column). Of these vessels, most landed only non-bait (62-98%; Figure 3). Bait-only vessels and the vessels landing both bait and non-bait comprise a smaller proportion, 0-6% for bait-only and 2-33% for bait and non-bait landings (Figure 3). The number of vessels landing above 500 lb for non-bait (1,135 lb whole weight) and 1,135 lb for bait (whole weight) fluctuates from FY 2003 to 2011, and mostly declines from FY 2011 to 2019. In the latter years in the time series, the proportion of vessels landing above these limits also shifts to higher percentages of bait-only and vessels landing both non-bait and non-bait.

The number of federal fishing permits issued for fishing years 2003 through 2019 is shown in Table 7 (column 2), and increased until FY 2007, after which a steady decline continued to FY 2019. The percent of vessels with federal fishing permits that actively landed some skate was 30% in FY 2003 (column 3), immediately declined to 22% in FY 2004, and held steady around 20% until FY 2017. Fishing years 2018 and 2019 show a slight decline in active skate vessels to 17% and 16% respectively; the actual numbers of active skate vessels are shown in column 4 (357 in FY 2019). The percentages shown in the remainder of Table 7 are calculated as follows, using FY 2019 as an example: for the non-bait section (columns 5-8), the total number of vessels 262 is dividend by 357 to yield 73%, then the vessels landing one or more trips with over 1135 whole weight pounds of skate, 123, is divided by 262 and yields 47%. The other two sections, bait vessels and non-bait-plus-bait vessels, calculate percentages in similar fashion. There is a noticeable jump in the number of vessels landing both non-bait and bait in the last three fishing years.

Table 12. Federal fishing permits with and without Federal skate permit (endorsements) and relative skate fishery participation, FY 2003-2019.

Fishing Year	Federal Permits with or without a Federal Skate Endorsement		All Active Federal Fishing Permits Landing Skate with or without a Federal Skate Endorsement																
			Total Active	Non-bait (Wing) Vessels				Bait Vessels				Non-bait and Bait Vessels						% Vessels that took one trip > 1,135 whole weight
	Total	% Active		Total		Landings > 1,135 lb whole weight at least once		Total		Landings > 1,135 lb whole weight at least once		Total		Landings > 1,135 lb whole weight on a mixed trip at least once		All other vessels landing > 1,135 lb whole weight at least once		
2003	2,082	30%	709	705	99%	352	50%	0	0%	0	0%	4	1%	≤3	~75%	≤3	~75%	50%
2004	2,443	22%	575	547	95%	280	51%	7	1%	4	57%	21	4%	11	52%	6	29%	52%
2005	2,686	20%	585	564	96%	293	52%	--	--	--	--	21	4%	11	58%	4	19%	53%
2006	2,727	20%	595	563	95%	280	50%	4	1%	≤3	~75%	28	5%	17	61%	10	36%	52%
2007	2,738	20%	586	552	94%	307	56%	10	2%	6	60%	24	4%	17	71%	7	29%	58%
2008	2,673	19%	549	501	91%	295	59%	12	2%	8	67%	36	7%	21	58%	12	33%	61%
2009	2,632	20%	572	533	93%	335	63%	4	1%	≤3	~75%	35	6%	24	69%	9	26%	65%
2010	2,557	20%	550	488	89%	234	48%	18	3%	12	67%	44	8%	20	45%	15	34%	51%
2011	2,390	22%	567	521	92%	295	57%	10	2%	7	70%	36	6%	22	61%	7	19%	58%
2012	2,322	21%	527	489	93%	265	54%	11	2%	8	73%	27	5%	18	67%	5	19%	56%
2013	2,246	19%	455	404	89%	232	57%	14	3%	12	86%	37	8%	21	57%	12	32%	61%
2014	2,187	19%	452	411	91%	248	60%	17	4%	16	94%	24	5%	15	63%	7	29%	63%
2015	2,131	19%	440	400	91%	246	62%	15	3%	14	93%	25	6%	16	64%	7	28%	64%
2016	2,114	18%	418	371	89%	205	55%	16	4%	14	88%	31	7%	21	68%	8	26%	59%
2017	2,093	19%	425	349	82%	182	52%	12	3%	9	75%	64	15%	32	50%	22	34%	58%
2018	2,079	17%	394	313	79%	144	46%	14	4%	10	71%	67	17%	33	49%	24	36%	54%
2019	2,062	16%	357	262	73%	123	47%	15	4%	9	60%	80	22%	43	54%	23	29%	55%

Source: Total permits from PERMIT database and permit activity from CFDERS tables, accessed 04/22/2020. 2019 data are preliminary.
Total Federal Fishing Permits with or without a Federal Skate permit (Endorsement) are all permits which had a Federal Skater permit/endorsement such that they are in the PERMIT database under PLAN "SKT" and permits which landed and sold skate under a Federal permit (I.e., A permit number not equal to "000000") but were not listed as possessing a Federal Skate endorsement at the time of landing. **All Active Federal Permits Landing Skate with or without a Federal Skate Endorsement** are permits which landed and sold at least one lb of skate under a Federal endorsement such that it was recorded in the CFDERS database. This includes permits identified in the CFDERS database (i.e., landed and sold skate species to a Federal dealer) but were not listed as possessing a Federal Skate endorsement for that specific fishing year. **Non-bait (wing) vessels** are vessels which only landed wings or other disposition codes. **Bait vessels** are vessels which only landed bait. **Non-bait and bait vessels** are vessels which landed both bait and non-bait on a single trip or on separate trips within the fishing year. **All other vessels landing > 1,135 lb** are vessels that landed wing and bait during the fishing year and exceeded this level on at least one trip.
Notes: The bait trips in FY 2005 were grouped into the bait and non-bait vessels to avoid issues with confidentiality. In FY 2010, the incidental limit was implemented: 500 lb for non-bait (1,135 lb whole weight) and 1,135 lb for bait (whole weight). On trips landing both wing and bait, the whole weight calculation was used, and the incidental limit is equal to 1,135 lb.

Since FY 2015, there has been a general decline in the number of vessels landing non-bait (wings) above 1,135 lb whole weight at least one time during the fishing year (Table 13). Examining these vessels by gear type, trawl gear comprised an average of 47% of vessels from FY 2003-2009 and 38% from FY 2010-2019. Several regulatory changes occurred in 2010 that could have influenced this reduction in trawl effort. Skate wing possession limits were reduced (Table 16). The groundfish sector program was implemented along with substantial catch limit reductions for some stocks. Though groundfish effort overall has declined since then, trawl gear has experienced higher decreases relative to other gear types (NEFMC 2020d, p. 51) and Amendment 16 of the Northeast multispecies FMP was expected to impact skate fishing, namely reduce bait skate trawl fishing effort in Southern New England as effort was likely to shift north, where vessels use gillnets to catch skate wings (NEFMC 2009, p. 296). Section 1.6.1.6 has other data by gear type.

Table 13. Number of active non-bait (wing) vessels by gear type for all non-bait (wing) landings and for non-bait (wing) landings over 1,135 lb whole weight at least once during the fishing year, FY 2003-2019.

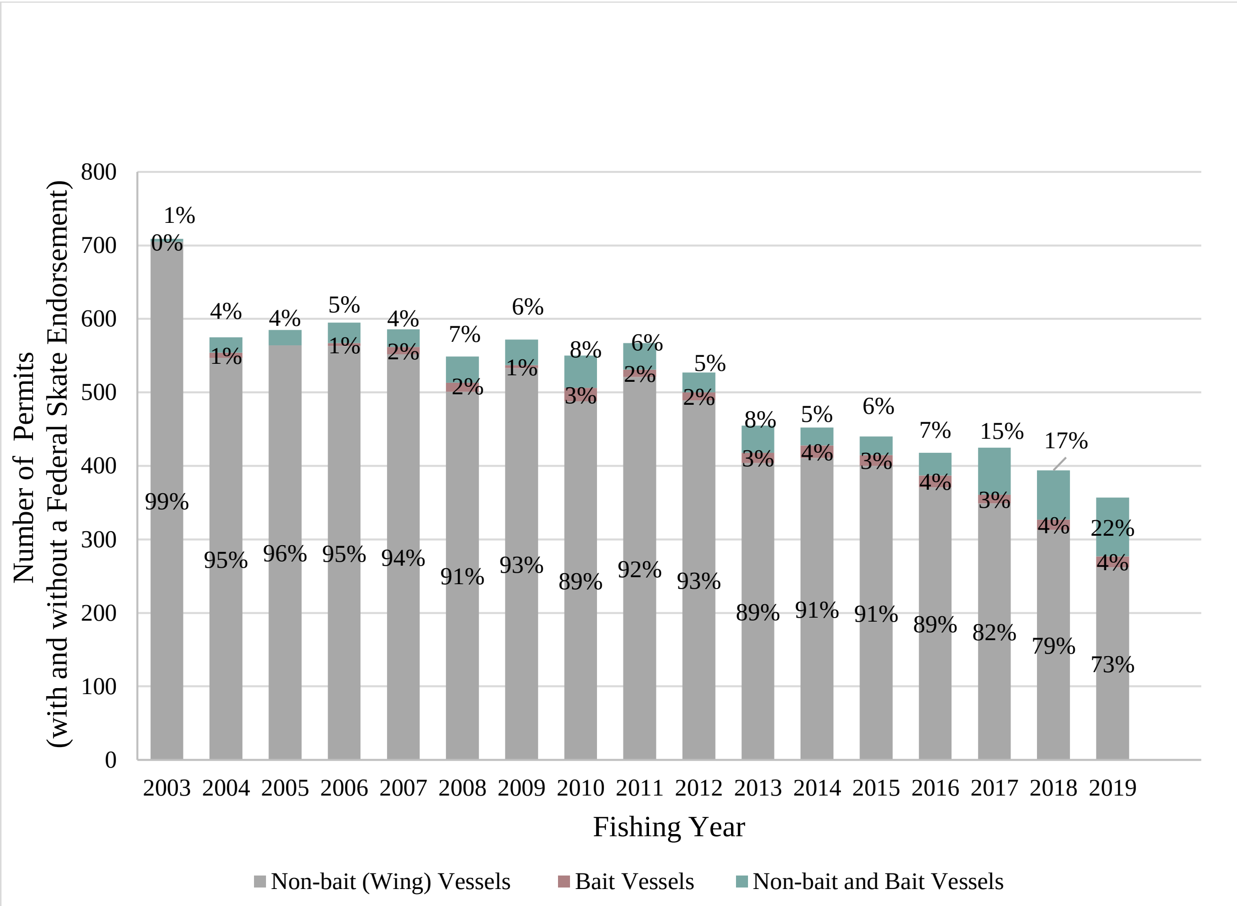
Fishing Year	Active Non-bait (Wing) Vessels					Non-bait (Wing) vessels landing > 1,135 lb at least once				
	All Gears	Trawl	% Trawl	Gillnet	Other Gear	All Gears	Trawl	% Trawl	Gillnet	Other Gear
2003	705	437	62%	238	30	352	213	61%	136	3
2004	547	239	44%	196	112	280	120	43%	109	51
2005	564	244	43%	199	121	293	127	43%	118	48
2006	563	242	43%	200	121	280	120	43%	114	46
2007	552	243	44%	188	121	307	135	44%	118	54
2008	501	235	47%	182	84	295	140	48%	120	35
2009	533	237	44%	174	122	335	152	45%	133	50
2010	488	197	40%	182	109	234	81	35%	117	36
2011	521	209	40%	173	139	295	102	35%	132	61
2012	489	198	40%	174	117	265	92	35%	125	48
2013	404	190	47%	129	85	232	95	41%	104	33
2014	411	170	41%	130	111	248	90	36%	108	50
2015	400	165	41%	127	108	246	93	38%	102	51
2016	371	164	44%	118	89	205	77	38%	93	35
2017	349	179	51%	93	77	182	79	43%	75	28
2018	313	148	47%	92	73	144	54	38%	75	15
2019	262	126	48%	78	58	123	46	37%	62	15

Source: Total permits from PERMIT database and permit activity from CFDERS tables, accessed 04/22/2020. 2019 data are preliminary. These data are from the same dataset and data pull as the non-bait (wing) data presented in Table 12.

Notes: For all non-bait (wing) vessels, the primary gear was determined using the gear that landed the most skate wings/other (i.e., non-bait) by weight (pounds) during the fishing year. For non-bait (wing) vessels landing over 1,135 lb whole weight at least once, the primary gear was determined using the gear which landed the most wings/other (i.e., non-bait) when only considering the trips landing over 1,135 lb whole weight for each fishing year. Other gear includes all other gear codes that are not trawl or gillnet. In FY 2010, the incidental limit was implemented: 500 lb for non-bait (1,135 lb whole weight) and 1,135 lb for bait (whole weight).

The number of active Federal permits landing skate (both with and without a Federal endorsement) follows an overall decreasing trend from FY 2003 to 2019 (Table 12, Figure 6). Most active permits fished solely for non-bait (wings, 73-99%; Figure 2)) while bait-only vessels make up a much smaller proportion of active permits (0-4%). Vessels that land both bait and wing comprise 1-22% of the active fleet over the time series. The proportion of non-bait/bait permits increases in the latter half of the time series, jumping from 7% in 2016 to 22% by 2019. Though incidental limits were triggered in FY 2016 and 2017, there are no striking differences in the activity of permits landings skate during this period which could indicate that external factors, such as environmental and or economic, may have played a larger role in the activation of these triggers.

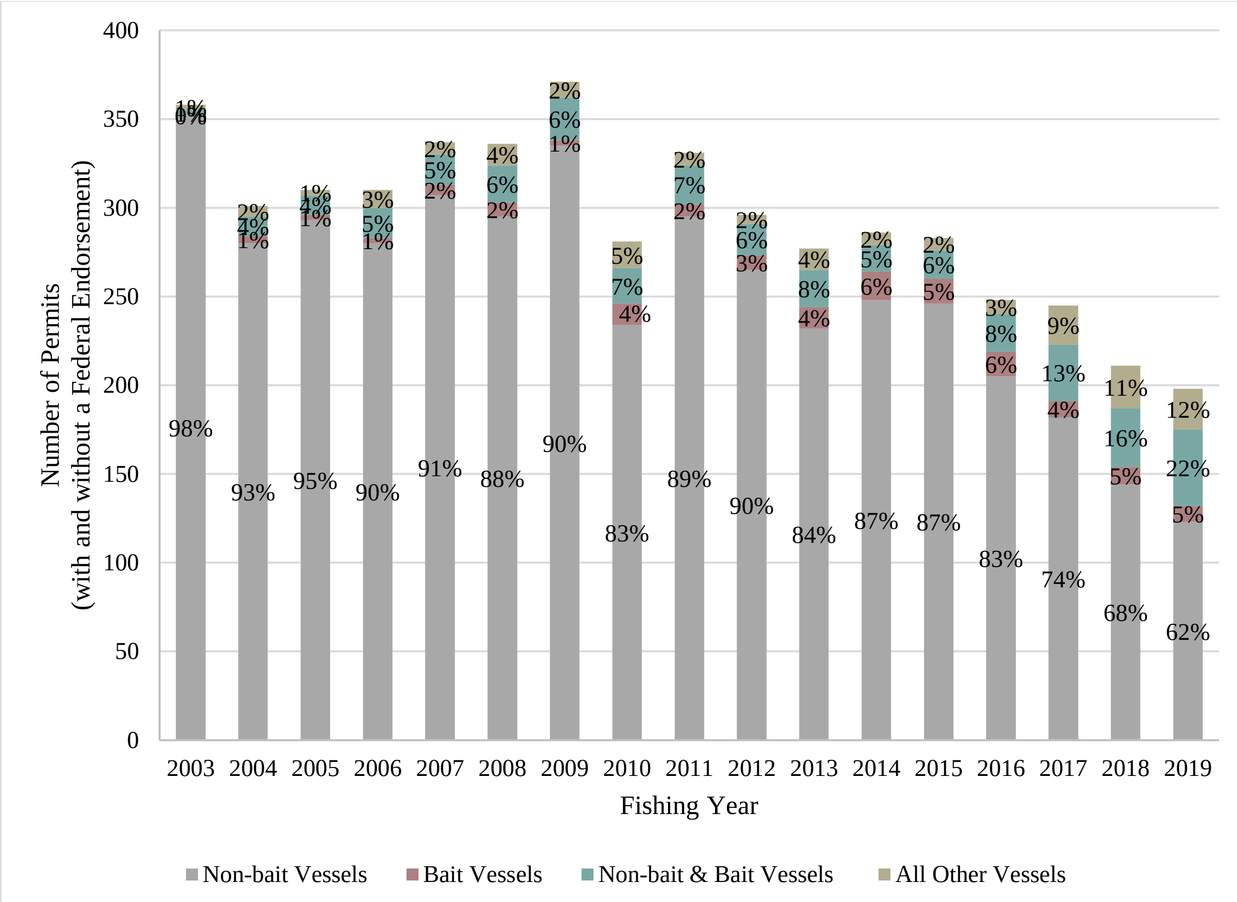
Figure 6. Number of active Federal fishing permits with and without a Federal skate permit (endorsement), FY 2003-2019 [from Table 12]



Note: In FY 2005, bait and bait+non-bait vessels were combined to avoid confidentiality issues. Also, in cases where the number of permits was three or less, the value was changed to three to avoid confidentiality violations. The years 2003-2006 had sporadic reporting by disposition code. Active permits are vessels that landed skate during that fishing year.
Source: CFDERS tables, accessed 04/22/2020. 2019 data are preliminary.

Of the vessels landing over 1,135 lb whole weight, most landed only non-bait (62-98%; Figure 3). Bait-only vessels and the vessels landing both bait and non-bait comprise a smaller proportion, 0-6% for bait-only and 2-33% for bait and non-bait landings (Figure 3). The number of vessels landing above 500 lb for non-bait (1,135 lb whole weight) and 1,135 lb for bait (whole weight) fluctuates from FY 2003 to 2011, and mostly declines from FY 2011 to 2019. In the latter years in the time series, the proportion of vessels landing above these limits also shifts to higher percentages of bait-only and vessels landing both non-bait and non-bait.

Figure 7. Number and percent of active Federal fishing permits (with and without a Federal Skate Endorsement) landing skates above 1,135 lb whole weight at least once per fishing year, 2003-2019 [from Table 12].



Note: Non-bait (wing) vessels are vessels which only landed wings or other disposition codes. Bait vessels are vessels which only landed bait. Non-bait and bait vessels are vessels which landed both bait and non-bait on a single trip or on separate trips within the fishing year. All other vessels landing > 1,135 lb whole weight are vessels that landed wing and bait during the fishing year and exceeded that level on at least one trip.

Note: The bait trips in FY 2005 were grouped into the bait and non-bait vessels to avoid issues with confidentiality. On trips landing both wing and bait, the whole weight calculation was used. In FY 2010, the incidental limit was implemented: 500 lb for non-bait (1,135 lb whole weight) and 1,135 lb for bait (whole weight).

Source: CFDERS tables, accessed 04/22/2020. 2019 data are preliminary.

Permit activity by vessels with a Federal skate permit

Separating federal fishing permits with a skate endorsement (SKT-1) from the total number of federal fishing permits (with any endorsement) is shown in Table 9. Those with a skate endorsement are shown in columns 3 and 5.

Table 14. Federal fishing permits landing skate, FY 2003-2019.

Fishing Year	Total Federal Permits with or without a Federal Skate Endorsement	Total Federal Permits WITH a Skate Endorsement	All Active Federal Permits Landing Skate with or without a Federal Skate Endorsement		
			Total Active	Active With Skate Endorsement	Active Without Skate Endorsement
2003	2,082	1,967	709	594	115
2004	2,443	2,391	575	523	52
2005	2,686	2,629	585	528	57
2006	2,727	2,669	595	537	58
2007	2,738	2,686	586	534	52
2008	2,673	2,630	549	506	43
2009	2,632	2,576	572	516	56
2010	2,557	2,503	550	496	54
2011	2,390	2,326	567	503	64
2012	2,322	2,263	527	468	59
2013	2,246	2,202	455	411	44
2014	2,187	2,147	452	412	40
2015	2,131	2,084	440	393	47
2016	2,114	2,075	418	379	39
2017	2,093	2,049	425	381	44
2018	2,079	2,033	394	348	46
2019	2,062	2,028	357	323	34

All Active Federal Permits Landing Skate with or without a Federal Skate Endorsement are as defined in 7 (All Federal fishing permits landing skate with or without a Federal skate endorsement).
Without Skate Endorsement are Federal fishing permits that landed and sold skates to a Federal dealer but did not have a Federal skate endorsement at the time of landing.
Source: CFDERS tables, accessed 04/22/2020. 2019 data are preliminary.

Table 10, column 2, is the same as Table 9, column 3, and represents the number of Federal Fishing Permits with a skate endorsement. This table shows the change in the number of such permits from fishing year to fishing year, the number of new permits each year (never had a SKT-1 permit since 2003), and the number of permits permanently exiting the fishery (not necessarily active skate vessels). In contrast, the number of newly inactive permits (vessels that leave the skate fishery each year but participate in at least one other year) actually land skate and are shown in Table 11 (last 3 columns). The numbers of permit holders permanently leaving and active vessels not fishing, in a given fishing year, are not directly comparable.

Table 15. Federal skate permit entry and exit trends, FY 2003-2019.

Fishing Year	Total Federal Permits WITH a Skate Endorsement	Change in Number of Permits with a Federal Endorsement	Percent Change in Number of Permits with a Federal Endorsement	Number of New Permits with a Federal Endorsement	Number of Permits with a Federal Endorsement Exiting the Fishery	Net Gain/Loss in Permits with a Federal Endorsement
2003	1,967	--	--	--	--	--
2004	2,391	+424	+22%	525	77	+448
2005	2,629	+238	+10%	427	164	+263
2006	2,669	+40	+2%	302	234	+68
2007	2,686	+17	+1%	252	220	+32
2008	2,630	-56	-2%	180	230	-50
2009	2,576	-54	-2%	202	251	-49
2010	2,503	-73	-3%	149	202	-53
2011	2,326	-177	-7%	113	278	-165
2012	2,263	-63	-3%	131	204	-73
2013	2,202	-61	-3%	109	190	-81
2014	2,147	-55	-2%	98	151	-53
2015	2,084	-63	-3%	125	192	-67
2016	2,075	-9	0%	119	148	-29
2017	2,049	-26	-1%	117	161	-44
2018	2,033	-16	-1%	108	142	-34
2019	2,028	-5	0%	114	162	-48

Number of new permits with a Federal endorsement are permits identified in the time series for the first time. This does not include permits which exited the fishery and reentered.
The Number of Permits with a Federal Endorsement Exiting the Fishery are permits which were within the fishery in the previous year but were not in the current and future fishing years. This does not include vessels that exited and reentered the fishery, only the final exit of permits is included.
Note: The analysis base fishing year is 2003, such that no change can be calculated from FY 2002-2003.
Source: PERMIT database, accessed 04/22/2020.

Federal Fishing Permits – active skate vessels

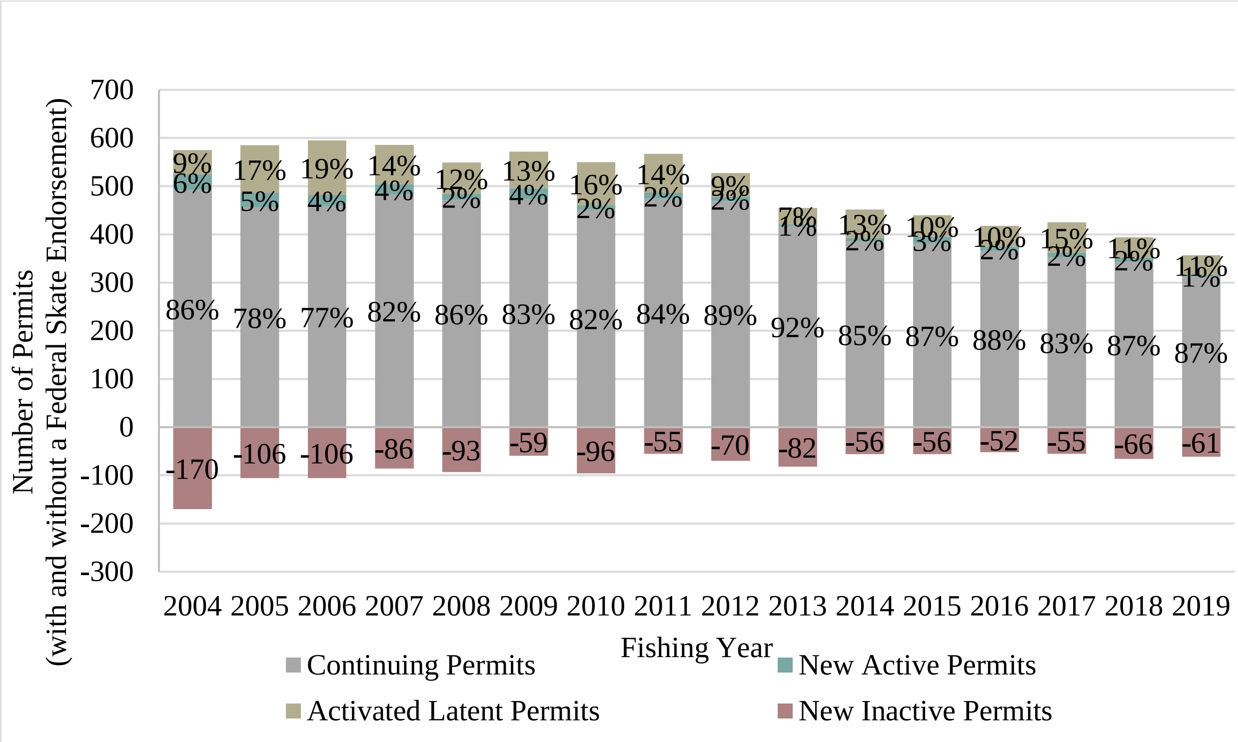
Overall, the number of active permits in the skate fishery (both with and without a federal endorsement) has declined over the time series, decreasing from 575 to 357 permits from FY 2004 to 2019 (Table 11, Figure 4). Of the active permits, only 1-6% entered the fishery for the first time each year as a "new permit", leveling off in the latter half of the time series with only 1-3% of permits (Figure 4). The number of permits which became active after being inactive in a previous year fluctuated across the time series, ranging from 7-19% of active permits (Figure 4). An average of 81 permits became inactive in each fishing year, from 52 to 170 newly inactive permits across the time series (Table 11). This category does not include permits that completely exited the fishery to highlight latent permit activity. The fluctuation in the activity and inactivity of permits demonstrates the variation in annual vessel activity within the skate fishery.

Table 16. Trends in Federal fishing permits with and without Federal endorsements activity in the skate fishery, FY 2003-2019.

Fishing Year	All Active Federal Permits Landing Skate with or without a Federal Skate Endorsement	Change in Number of Active Permits	Percent Change in Number of Active Permits	New Active Permits			Activated Latent Permits			Newly Inactive Permits		
				Total			Total			Total		
					Number of Non-bait (Wing) Vessels	Percent of Non-bait (Wing) Vessels		Number of Non-bait (Wing) Vessels	Percent of Non-bait (Wing) Vessels		Number of Non-bait (Wing) Vessels	Percent of Non-bait (Wing) Vessels
2003	709	--	--	--	--	--	--	--	--	--	--	--
2004	575	-134	-19%	33	32	97%	50	50	100%	170	170	100%
2005	585	+10	+2%	30	30	100%	99	95	96%	106	101	95%
2006	595	+10	+2%	23	23	100%	113	106	94%	106	104	98%
2007	586	-9	-2%	21	19	90%	82	75	91%	86	83	97%
2008	549	-37	-6%	13	10	77%	65	58	89%	93	90	97%
2009	572	+23	+4%	23	22	96%	76	72	95%	59	55	93%
2010	550	-22	-4%	10	8	80%	89	82	92%	96	94	98%
2011	567	+17	+3%	12	12	100%	81	78	96%	55	52	95%
2012	527	-40	-7%	9	7	78%	49	47	96%	70	66	94%
2013	455	-72	-14%	3	3	100%	34	32	94%	82	80	98%
2014	452	-3	-1%	8	8	100%	59	56	95%	56	54	96%
2015	440	-12	-3%	14	12	86%	45	44	98%	56	53	95%
2016	418	-22	-5%	9	9	100%	43	41	95%	52	51	98%
2017	425	+7	+2%	10	8	80%	63	54	86%	55	51	93%
2018	394	-31	-7%	9	6	67%	42	37	88%	66	60	91%
2019	357	-37	-9%	4	4	100%	41	34	83%	61	51	84%

All Active Federal Permits Landing Skate with or without a Federal Skate Endorsement defined in the same manner as in 7.
New active permit is a permit which entered the fishery for the first time and was active in the specified fishing year.
Activated latent permit is a permit that was inactive in previous fishing years but became active in the current fishing year.
Newly inactive permit is a permit that was active in previous fishing years but became inactive in the current fishing year. This does not include permits which exited the fishery entirely.
Notes: The analysis base fishing year is 2003 such that no change can be calculated from FY 2002-2003. Only non-bait vessels are shown as they represent the most fluctuation in permit activity.
Source: Skate permit activity data from CDFERS data tables, accessed on 04/22/2020.

Figure 8. Skate-landing permit (with and without a Federal Skate Endorsement) activity and inactivity by fishing year, 2004-2019 [from Table 10].



Note: The positive values are equal to the total number of active permits such that their combined percentages equal 100%. Inactive permits (shown as negative values) are not included in the total percentage of active permits and, therefore, are only represented by the number of newly inactive permits rather than a percentage.

Source: CFDERS tables, accessed 04/22/2020. FY 2019 data are preliminary.

Disposition of skate landings, by gear type, FY2018

For FY 2018, otter trawl trips were more frequent than gillnet trips overall and for each disposition combination: food only, bait only, food and bait trips (Table 17). Food only trips accounted for the greatest number of trips by a large margin followed by bait only trips, and then food and bait trips. Section 5.6.1.6 has more data by gear type.

Table 17. Number of trips landing skate by disposition and gear, FY2018.

Disposition	Gear Type	Total number of trips
Food only	Gillnet	4,929
	Otter Trawl	6,067
	Other	740
	Total	*11,736*
Bait only	Gillnet	57
	Otter Trawl	2,100
	Other	34
	Total	*2,191*
Food and bait	Gillnet	68
	Otter Trawl	142
	Other	2
	Total	*212*
Total	Gillnet	5,054
	Otter Trawl	8,309
	Other	776
	Total	*14,139*

Source: CFDETT/CFDETS database.
Note: Data only include the disposition codes for bait and wing, not "VTR only," "Unknown," or any other codes. These other disposition codes should be analyzed separately because in-season and year-end catch monitoring account for disposition codes differently, especially research and state landings.

1.6.1.2 Catch Limits, Catch and Landings

Skates have been reported in New England fishery landings since the late 1800s. However, commercial fishery landings never exceeded several hundred metric tons until the advent of distant-water fleets during the 1960s (a full description of historic landings is in Amendment 3, NEFMC, 2009).

Methods for In-season Quota Monitoring and Year-end Catch Accounting: 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 (Table 18). 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.

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 19). 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 19). 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).

Federal landings are landings made by vessels where permit # is non-zero while state landings are landings from vessels with permit # = 0. More information on how state landings are defined, specified, and accounted for in the Skate FMP is included in the March 10, 2021, PDT memo. The March 13, 2020, PDT memo has more information on regulations important to understanding skate fishery data, particularly under what scenarios may skate landings from trips without a Federal declaration ("undeclared") be permissible. For FY 2018, landings inconsistent with regulations were 224,459 lb (2.4% of total FY 2018 wing landings; March 14, 2020, PDT memo).

From FY 2017-2020, the overall federal skate TAL was not exceeded (Table 18). 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.

From FY 2017-2020, the ACL was not exceeded (Table 4; 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.

Total skate landings have fluctuated between FY 2010 and 2020, largely attributable to the wing fishery as landings in the bait fishery have been more stable (Table 20, Figure 9). It is unclear what is driving the trend in wing landings as quota is likely not limiting the fishery. A potential explanation is the decrease in winter skate survey index that suggests fewer winter skate were available to the fishery. Skate landings relative to TALs have also fluctuated during this time. In FY 2016 and 2017, when in-season incidental possession limits were triggered, TALs had been lowered by 23% relative to FY 2014 and 2015. Landings were also lower, but not by that much.

Note that the 2020 Annual Monitoring Report indicated that the "state-permitted only vessel landings" are "landings sold to a federal dealer by vessels without a federal fishing permit at any time during the year…this may include state permitted landings from state-only dealers provided to GARFO from states". The PDT now understands that this is not accurate. As above, it is the landings from vessels that have never had a federal fishing permit. This clarification will be made going forward.

Table 18. FY 2017 - 2020 in-season monitoring of federal Northeast skate wing and bait landings.

Disposition	Live Landings		TAL (live weight)		Percent of TAL Landed
	(lb)	(mt)	(lb)	(mt)	
FY 2017					
Wing	18,662,000	8,465	18,457,000	8,372	101.1%
Bait	8,769,989	3,978	9,299,098	4,218	94.3%
Total	**27,431,989**	**12,443**	**27,756,098**	**12,590**	**98.8%**
FY 2018					
Wing	17,278,000	7,837	23,146,333	10,499	74.6%
Bait	7,398,714	3,356	11,660,249	5,289	63.5%
Total	**24,676,714**	**11,193**	**34,806,582**	**15,788**	**70.9%**
FY 2019					
Wing	19,038,306	8,636	23,146,333	10,499	82.3%
Bait	8,515,179	3,862	11,660,249	5,289	73.0%
Total	**27,553,485**	**12,498**	**34,806,582**	**15,788**	**79.2%**
FY 2020					
Wing	20,478,599	9,289	26,188,712	11,879	78.2%
Bait	7,453,195	3,381	13,192,462	5,984	56.5%
Total	**27,931,794**	**12,670**	**39,383,331**	**17,864**	**70.9%**

Notes:

- "Live Landings" aggregates landings from the weekly, in-season quota monitoring reports. Although this is a year-end tally, it only includes the skate landings by vessels with a federal fishing permit on the day of landing, sold to a Federal dealer or reported solely via VTRs (this includes vessel-to-vessel transfers).
- "Live Landings" excludes all landings by vessels that do not have any federal fishing permits on the day of landing, landings from research, and recreational landings (e.g., these landings are excluded from TAL monitoring).
- These data are pulled a few months after the end of each fishing year and include updates and corrections not in the Table 20 data, pulled right at the end of the fishing year.

Source: cfders, Vessel Trip Reports, and permit databases. 2020 data accessed 7/02/2021.

Table 19. Year-end Northeast skate complex annual catch limit (ACL) accounting, FY2017-2019.

Catch accounting element	Pounds	Metric tons	% of ACL
FY 2017 (ACL = 31,081 mt)			
Commercial landings	31,854,574	14,449	46.5%
State-permitted only vessel landings	1,752,206	795	2.6%
Estimated dead discards	18,790,080	8,523	27.4%
Recreational catch (MRIP landings and dead discards)	3,367,634	1,528	4.9%
Total Northeast skate catch	**55,764,494**	**25,294**	**81.4%**
FY 2018 (ACL = 31,327 mt)			
Commercial landings	32,155,182	14,585	46.9%
State-permitted only vessel landings	1,268,820	576	1.9%
Estimated dead discards	17,369,954	7,879	25.3%
Recreational catch (MRIP landings and dead discards)	2,398,508	1,088	3.5%
Total Northeast skate catch	**53,192,464**	**24,128**	**77.6%**
FY 2019 (ACL = 31,327 mt)			
Commercial landings	29,869,783	13,549	43.2%
State-permitted only vessel landings	383,529	174	0.6%
Estimated dead discards	13,144,115	5,962	19.0%
Recreational catch (MRIP landings and dead discards)	2,229,125	1,011	3.2%
Total Northeast skate catch	**45,626,552**	**20,696**	**66.1%**
FY 2020 (ACL = 32,715 mt)			
Commercial landings	29,457,636	13,362	40.8%
State-permitted only vessel landings	577,288	262	0.8%
Estimated dead discards	18,791,428	8,524	26.1%
Recreational catch (MRIP landings and dead discards)	692,135	314	1.0%
Total Northeast skate catch	**49,518,487**	**22,461**	**68.7%**

Notes:

- Live weight is used instead of landed weight to make in-season and year-end accounting more comparable.
- "Commercial landings" 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.
- "Northeast skate state-permitted only vessel landings" are landings from vessels that never had a federal fishing permit (so the permit #=0) that were reported to the federal database
- "Northeast skate estimated dead discards" is based on landings of all species and skate discards on observed trips extrapolated to all commercial landings of all species (weighted by area, gear, etc.) to calculate total skate discards. Then, a discard mortality rate is applied to the calculated total skate discards (discard estimation method differs from how discards are estimated during specifications setting, which uses the NEFSC method).
- "Northeast skate recreational catch" includes landings from private angler and party/charter and dead discards from MRIP.
- Not included in the year-end ACL accounting:
    - Vessel-to-vessel skate transfers (e.g., 210 mt in FY 2019, reported via VTRs).
    - Skate for personal use/home consumption (unknown, not reported to a Federal dealer).
    - 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 at varying frequencies, updated daily (likely minor, but possible).

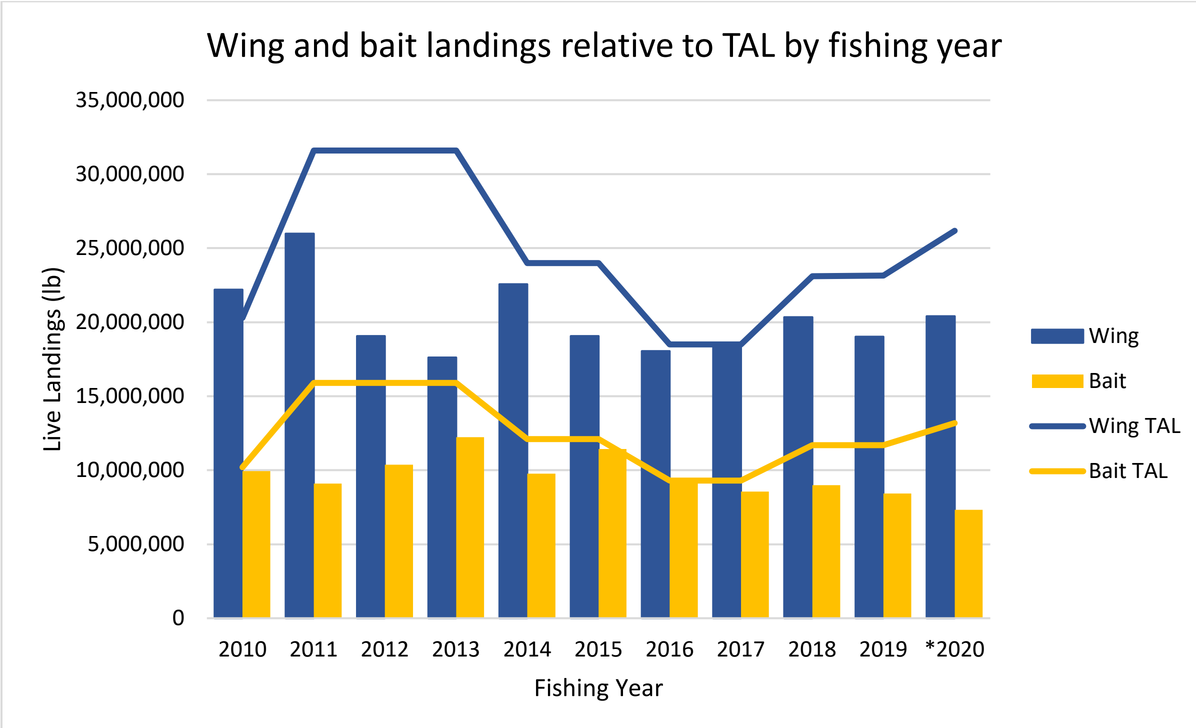
Source: Commercial fisheries dealer database and Northeast Fishery Observer Program database; FY 2020 data accessed June 30, 2021; MRIP reports accessed July 2, 2021.

Table 20. Total allowable landings (TAL) (pounds), live landings, and percent of TAL achieved for the wing and bait fisheries by fishing year, 2010-2020.

FY	Wing			Bait		
	TAL	Landings (Live lb)	% Wing TAL achieved	TAL	Landings (Live lb)	% Bait TAL achieved
2010	20.3 M	22,200,790	109%	10.2 M	9,949,098	97%
2011	31.6 M	25,992,579	82%	15.9 M	9,108,500	57%
2012	31.6 M	19,060,914	60%	15.9 M	10,368,251	65%
2013	31.6 M	17,611,487	56%	15.9 M	12,230,497	77%
2014	24.0 M	22,558,411	94%	12.1 M	9,760,925	81%
2015	24.0 M	19,065,405	79%	12.1 M	11,434,945	94%
2016	18.5 M	18,057,360	98%	9.3 M	9,379,919	101%
2017	18.5 M	18,577,059	100%	9.3 M	8,557,568	91%
2018	23.1 M	20,334,407	88%	11.7 M	8,992,742	77%
2019	23.1 M	19,019,727	82%	11.7 M	8,424,659	72%
*2020	26.2 M	20,409,990	78%	13.2 M	7,329,043	56%

Source: GARFO Quota Monitoring Archive, accessed May 6, 2021.
Note: These are the data right at the end of each fishing year. The data in Table 18 are pulled a few months later and include updates and corrections.
*2020 data reported as of May 1, 2021.

Figure 9. Skate wing and bait landings relative to total allowable landings (TAL), FY 2010 – 2020*.



Source: GARFO Quota Monitoring Archive, accessed May 6, 2021.
*2020 data reported as of May 1, 2021.

1.6.1.3 Possession Limits

The wing and bait fisheries have differing seasonal possession limits and triggers for when an incidental limit may be implemented under the discretion of the Regional Administrator. If for both skate fisheries, at the end of a fishing year, it is calculated that the TAL was exceeded by more than 5%, an automatic adjustment to that fishery's TAL trigger would occur for the next fishing year. A straight one-for-one percent reduction in a TAL trigger for prior overages reduces the likelihood that future landings would exceed that TAL. This increases the buffer between the TAL and trigger to account for incidental landings in a skate fishery when the skate possession limit declines to the incidental limit. An overage of less than 5% would not be alarming and might be offset by reductions in skate discards.

Current and historical possession limits

In fishing year 2020 and 2021, the bait fishery has three seasons with a 25,000 lb whole weight possession limit (Table 22). The wing fishery has two seasons, with 3,000 lb and 5,000 lb wing weight possession limits. In the wing fishery, if an 85% trigger is reached, the incidental limit will be in place until the end of the season. In the bait fishery, if a 90% trigger is reached in Seasons 1 and 2, or 80% in Season 3, the incidental limit will be in place until the end of the season. In both fisheries, the Regional Administrator has the discretion to not implement, or to later lift, the incidental limit if the full TAL is not expected to be reached.

The wing possession limits for both seasons have remained relatively constant since annual catch limits and accountability measures were implemented in 2010, with seasonal possession limit increases effective beginning in FY 2020 (Table 21). The bait possession limits have varied since annual catch limits and accountability measures were implemented in 2010, with Season 3 possession limit increases effective beginning in FY 2020 (Table 23). The incidental limit trigger and incidental possession limit have also changed over time. As previously explained, the in-season adjustments to possession limits were linked between the bait and wing fisheries through March 15, 2018, which was problematic in FY 2016.

Table 21. Skate wing possession limits by season and fishing year.

FY	Season	Dates	Possession Limit	Barndoor Skate Wing Possession Limit	Incidental Limit Regulations
2003 – Northeast Skate Complex FMP implemented			10,000 lb/ <24 hours (i.e., day) & 20,000 lb/ > 24 hours (i.e., trip)		
FY 2009	No season	May 1–Apr. 30	10,000 lb/ <24 hours (i.e., day) & 20,000 lb/ > 24 hours (i.e., trip)	0	
FY 2010	No season	May 1–Jul. 16	10,000 lb/ <24 hours (i.e., day) & 20,000 lb/ > 24 hours (i.e., trip)		
		Jul. 16–Sep. 3	5,000 lb		500 lb (if 80% of wing TAL is landed)
		Sep. 3-Apr. 30	500 lb		
FY 2011	No season	May 1-May 17	5,000 lb		
	1	May 17–Aug. 31	2,600 lb		500 lb (if 85% of wing TAL is landed)
	2	Sept. 1–Apr. 30	4,100 lb		
FY 2012 – 2015	1	May 1 – Aug. 31	2,600 lb		
	2	Sept. 1 – Apr. 30	4,100 lb		
FY 2016	1	May 1 – Aug. 31	2,600 lb		
	2	Sept. 1 – Jan. 29	4,100 lb		
		Jan. 30 – Mar. 13	500 lb		
		Mar. 14 – Apr. 30	4,100 lb		
FY 2017	1	May 1 – Aug. 31	2,600 lb		
	2	Sept. 1 – Dec. 26	4,100 lb		
		Dec. 27 – Apr. 8	500 lb	*	
		Apr. 9 – Apr. 30	4,100 lb	1,025 lb	
FY 2018 - 2019	1	May 1 – Aug. 31	2,600 lb	650 lb	
	2	Sept. 1 – Apr. 30	4,100 lb	1,025 lb	
FY 2020 - 2021	1	May 1 – Aug. 31	3,000 lb	750 lb	
	2	Sept. 1 – Apr. 30	5,000 lb	1,250 lb	

*From February 13 – April 8, 2018, the barndoor skate possession limit was 125 lb due to the soft closure.

Table 22. Skate bait possession limits by season and fishing year.

<table>
<tr><th>FY</th><th>Season</th><th>Dates</th><th>Possession Limit</th><th>Incidental Limit Regulations</th></tr>
<tr><td colspan="5">2003 – Northeast Skate Complex FMP implemented, Skate Bait LOA requirement</td></tr>
<tr><td rowspan="3">FY 2010 - 2011</td><td>1</td><td>May 1 – Jul. 31</td><td rowspan="3">20,000 lb</td><td rowspan="15">5,902 lb (Season 1) and 9,307 lb (Season 2) (if 90% of bait season's TAL or annual TAL is landed)
or 1,135 lb (if 85% of wing TAL is also landed)[1]</td></tr>
<tr><td>2</td><td>Aug. 1 – Oct. 31</td></tr>
<tr><td>3</td><td>Nov. 1 – Apr. 30</td></tr>
<tr><td rowspan="3">FY 2012 - 2015</td><td>1</td><td>May 1 – Jul. 31</td><td rowspan="3">25,000 lb</td></tr>
<tr><td>2</td><td>Aug. 1 – Oct. 31</td></tr>
<tr><td>3</td><td>Nov. 1 – Apr. 30</td></tr>
<tr><td rowspan="6">FY 2016</td><td>1</td><td>May 1 – Aug. 31</td><td>25,000 lb</td></tr>
<tr><td rowspan="2">2</td><td>Sep. 1 – Oct. 17</td><td>25,000 lb</td></tr>
<tr><td>Oct. 18 – Oct. 31</td><td>9,307 lb</td></tr>
<tr><td rowspan="3">3</td><td>Nov. 1 – Jan. 29</td><td>25,000 lb</td></tr>
<tr><td>Jan. 30 – Mar. 13</td><td>1,135 lb</td></tr>
<tr><td>Mar. 14 – Apr. 30</td><td>9,307 lb</td></tr>
<tr><td rowspan="4">FY 2017</td><td>1</td><td>May 1 – Jul. 31</td><td rowspan="2">25,000 lb</td></tr>
<tr><td>2</td><td>Aug. 1 – Oct. 31</td></tr>
<tr><td rowspan="2">3</td><td>Nov. 1 – Mar. 14</td><td>25,000 lb</td></tr>
<tr><td>Mar. 15 – Apr. 30</td><td>12,000 lb</td><td>8,000 lb (if 80% of bait TAL is landed in a season)</td></tr>
<tr><td rowspan="3">FY 2018 - 2019</td><td>1</td><td>May 1 – Jul. 31</td><td rowspan="2">25,000 lb</td><td rowspan="2">8,000 lb (if 90% of bait TAL is landed in a season)</td></tr>
<tr><td>2</td><td>Aug. 1 – Oct. 31</td></tr>
<tr><td>3</td><td>Nov. 1 – Apr. 30</td><td>12,000 lb</td><td>8,000 lb (if 80% of bait TAL is landed in a season)</td></tr>
<tr><td rowspan="3">FY 2020 - 2021</td><td>1</td><td>May 1 – Jul. 31</td><td rowspan="3">25,000 lb</td><td rowspan="2">8,000 lb (if 90% of bait TAL is landed in a season)</td></tr>
<tr><td>2</td><td>Aug. 1 – Oct. 31</td></tr>
<tr><td>3</td><td>Nov. 1 – Apr. 30</td><td>8,000 lb (if 80% of bait TAL is landed in a season)</td></tr>
<tr><td colspan="5">[1] The bait fishery was only held to the wing incidental limit if BOTH the bait AND wing triggers were reached. If only the wing fishery trigger was reached, the bait fishery would still operate at normal limits until it hits its 90% trigger.</td></tr>
</table>

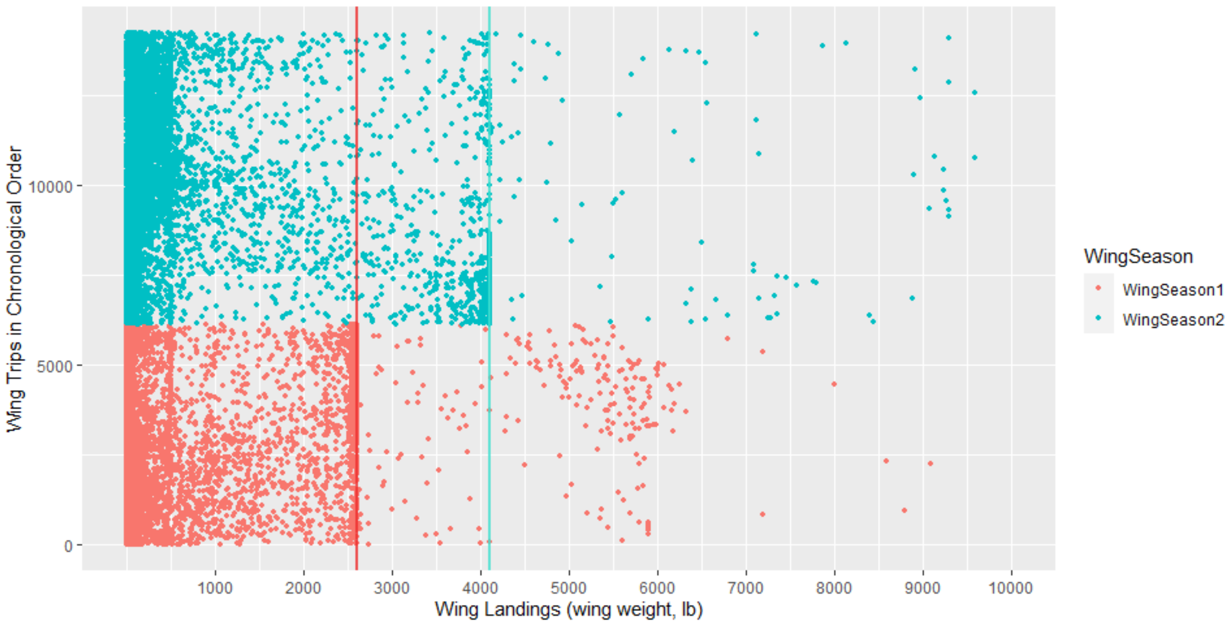
Skate landings relative to possession limits

Provided here are data on skate wing and bait landings frequencies used to inform development of FY 2022/2023 skate specifications. The data source is CFDETS AA, because it has the most complete trip-level data with species level information and are the 'official' corrected data that have gone through the QA/QC process. Data from FY 2018 (a combination of calendar years 2018 and 2019) are provided, because that is the latest 'official' data available as of May 2021; the data to provide a similar look at FY 2019 will likely be available in June 2021, after which the analysis in this section can be redone.

Since the possession limits were higher in FY 2020 (and 2021), it would be helpful to look at that year and compare how many trips are landing at the higher limits. FY 2020 data could be explored for this type of analysis. However, a different database must be used, one that is more challenging to query for trip-level information. Given the market disruptions due to the pandemic, the landings in FY 2020 are likely atypical.

Skate wing landings relative to possession limits

Figure 10. Skate wing landings relative to possession limits by trip and season, FY 2018.



Notes:

- Pink vertical line represents Season 1 possession limit (2,600 lb), turquoise vertical line represents Season 2 possession limit (4,100 lb).
- Each colored dot represents an individual trip.
- Trips are organized in chronological order (e.g., wing trip at 500 means the 500th trip during FY 2018.
- Three trips were excluded from Figure 10.
- because wing landings exceeded 10,000 lb and skewed the visualization of the other trips.

Source: CFDETS AA, 2018 and 2019.

Table 23. Total number and percent of wing trips below, within +/- 5%, and above the seasonal possession limits, FY 2018.

Wing Season	PL Category	# of Wing Trips	% of Wing Trips
Season 1	Below PL	4,034	79%
	Within +/-5% of PL	868	17%
	Above PL	224	4%
Season 2	Below PL	6,485	94%
	Within +/- 5% of PL	347	5%
	Above PL	79	1%
FY18 OVERALL	**Below PL**	**10,519**	**87%**
	Within +/-5% of PL	**1,215**	**10%**
	Above PL	**303**	**3%**

Notes:
Possession limits (PL) were 2,600 lb in Season 1 and 4,100 in Season 2.
'Below PL' = landings that are <5% below the seasonal possession limit.
'Above PL' = landings that are >5% above the seasonal possession limit.
Source: CFDETS AA, 2018 and 2019.

Table 24. Number of unique wing vessels landing skate wings below, within +/- 5%, and above the seasonal possession limits, FY 2018.

Wing Season	PL Category	# of Wing Vessels	% of Wing Vessels within Season
Season 1 (294 vessels)	Below PL	294	100%
	Within +/-5% of PL	66	23%
	Above PL	22	8%
Season 2 (323 vessels)	Below PL	321	99%
	Within +/- 5% of PL	39	12%
	Above PL	15	5%

Notes:
Possession limits (PL) were 2,600 lb in Season 1 and 4,100 in Season 2.
The number of unique vessels is calculated based on the 'PL Category,' meaning the number of unique vessels is not additive across the possession limit categories (e.g., if a vessel lands below the PL on one trip but over the PL on a different trip within Season 1, then that vessel would be considered a unique vessel in both of those categories).
Source: CFDETS AA, 2018 and 2019.

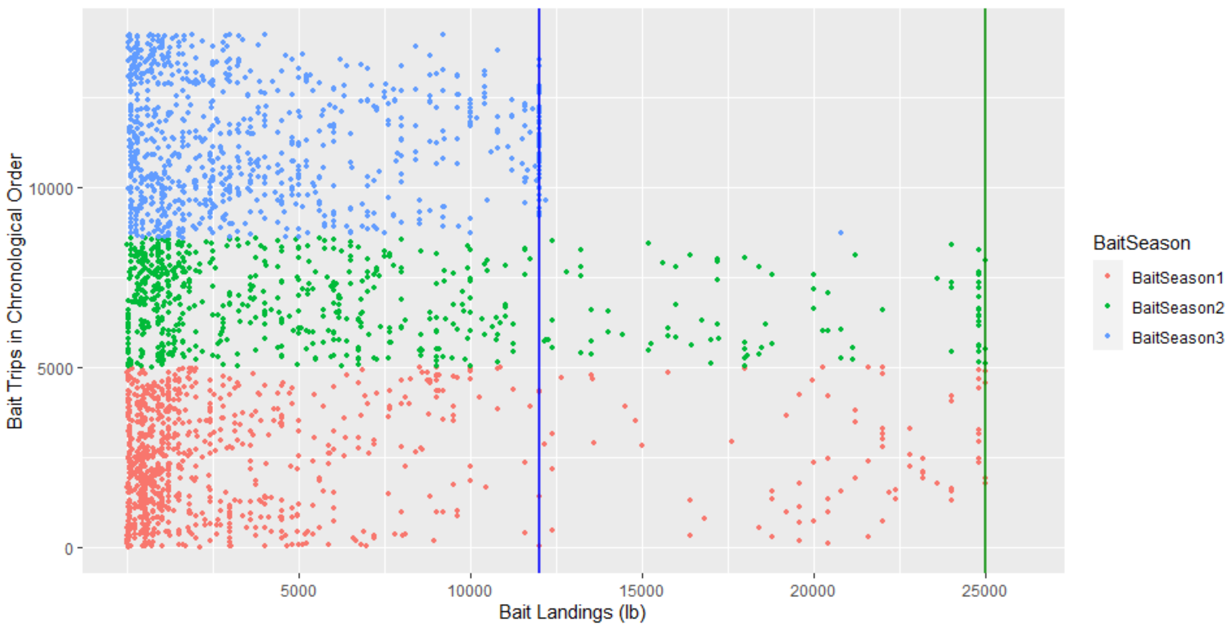
Main take-aways – wing landings

- Several vessels landed skate wing close to or at the seasonal possession limits in FY 2018 (Figure 10, Table 23, Table 24).
- Many trips landed the incidental limit of skate wings (500 lb wing weight).
- Several wing trips exceeded the seasonal possession limits, which could be due to:
  - Aggregate records (not ending in permit XXX998);
  - Have landed=live pounds whereby the dealer processes the wings, which could account for the trips landing over the possession limits and for trips > 10,000 lb;
  - Miscoding between wing and bait disposition code;

  - Data entry errors; or
  - Activity inconsistent with regulations.
- For the vessels (e.g., unique permit numbers) in FY 2018 that landed skate wings below the possession limit, monkfish was landed in high amounts (~1,400 lb/trip), followed to a much lesser extent of haddock (~200 lb/trip). Many other species were also landed to a lesser extent on these trips.
- For the vessels (e.g., unique permit numbers) in FY 2018 that landed skate wings within +/- 5% of the seasonal possession limits, monkfish was also landed in high amounts (~ 660 lb/trip), followed by spiny dogfish (~350 lb/trip). Other species were landed to a lesser extent on these trips.
- For the vessels (e.g., unique permit numbers) in FY 2018 that landed skate wings above the possession limit, spiny dogfish and monkfish were both landed in high amounts (>700 lb/trip for each species). Limited other species were landed in small amounts on these trips.

Skate bait landings relative to possession limits

Figure 11. Skate bait landings relative to possession limits by trip and season, FY 2018.



Notes:

- Green vertical line represents Season 1 and Season 2 possession limits (25k lb); blue vertical line represents Season 3 possession limit (12k lb).
- Each colored dot represents an individual trip.
- Trips are organized in chronological order (e.g., bait trip at 500 means the 500th trip during FY2018).

Source: CFDETS AA, 2018 and 2019.

Table 25. Total number and percent of bait trips well below, within +/- 5%, and well above the seasonal possession limits (25,000 lb Seasons 1 and 2, 12,000 lb Season 3), FY2018.

Bait Season	PL Category	# of Bait Trips	% of Bait Trips
Season 1	Below PL	887	98%
	Within +/- 5% of PL	18	2%
	Above PL	0	0%
Season 2	Below PL	607	96%
	Within +/- 5% of PL	26	4%
	Above PL	0	0%
Season 3	Below PL	794	92%
	Within +/- 5% of PL	70	8%
	Above PL	c	c
FY18 OVERALL	**Below PL**	**2,288**	**95%**
	Within +/- 5% of PL	**114**	**5%**
	Above PL	**c**	**c**

Notes:
'Below PL' = landings that are <5% below the seasonal possession limit.
'Above PL' = landings that are >5% above the seasonal possession limit.
Due to confidentiality reasons, some data (c) were excluded for ≤3 vessels.
Source: CFDETS AA, 2018 and 2019.

Table 26. Number of unique bait vessels landing skate bait below, within +/- 5%, and above the seasonal possession limits (PL) (25,000 lb Seasons 1 and 2, 12,000 lb Season 3), FY 2018.

Bait Season	PL Category	# of Vessels	% of Bait Vessels within Season
Season 1 (41 vessels)	Below PL	41	100%
	Within +/- 5% of PL	5	12%
	Above PL	0	0%
Season 2 (48 vessels)	Below PL	48	100%
	Within +/- 5% of PL	4	8%
	Above PL	0	0%
Season 3 (60 vessels)	Below PL	60	100%
	Within +/- 5% of PL	9	15%
	Above PL	c	c

Notes:
The number of unique vessels is calculated based on the 'PL Category,' meaning the number of unique vessels is not additive across the possession limit categories (e.g., if a vessel lands below the PL on one trip but over the PL on a different trip within Season 1, then that vessel would be considered a unique vessel in both of those categories).
Due to confidentiality reasons, some data (c) were excluded for ≤3 vessels.
Source: CFDETS AA, 2018 and 2019.

Main take-aways – bait landings

- Several vessels landed skate bait close to or at the seasonal possession limits in FY18 (Figure 11, Table 25, Table 26).
- Some trips exceeding the seasonal possession limits could be:
  - Aggregate records (not ending in permit XXX998);
  - Data entry errors; or
  - Activity inconsistent with regulations.
- For the vessels (e.g., unique permit numbers) in FY18 that landed skate bait below the possession limit, skate wings were landed in higher amounts (~650 lb/trip), while a mix of other species were landed in more moderate amounts (100-350 lb/trip) including monkfish, scup, spiny dogfish, and fluke, primarily.
- For the vessels (e.g., unique permit numbers) in FY18 that landed skate bait within +/- 5% of the seasonal possession limits, spiny dogfish was landed in minimal amounts (~ 225 lb/trip), with other species landed to an even lesser extent on these trips.

Triggering of incidental limit

An incidental limit has been triggered five times (two for bait, three for wing) since first implemented July 2010, out of over 50 seasons of the wing and bait fisheries. The first time was in September 2010 when the wing fishery reached 80% of the wing TAL, triggering the 500 lb incidental limit for about eight months (Table 27). This was due to increased landings of skate wings and a delay in implementing Amendment 3 which reduced the skate wing possession limit to 5,000 lb. The second time the incidental limit was triggered was in October 2016 for the bait fishery in Bait Season 2 for the remainder of that season (about two weeks, Table 27).

Then later in FY 2016 (January 2017), both the wing and bait fisheries reached their respective triggers of 85% (wing) and 90% (bait), so the incidental limit for the third and fourth time was triggered for both fisheries. At the time, the bait incidental limit was tied to the wing incidental limit, meaning 1,135 lb whole weight for bait and 500 lb wing weight for wings. Both fisheries were limited to the wing incidental limit until March 14, 2017. At that time, the RA projected the wing and bait TALs would not be exceeded for the remainder of that fishing year (about one and a half months), so the skate wing possession limit was increased to the full 4,100 lb possession limit, while the bait possession limit was not increased to the full 25,000 lb limit but rather the whole weight wing limit equivalent of 9,307 lb (Table 27).

At the next Council meeting (April 2017, when the Council also received the Amendment 5 scoping comments), the Council initiated Framework 4. Implemented on March 15, 2018, this action lowered the Bait Season 3 possession limit and trigger and de-coupled the triggers of the wing and bait incidental limits, creating an independent incidental possession limit for the bait fishery. Since then, the bait trigger is no longer linked to the wing fishery possession limits.

The fifth (and latest) time an incidental limit was triggered was for the wing fishery in December 2017. It remained in place for most of the rest of the fishing year (about 3.5 months). For the last few weeks of that fishing year, the Regional Administrator returned the fishery to its regular seasonal limit when it was determined that the annual TAL was unlikely to be reached.

Again, at the next Council meeting (January 2018), the Council initiated Framework 6 primarily to minimize the likelihood of the wing fishery incidental possession limit being triggered. More on this action is below.

Table 27. Dates when the incidental limits have been triggered in the skate fishery.

Fishery	Date	Action
Wing	September 3, 2010	Possession limit reduced from 5,000 to 500 lb (wing weight) when 80% of annual TAL was expected to be reached. Remained in place until the end of the fishing year, April 30, 2011.
Bait	October 18, 2016	Season 2 PL reduced from 25,000 to 9,307 lb (whole weight; equal to the 4,100 landed lb wing limit) when 90% of Season 2 TAL was expected to be reached. Remained in place until the end of Season 2, October 31, 2016.
Wing & Bait	January 30, 2017	**WING:** Season 2 PL reduced from 4,100 to 500 lb (wing weight) when 85% of annual wing TAL was expected to be reached. Remained in place until March 14, 2017. PL returned to 4,100 lb as RA projected that the wing TAL would not be exceeded. **BAIT:** Season 3 PL reduced from 25,000 to 1,135 lb (wing weight; equal to the 500 landed lb wing limit) when 90% of the annual bait TAL was expected to be reached. Remained in place until March 14, 2017. PL increased to 9,307 lb as RA projected that the bait TAL would not be exceeded.
Wing	December 27, 2017	Season 2 PL reduced from 4,100 to 500 lb (wing weight) when 85% of annual TAL was expected to be reached. Remained in place until April 8, 2018. PL returned to 4,100 as RA projected that TAL would not be exceeded.

1.6.1.4 Declarations

In the years FY 2012, FY 2015, FY 2017, and FY 2018, most of the skate wing landings were either from declared Northeast multispecies trips (41-49% of wing landings) or from declared monkfish trips (36-45% of wing landings) followed by undeclared trips (6-15% of wing landings; Table 28; March 14, 2020 PDT memo). Most skate bait landings were from declared Northeast multispecies trips (29-63% of bait landings) and on undeclared trips (20-44% of bait landings).

Table 28. Skate landings by VMS declaration and skate fishery disposition, FY 2017-2018, combined.

	Live lb		Landed lb		Trips (#)		Vessels (#)	
WING landings by declaration (plan) code								
SES	6,832	0%	3,009	0%	54	1%	14	2%
SMB	371,279	2%	168,815	2%	722	7%	75	12%
DOF	892,153	4%	415,506	4%	1,791	17%	115	19%
Undeclared	1,167,012	6%	550,717	6%	1,952	19%	176	28%
MNK	8,027,842	39%	3,781,546	40%	2,582	25%	100	16%
NMS	10,128,637	49%	4,496,04	48%	3,208	31%	139	22%
TOTAL	**20,593,755**	**100%**	**9,415,633**	**100%**	**10,309**	**100%**	**370** [a]	100%
BAIT landings by declaration (plan) code								
SMB	36,270	0%	36,270	0%	14	1%	7	7%
MNK	411,532	4%	411,532	4%	126	6%	9	8%
Undeclared	2,014,406	20%	2,012,566	20%	719	36%	35	33%
DOF	2,747,799	28%	2,747,799	28%	365	18%	22	21%
NMS	4,672,338	47%	4,672,133	47%	789	39%	34	32%
TOTAL	**9,882,345**	**100%**	**9,880,300**	**100%**	**2,013**	**100%**	**74** [a]	100%

[a] The number of unique vessels, not the column total.
Source: CFDERS and DMIS data, accessed March 2020.

Potential source data errors. In examining the data from undeclared trips closely, the PDT has discovered that there are likely errors in the source data (March 14, 2020 PDT memo, Section 4.1):

1. There are trips in which the landings disposition code is likely miscoded, i.e., trips in which the landings were recorded as wing but are more likely to be bait (the lower price is more akin to expected bait prices and landed and live weight are equivalent).
2. There are trips in which the wing landed weight is greater than the live weight.

The magnitude of these potential data errors is small relative to the total undeclared landings (e.g., 0.9% in FY 2017; 0.1% in FY 2018 for the undeclared data). Thus, a minor weight of undeclared landings that were likely bait may be accounted for under the wing TALs.

Undeclared wing landings over the incidental limit. In October, the Committee was concerned that the FY 2017 draft data provided was showing that there was a large weight (850,084 lb) of wing landings on undeclared trips over the incidental limit. Correcting the data query method reduced this number to 584,936 lb (March 14, 2020 PDT memo, Section 5). Removing trips by vessels with a Federal fishing permit but no Federal endorsements (potentially fishing with state fishing permits) and potential data errors reduced the number further to 205,936 lb (2.4% of total FY 2017 wing landings,). These landings are inconsistent with regulations and occurred from 128 trips landing 504-5,372 lb each trip by 35 unique permit numbers (three permits account for most of these trips). For FY 2018, landings similarly inconsistent with regulations were 224,459 lb (2.4% of total FY 2018 wing landings).

Wing landings exceeding possession limits. In October, the Committee was concerned about the number of trips in the FY 2017 draft data that appeared to have wing landings exceeding possession limits. Correcting the data query method (duplicate trips and doubled landings removed) has reduced the number of trips and the weight of overage (March 14, 2020 PDT memo, Section 6), though comparison is difficult, because the data provided in October were not presented by season and excluded some trips. With the query method corrections, total wing landings (all declaration codes) that exceed the seasonal possession limits were under 300,000 lb (65 vessels, 155 trips) in FY 2017 and under 200,000 lb (20 vessels, 113 trips) in FY 2018. However, this includes potentially miscoded data and skate landings by vessels with a Federal fishing permit but no Federal endorsement. Accounting for all potential data issues (including miscodings) for undeclared landings with a Federal endorsement, the weight more than possession limits is about 7,000 and 18,000 lb in FY 2017 and 2018, respectively.

1.6.1.5 Revenue and Dependence on Skates

Skate revenue was $5.1-$9.1M annually from FY 2010 to 2019 (Table 29). The fluctuations in skate revenue are largely due to changes in wing revenue and landings, ranging from $4.0-7.8M annually. Revenue from the skate bait fishery is much lower and fluctuates less, $1.1-1.8M annually. Total revenue peaked in FY 2011; the wing fishery had its top revenue year in FY 2014, while the bait fishery had its top year in FY 2011.

Table 29. Skate wing and bait landings (live and landed lb) and revenue, FY 2010 – 2019.

FY	WING			BAIT			Total $
	Landings		Revenue ($)	Landings		Revenue ($)	
	Live lb	Landed lb		Live lb	Landed lb		
2010	21,058,265	9,811,682	4,850,094	9,683,262	9,343,208	1,161,771	$6.0M
2011	29,036,696	13,624,564	7,235,626	10,758,817	10,757,420	1,821,579	$9.1M
2012	21,645,473	10,072,044	5,607,823	10,662,488	10,651,587	1,393,603	$7.0M
2013	19,132,771	9,005,608	6,151,136	11,158,998	11,158,960	1,200,531	$7.4M
2014	23,995,022	11,295,094	7,825,597	9,336,994	9,336,338	1,142,550	$9.0M
2015	20,376,130	9,275,687	4,446,962	10,729,044	10,727,557	1,111,854	$5.6M
2016	19,193,091	9,449,049	3,995,203	10,099,849	10,135,369	1,113,741	$5.1M
2017	19,186,699	9,389,596	4,461,882	11,547,140	12,012,484	1,356,860	$5.8M
2018	21,041,575	10,311,695	5,864,934	10,028,801	10,437,677	1,289,204	$7.2M
2019*	19,356,338	9,208,989	5,211,620	8,915,435	9,828,257	1,316,749	$6.5M
Note: * data are preliminary, CFDERS *Source:* CFDETT/CFDETS, July 2020.							

Total revenue from vessels that landed at least 1 lb of skate over the course of the fishing year was $170M in FY 2018, which includes all species' revenues from trips that do and do not land skates if one trip landed skates at one point during the year (Table 31, sum of revenue from all dispositions). The total revenue from vessels that landed at least 1 lb of skate on each trip was $54M in FY 2018, which includes all species' revenues on trips that landed at least 1 lb of skate (Table 32).

Revenue by Disposition. Given the diversity of participation in the skate fishery, revenue dependence for vessels landing at least 1 lb of skate in a FY is summarized by vessels that land only skate for bait, for food, or skate for bait and food. Within each of these disposition categories, vessels were further divided by those with ≤ or > than 10% of their revenue from skate to understand the importance of skate throughout the fishing year. For vessels landing skate for bait and food in a FY, there are trips where skate is landed for only food, only bait, or both. During FY 2018, 305 vessels (247+58) landed skate for food only, 15 (11+4) vessels landed bait, and 68 vessels (40+28) landed skate for both food and bait (Table 31).

As of July 2020, data for FY 2018 is the latest available from the data source (FY 2019 data are preliminary) and is provided here along with FY 2016 and FY 2017 for comparison (Table 31). There are two years that an in-season incidental possession limit was triggered (Jan 30 – April 30 in FY 2016, December 27 – April 8 in FY 2017; Table 27); despite that, the dependence data for FY 2016 and 2017 are like FY 2018.

Food only: For the 305 vessels that landed skate for food only in FY 2018, the 247 vessels with ≤ 10% of their annual fishing revenues from skate for food had very low dependence (0.7%, Table 31). The 58 vessels with >10% revenue from skate had higher revenue dependence, averaging 34% or $51,727 per vessel. This group had the highest absolute level of skate for food revenues, $3M. From FY 2016-2018, the number of vessels and total revenue for vessels with skate revenue ≤ 10% of a vessel's annual revenue decreases from 307 to 247 vessels and from $163M to $140M (Table 31).

Bait only: For the 15 vessels that landed only skate bait during FY 2018, the 11 vessels with ≤10% of their annual fishing revenues from skate bait had very low revenue dependence, 2.2% on average (Table 31). The four vessels with >10% revenue from skate, had much higher revenue dependence, averaging 39% or $204,700 ($51,175 per vessel). From FY 2016-2018, the number of vessels remained relatively stable for vessels with skate revenue ≤ and > 10% of vessel's revenue; however, total revenue increased from $395K to $523K for vessels with skate revenue > 10% of vessel's annual revenue (Table 31).

Bait and food: For the 68 vessels that landed skate for both food and bait during FY 2018, the 40 vessels with ≤10% of their annual fishing revenues from skate, had very low dependence on both bait (1.5%) and food (1.2%, Table 31). The 28 vessels with >10% revenue from skate had important amounts from bait (12.2%) and food (23.1%), for a total of 34% of their revenues depending on skate. Note that the vessels with >10% revenue from skate had the highest absolute level of revenue from skate bait, $0.88M. The number of vessels with skate revenue ≤ and > 10% of vessel's annual revenue increased; total revenue also increased ($8.9M in FY 2016 to $11.7M in FY 2018 for vessels with ≤ 10% from skate revenue (Table 31). For vessels with skate revenue comprising >10% of annual revenue, the number of vessels and total revenue remained relatively stable over the period, except that 28 vessels appear in the Bait and Food group in FY 2018 only.

1.6.1.6 Skate Landings by Gear and Landings of Other Species

Trips landing skate

The following examines landings from vessels that landed at least 1 lb of skate on a trip, $54.1M total in FY 2018 (Table 31). Table 31 includes all landings and revenue for trips with 1+ lb of skate landings by food only, bait only, and food and bait and by gear type (gillnet, otter trawl, and other). Section 5.6.1.1 has more data by gear type.

The largest skate landings are by otter trawl in the bait only fishery, 10.0M lb, followed by gillnet in the food only fishery, 8.3M lb (Table 31, top section). The largest amount of all landings on trips landing 1+ lb of skates is by otter trawl in the food only fishery, at 28.0M, or almost half the grand total. In terms of percentage of landings, skates and monkfish comprise the majority of landings with gillnet gear in the food only fishery (Table 31, top section). Monkfish comprises >50% of landings on trips where skates are landed for both food and bait, however, trips where skates are landed as both food and bait are low volume overall. For revenue in the food only fishery, skates and monkfish comprise most of the revenue in the gillnet fishery, while loligo squid, scup, and whiting contribute the most in the otter trawl, which comprises the greatest revenue for all species, $37.5M (Table 31, bottom section). Other important species on trips where at least 1 lb of skate is landed in terms of landings and revenue are whiting, fluke, and loligo (not groundfish or scallops).

Table 30. Vessels landing 1+ lb of skate on at least one trip by dependence on total revenue from all species and dependence on skate revenue by disposition, FY 2016-2018.

Number of vessels			Total revenue	Bait revenue	Avg. bait percent of total revenue	Food revenue	Avg. food percent of total revenue
FY 2016							
Food only	**≤10%**	307	162,888,154	-	-	1,281,459	0.8%
	>10%	54	9,231,589	-	-	2,467,240	26.7%
Bait only	**≤10%**	13	1,349,099	29,989	2.2%	-	-
	>10%	3	394,845	239,795	60.7%	-	-
Bait & food	**≤10%**	31	8,915,353	843,957	9.5%	246,504	2.8%
	>10%	0	-	-		-	-
FY 2017							
Food only	**≤10%**	289	147,599,145	-	-	1,161,486	0.8%
	>10%	56	7,998,999	-	-	2,459,580	30.7%
Bait only	**≤10%**	10	1,178,491	21,327	1.8%	-	-
	>10%	3	517,473	233,620	45.1%	-	-
Bait & food	**≤10%**	61	14,354,794	1,101,913	7.7%	840,816	5.9%
	>10%	0	-	-	-	-	-
FY 2018							
Food only	**≤10%**	247	140,194,496	-	-	1,028,384	0.7%
	>10%	58	8,824,167	-	-	3,030,979	34.3%
Bait only	**≤10%**	11	1,366,610	30,624	2.2%	-	-
	>10%	4	522,699	204,714	39.2%	-	-
Bait & food	**≤10%**	40	11,718,989	174,537	1.5%	137,956	1.2%
	>10%	28	7,234,663	879,329	12.2%	1,667,615	23.1%
Source: CFDETT/CFDETS, July 2020.							

During FY 2018, gillnets accounted for over twice as much skate revenue as otter trawls for all trips landing skate. On trips where skates were landed for food only, gillnets are the overwhelming revenue source, with otter trawls a distant second. Quite the reverse is true of the bait only fishery, where otter trawls accounted for most of the skate revenue. On trips where skates were landed as both food and bait, the pattern is like the food only fishery, though at reduced levels.

Table 31. Landings and revenues from trips landing skate, by disposition, FY 2018.

	FOOD ONLY (landed lb)			BAIT ONLY (live lb)			FOOD AND BAIT		
Gear type	**Gillnet**	**Other**	**Otter Trawl**	**Gillnet**	**Other**	**Otter Trawl**	**Gillnet**	**Other**	**Otter Trawl**
Landings									
American plaice	10,425	6,624	343,410	37	112	3,841	0	95	2,526
Black sea bass	3,206	6,105	502,625	0	55	13,070	0	0	6,683
Blackback	24,164	8,481	1,128,099	7	180	9,308	0	147	2,050
Cod	48,963	18,681	640,855	451	95	14,507	231	17	5,159
Dogfish	1,322,803	817,118	93,652	894	0	208,668	0	0	37,330
Fluke	16,208	27,382	1,919,138	0	7,152	77,262	1,932	0	49,353
Flounder	50,325	7,416	717,654	235	272	23,155	0	271	7,119
Groundfish	145,385	11,971	2,511,472	1,126	4	35,307	0	0	3,728
Haddock	4,795	29,767	2,021,491	478	0	17,935	0	0	13,685
Loligo squid	0	244,106	2,951,212	0	43	11,496	0	0	14,016
Monkfish	4,926,493	175,117	1,098,917	75	196	4,598	155,329	1	2,323
Scallop	0	42,287	6,998	0	0	152	0	0	34
Scup	19,100	96,874	4,716,685	0	248	85,851	0	0	18,739
Skates	8,266,465	233,493	1,658,624	69,776	49,440	9,977,515	134,164	687	359,208
Whiting	15,082	564,820	5,806,827	39	2	32,604	0	0	10,302
Other	422,375	102,831	1,912,371	29,677	33	27,389	120	0	11,819
Total (57,239,245 lb)	**15,275,789**	**2,393,073**	**28,030,030**	**102,795**	**57,832**	**10,542,658**	**291,776**	**1,218**	**544,074**
Revenues									
American plaice	$13,902	$11,343	$663,894	$62	$137	$7,335	$0	$120	$4,583
Black sea bass	$14,689	$23,961	$2,047,410	$0	$175	$56,286	$0	$0	$26,209
Blackback	$56,935	$22,051	$3,526,831	$20	$350	$21,516	$0	$266	$5,655
Cod	$133,211	$43,670	$1,564,823	$1,214	$270	$39,619	$515	$49	$14,734
Dogfish	$283,364	$180,423	$19,551	$216	$0	$34,076	$0	$0	$8,563
Flounder	$47,313	$9,024	$1,123,166	$500	$264	$33,758	$0	$231	$15,464
Fluke	$63,756	$99,750	$6,844,235	$0	$37,074	$353,590	$5,405	$0	$225,600
Groundfish	$206,062	$8,832	$1,874,894	$1,351	$1	$9,996	$0	$0	$2,770
Haddock	$5,819	$27,432	$2,020,749	$685	$0	$23,862	$0	$0	$19,531
Loligo squid	$0	$407,339	$4,909,195	$0	$78	$18,089	$0	$0	$26,557
Monkfish	$5,654,489	$240,463	$1,990,587	$44	$178	$8,118	$189,847	$1	$3,878
Scallop	$0	$439,931	$66,164	$0	$0	$1,527	$0	$0	$391
Scup	$18,104	$69,782	$3,111,974	$0	$124	$35,320	$0	$0	$7,901
Skates	$4,657,582	$143,994	$978,224	$7,702	$4,602	$1,246,291	$72,464	$205	$43,074
Whiting	$10,193	$347,159	$4,769,041	$28	$2	$27,975	$0	$0	$11,374
Other	$464,483	$151,428	$2,035,270	$7,516	$26	$16,124	$110	$0	$6,758
Total ($54,090,848)	**$11,629,902**	**$2,226,582**	**$37,546,008**	**$19,338**	**$43,281**	**$1,933,482**	**$268,341**	**$872**	**$423,042**

Note: Data only include disposition codes for bait and wing and exclude VTR only, unknown, and other codes which should be analyzed separately. The 'other' species combines all species not itemized in the tables. The shaded cells represent >10% of the total landings and total revenues, which are calculated as weighted averages, dividing the total species' landings or revenues by the grand total by the group.
Source: CFDETT/CFDETS 2018-2019, July 2020.

All trips by vessels that landed skate on at least one trip

To better understand which species are contributing the most to total revenue for vessels landing at least 1 lb of skate in a FY, FY 2018 was further examined (Table 32). Table 32 breaks down revenue data by vessels in which skates constitute ≤ or > 10% of their annual revenue and by vessels that land skate as food, bait, or both at least once during FY 2018.

Food only: Monkfish comprised 41% of revenue for vessels with >10% from skate revenue, followed by dogfish (7%); groundfish comprised a little over 1% (Table 32). For the 247 vessels with ≤10% of their total revenue from only skate for food, the species dependence is more diverse, with 23% Loligo squid, 21% from the groundfish complex, 15% from other species, and 14% scallops.

Bait only: Fluke and blackback (winter) flounder comprised 49% of revenue for vessels with >10% from skate revenue (Table 32). For the 11 vessels with ≤10% of their total revenue from only skate bait, blackback, haddock, fluke, loligo squid, and other species were all important.

Bait and food: Fluke and monkfish comprised 35% of revenue for vessels with >10% from skate revenue (Table 32). For the 40 vessels with ≤10% of their total revenue from skates, 29% of their revenue was from Loligo squid, 25% from fluke, and 10% from the groundfish complex.

Table 32. FY 2018 revenue by species and disposition of vessels landing skate at least once during FY.

	FOOD ONLY				**BAIT ONLY**				**BAIT and FOOD**			
	≤ 10%		**> 10%**		**≤ 10%**		**> 10%**		**≤ 10%**		**> 10%**	
Vessels	247		58		11		4		40		28	
Skate Revenue												
Skate bait	$0	0.0%	$0	0.0%	$30,624	2.2%	$204,714	39.2%	$174,537	1.5%	$879,329	12.2%
Skate wings	$1,028,384	0.7%	$3,030,979	34.3%	$0		$0		$137,956	1.2%	$1,667,615	23.1%
Groundfish Revenue												
Am plaice	$2,848,121	2.0%	$136	0.0%	$14,420	1.1%	$0	0.0%	$47,288	0.4%	$33,437	0.5%
Blackback	$3,931,912	2.8%	$859	0.0%	$174,951	**12.8%**	$78,687	**15.1%**	$295,056	2.5%	$189,875	2.6%
Cod	$3,386,183	2.4%	$77,778	0.9%	$24,227	1.8%	$514	0.1%	$145,856	1.2%	$158,633	2.2%
Flounder	$2,367,586	1.7%	$30	0.0%	$24,881	1.8%	$573	0.1%	$227,351	1.9%	$34,465	0.5%
Haddock	$9,170,186	6.5%	$1,455	0.0%	$223,967	**16.4%**	$1,571	0.3%	$67,143	0.6%	$52,916	0.7%
Other Groundfish	$10,599,019	7.6%	$32,509	0.4%	$8,282	0.6%	$606	0.1%	$355,865	3.0%	$55,812	0.8%
Other Species Revenue												
Blk sea bass	$3,092,005	2.2%	$84,853	1.0%	$30,372	2.2%	$15,266	2.9%	$873,258	7.5%	$108,547	1.5%
Dogfish	$792,150	0.6%	$638,242	7.2%	$51	0.0%	$30	0.0%	$39,361	0.3%	$295,477	4.1%
Fluke	$10,207,013	7.3%	$127,002	1.4%	$221,256	**16.2%**	$176,193	**33.7%**	$2,872,018	**24.5%**	$1,065,004	**14.7%**
Loligo	$31,606,290	**22.5%**	$5	0.0%	$194,698	**14.2%**	$8,186	1.6%	$3,431,810	**29.3%**	$435,043	6.0%
Monkfish	$7,307,026	5.2%	$3,581,559	**40.6%**	$5,684	0.4%	$11,709	2.2%	$208,042	1.8%	$1,476,757	**20.4%**
Scallop	$20,087,523	**14.3%**	$0	0.0%	$82,845	6.1%	$3,632	0.7%	$558,497	4.8%	$5,548	0.1%
Scup	$5,815,047	4.1%	$30,451	0.3%	$15,056	1.1%	$16,816	3.2%	$957,301	8.2%	$157,611	2.2%
Whiting	$7,336,430	5.2%	$873	0.0%	$3,296	0.2%	$1,446	0.3%	$550,070	4.7%	$161,385	2.2%
Other	$20,619,621	**14.7%**	$1,217,436	**13.8%**	$312,000	**22.8%**	$2,756	0.5%	$777,580	6.6%	$457,209	6.3%
Total Revenue												
Total	**$140,194,496**	**100.0%**	**$8,824,167**	**100.0%**	**$1,366,610**	**100.0%**	**$522,699**	**100.0%**	**$11,718,989**	**100.0%**	**$7,234,663**	**100.0%**

Note: Vessels are grouped in columns by whether their annual revenue from skate is under or over 10% of all fishing revenue. Bolded cells represent >10% of annual revenue.
Source: CFDETT/CFDETS 2018-2019, accessed July 2020.

1.6.1.7 Market and Substitute Goods

[Should add in uses as bait by lobster and crab fishery (also uses herring and other), uses as food. Some content is in Sect. 1.6.1]

1.6.1.8 Skate Dealers

As with active vessels, the number of active skate dealers has decreased over time, with 124 active in 2011 down to 80 active in 2020 (Table 33). There are active skate dealers from Maine to North Carolina, though dealers are concentrated from Massachusetts to New Jersey. Dealers have remained active across the full range of states since 2011.

Table 33. Number of active skate dealers by state, calendar year 2011-2020.

State	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
ME	C	3	C	C	3	C	C	C	3	5
NH	6	7	4	4	3	4	4	7	4	C
MA	43	41	39	30	29	28	27	27	29	21
RI	33	37	31	33	30	32	29	33	31	25
CT	15	11	14	2	14	18	17	18	17	14
NY	36	39	39	37	34	35	26	30	36	28
NJ	25	20	25	33	26	24	21	25	27	20
MD	5	6	7	5	5	7	5	5	6	4
VA	8	11	12	10	9	12	10	9	7	7
NC	6	5	3	9	10	7	8	4	6	4
Total	**124**	**128**	**116**	**109**	**103**	**106**	**93**	**93**	**101**	**80**

Source: dealer data (cfders), accessed July 2021.
Note: Total may not equal the sum of the rows; a dealer may be active in multiple states. C = confidential

1.6.2 Recreational Skate Landings

Skates have little to no recreational value and are primarily discarded in recreational fisheries. Between calendar year 2012 and 2018, recreational skate landings have fluctuated, with a high of 307,907 lb (140 mt) in 2015 (Table). Landings by species varied by region. In FY 2018, recreational landings (248,353 lb) were 10% of landings and dead discards (2.4M lb, Table). Reliability of skate recreational catch estimates is a concern. Total catch estimates (A+B1+B2), however, appear to be more reliable than harvest estimates (A+B1 only). Since skates are not a valuable or heavily fished recreational species, the number of intercepts from which these estimates are derived is likely to have been very low. The fewer intercepts from which to extrapolate total catch estimates there are, the less reliable the total catch estimates will be. Due to the relative absence of recreational skate fisheries, virtually all skate landings are from commercial fisheries.

Table 34. Estimated recreational skate landings by species, calendar year 2012-2018.

	Winter (lb)	Clearnose (lb)	Little (lb)	Total (lb)	Total (mt)
2012	2,184	115,168	0	**117,352**	**53**
2013	854	88,419	110,771	**200,044**	**91**
2014	82	35,279	213,091	**248,452**	**113**
2015	102,979	162,808	42,120	**307,907**	**140**
2016	52,233	215,191	414	**267,838**	**121**
2017	4,248	42,008	30,077	**76,333**	**35**
2018	1,631	246,633	89	**248,353**	**113**

Source: NMFS/MRIP (PSE >50 for all values indicating imprecise estimates)
http://www.st.nmfs.noaa.gov/recreational-fisheries/access-data/run-a-data-query/index
Note: Species not listed have no reported harvest.

1.6.3 Other Managed Resources and Fisheries

In addition to skates, other fisheries could be impacted by the Alternatives under Consideration. The groundfish and monkfish fisheries are often prosecuted in conjunction with skates and the lobster fishery is dependent on skate as bait.

1.6.3.1 American Lobster Fishery

Population status: The 2015 peer-reviewed stock assessment report (ASMFC 2015) indicated a mixed picture of the American lobster resource. The assessment found the GOM/GBK stock was experiencing record stock abundance and recruitment (not overfished, not experiencing overfishing), though population indicators show young-of-year estimates are trending downward. This indicates a potential decline in recruitment in the coming years, and the Panel recommended that the ASMFC be prepared to impose restrictions should recruitment decline. Conversely, the assessment found the SNE stock is severely depleted, though overfishing was not occurring, with abundance indices at or near time-series lows. Recruitment indices show the stock has continued to decline and is in recruitment failure.

Management: The Atlantic States Marine Fisheries Commission and NMFS jointly manage lobster. The fishery occurs within the three stock units: Gulf of Maine, Georges Bank, and Southern New England, each with an inshore and offshore component. The fishery is managed using minimum and maximum carapace length; limits on the number and configuration of traps; possession prohibitions on egg-bearing (berried) and v-notched female lobsters, lobster meat, or lobster parts; prohibitions on spearing lobsters; and limits on non-trap landings and entry into the fishery (ASMFC 2015). The most recent addendum, Addendum XVIII, reduces trap allocations by 50% for LCMA 2 and 25% for LCMA 3.

Fishery: The American lobster fishery has seen incredible expansion in effort and landings over the last 40 years and is now one of the top fisheries on the U.S. Atlantic coast. In the 1920s, lobster landings were about 11M lb. Landings were stable from 1950 to 1975, around 30M pounds; however, from 1976 to 2008, landings tripled, reaching 92M pounds in 2006. Landings continued to increase and peaked in 2013 at over 150M pounds. Landings leveled off but remained high at 147M pounds in both 2014 and 2015 (Table), but again jumped to over 158M pounds (over $660 M) in 2016. Recently, most landings have been attributed to Maine (83%) and Massachusetts (11%). Landings, in descending order, also occurred in New Hampshire, Rhode Island, New Jersey, Connecticut, New York, Maryland, Delaware, and Virginia (ASMFC 2018).

Table 35. Total lobster landings (lb) by state, 2009-2015.

	ME	NH	MA	RI	CT	NY	NJ + South[a]	Total
2009	81,175,847	2,985,166	11,781,490	3,174,618	451,156	731,811	238,267	**100,538,355**
2010	95,506,383	3,658,894	12,768,448	3,258,221	432,491	813,513	692,480	**117,130,430**
2011	104,693,316	3,917,461	13,717,192	2,513,255	191,594	344,232	689,000	**126,066,050**
2012	125,759,424	4,236,740	14,917,238	2,932,388	236,846	275,220	978,767	**149,336,623**
2013	127,773,264	3,822,844	15,738,792	2,149,266	133,008	248,267	756,494	**150,621,935**
2014	124,440,799	4,939,310	15,060,352	2,387,321	141,988	216,630	619,565	**147,805,965**
2015	122,212,133	4,716,084	16,418,796	2,879,874	158,354	146,624	505,985	**147,037,850**
Average	**111,651,595 (83%)**	**4,039,500 (3.0%)**	**14,343,187 (11%)**	**2,756,420 (2.1%)**	**249,348 (0.19%)**	**396,614 (0.30%)**	**640,080 (0.48%)**	**134,076,744 (100%)**
Source: ASMFC lobster data warehouse (M. Cieri, pers. comm., 2017). [a] "South" includes Delaware, Maryland and Virginia.								

In Maine, the fishery is most active during the months of July to November. For the years 2004-2016, about 85% of the pounds landed were landed in those months. Just 4% of landings occurred in the months of January to April (www.maine.gov).

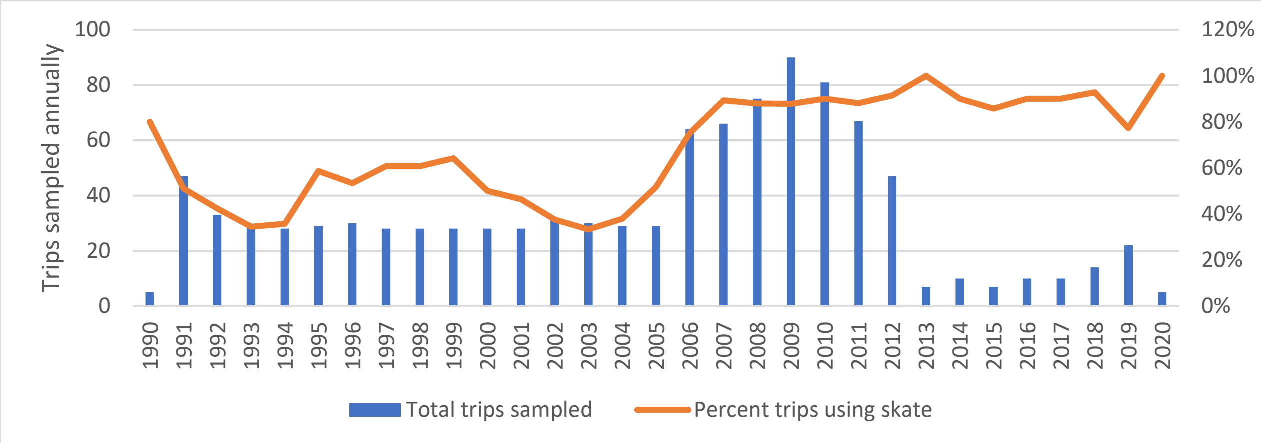
There was an average of 8,315 vessels issued commercial lobster permits for the fishery in state waters each year from 2009 to 2013, and 3,080 vessels were issued federal permits, though in most cases, a vessel holding a federal permit also holds a state permit. Thus, there are about 8,300 vessels in the lobster fishery. The State of Maine has issued the largest number of state permits, recently averaging 5,163 (62%). For Maine, about 85% of the permits are active (~4,400). For New Hampshire, about 70% of the permits issued were active during 2009-2013 ASMFC (2015).

Reliance on skate as bait: Use of skate by the lobster fishery has varied with geography and market conditions. The Maine lobster industry typically prefers herring as bait, though it depends on price and availability. South of Maine, lobstermen tend to use skate or other bait, as herring tends to break down in warmer water. For lobstermen surveyed in 2010 from Maine, New Hampshire and Massachusetts who harvest in Lobster Conservation Management Area 1 (inshore Gulf of Maine), skate was a minor bait source (Table). It is anecdotally known that most of the lobstermen in Rhode Island currently use skates for bait. Though the number of lobster and Jonah crab trips sampled over time has varied, from 1991-2005, the percent of trips where skate was used as used as bait was generally ≤60%. Since 2006, skate was a bait source on 75-100% of trips sampled (Figure 12). This suggests that skate has become a more important bait source over time.

Table 36. Bait use in the inshore Gulf of Maine lobster fishery, in 2010.

	Maine							NH	MA
	Zone A	Zone B	Zone C	Zone D	Zone E	Zone F	Zone G		
Herring	90%	86%	73%	73%	84%	37%	75%	60%	76%
Pogies	3%	2%	0%	15%	14%	39%	11%	4%	13%
Redfish	1%	8%	12%	4%	1%	19%	8%	0%	0%
Racks	1%	2%	1%	2%	0%	1%	1%	26%	6%
Alewives	1%	1%	0%	1%	0%	0%	0%	0%	0%
Other	4%	2%	13%	5%	0%	4%	4%	9%	4%
Source: Dayton *et al.* (2014). "Racks" are the skeletal remains of fish.									

Figure 12. Use of skate as bait on lobster and Jonah crab trips sampled by RI DEM, calendar year 1990-2020.



Source: RI DEM, May 2020. *Note:* 2020 data are for a partial year.
Note: The number of trips sampled was low in 2013-2018 due to staffing limitations.

1.6.3.2 Large Mesh Multispecies (Groundfish)

The overall trend since the start of sector management through 2014 has been a decline in groundfish landings and revenue ($55M in FY 2014) and the number of vessels with revenue from at least one groundfish trip (273 in FY 2014). The groundfish fishery has had a diverse fleet of vessels sizes and gear types. Over the years, as vessels entered and exited the fishery, the typical characteristics defining the fleet changed as well. The decline in active vessels has occurred across all vessel size categories. Since FY 2009, the 30’ to < 50’ vessel size category, which has the largest number of active groundfish vessels, experienced a decline from 305 to 145 active vessels. The <30’ vessel size category, containing the least number of active groundfish vessels, experienced the largest reduction since FY 2009 (34 to 14 vessels; Murphy et al. 2015; NEFMC 2017).

1.6.3.3 Monkfish

Life History. Monkfish, *Lophius americanus*, (i.e., “goosefish”), occur in the western North Atlantic from the Grand Banks and northern Gulf of St. Lawrence south to Cape Hatteras, North Carolina. Monkfish occur from inshore areas to depths of at least 2,953 ft (900 m). Monkfish undergo seasonal onshore-offshore migrations, which may relate to spawning or possibly to food availability. Female monkfish begin to mature at age 4 with 50% of females maturing by age 5 (~17 in [43 cm]). Males generally mature at slightly younger ages and smaller sizes (50% maturity at age 4.2 or 14 in [36 cm]). Spawning takes place from spring through early autumn. It progresses from south to north, with most spawning occurring during the spring and early summer. Females lay a buoyant egg raft or veil that can be as large as 39 ft (12 m) long and 5 ft (1.5 m) wide, and only a few mm thick. The larvae hatch after 1 - 3 weeks, depending on water temperature. The larvae and juveniles spend several months in a pelagic phase before settling to a benthic existence at a size of ~3 in (8 cm; NEFSC 2011).

Population and Management Status. NMFS implemented the Monkfish FMP in 1999 (NEFMC & MAFMC 1998) and NEFMC and MAFMC jointly managed the fishery. The FMP included measures to stop overfishing and rebuild the stocks through measures such as: limiting the number of vessels with access to the fishery and allocating DAS to those vessels; setting trip limits for vessels fishing for monkfish; minimum fish size limits; gear restrictions; mandatory time out of the fishery during the spawning season; and a framework adjustment process.

The Monkfish FMP defines two management areas for monkfish (northern and southern), divided roughly by an east-west line bisecting Georges Bank. As of 2013 data, monkfish in both management areas are not overfished and overfishing is not occurring (NEFSC 2013). Operational assessments for monkfish were conducted in 2016 and 2019, but it was recommended that stock status not be updated during these data updates due to a lack of biological reference points (NEFSC 2020; Richards 2016). According to the 2019 assessment, strong recruitment in 2015 fueled an increase in stock biomass in 2016-2018, though abundance has since declined as recruitment returned to average levels. Biomass increases were greater in the northern area than in the southern area, and biomass has declined somewhat in the south, as abundance of the 2015-year class declined. In the north, landings and catch have fluctuated around a steady level since 2009, but increased after 2015, with discards increasing only slightly. In the south, catch and landings had been declining since around 2000, but catch increased after 2015 due to discarding of a strong 2015-year class, with almost a doubling of the discard rate.

1.6.4 Fishing Communities

Consideration of the economic and social impacts on fishing communities from proposed fishery regulations is required under the National Environmental Policy Act (NEPA) and the Magnuson Stevens Fishery Conservation and Management Act, particularly, National Standard 8 which defines a "fishing community" as "a community which is substantially dependent on or substantially engaged in the harvesting or processing of fishery resources to meet social and economic needs, and includes fishing vessel owners, operators, and crew and United States fish processors that are based in such community" (16 U.S.C. § 1802(17)). Determining which fishing communities are "substantially dependent" on, and "substantially engaged" in a fishery can be difficult. For skates, they are widely used as bait for the lobster fishery, and it is impractical to identify every community with substantial involvement in the lobster fishery (and consequently some dependence on the skate fishery) for assessment in this document.

Determining the engagement in and reliance on the skate fishery: The NOAA Fisheries Fishing Engagement and Reliance Indices give a broader view of the degree of involvement of communities in fisheries than simply using pounds or revenue of landed fish (Jepson & Colburn 2013). The indicators portray the importance or level of dependence of commercial or recreational fishing to coastal communities and are used here to help identify primary ports for a fishery. The degree of engagement in or reliance on the skate fishery is based on multiple sources of information, averaged over five-year time periods, using NMFS dealer and U.S. Census data.

- *The engagement index* incorporates the pounds and value of landed skates, the number of Northeast skate commercial fishing permits with that community identified as the homeport, and the number of skate dealers buying fish in that community.
- *The reliance index* is a per capita measure using the same data as the engagement index but divided by total population of the community.

Using a principal component and single solution factor analysis, each community receives a factor score, which is translated into a ranking of low, medium, medium-high, or high. A score of 1.0 or more places the community at 1 standard deviation above the mean (or average) and is considered highly engaged or reliant. Communities with negative scores (i.e., below the mean) have low engagement. More information about the indicators may be found at: http://www.st.nmfs.noaa.gov/humandimensions/social-indicators/index.

1.6.4.1 Skate Fishing Communities

1.6.4.1.1 Communities Identified

There are over 400 communities that have been a homeport or landing port to one or more active Northeast skate vessels since 2010 (more homeports than landing ports). These ports occur throughout the coastal northeast and mid-Atlantic, primarily from Maine to New Jersey. The level of activity in the skate fishery has varied across time. This section identifies the communities for which skates are particularly important. While the involvement of communities in the skate fishery is described, individual vessel participation may vary. Communities dependent on the skate resource are categorized into primary and secondary port groups. Metrics were calculated using the annual average over a recent nine-year period for which landings data are available, here (FY 2010-2018). Because geographical shifts in the distribution of Northeast skate fishing activity have occurred, the characterization of some ports as "primary" or "secondary" may not reflect their historical participation in and dependence on the skate fishery. The NOAA Fisheries Fishing Engagement and Reliance Indicators reveal that there are over 480 communities that have a skate fishery engagement and reliance index in the range of low to high, using 2014-2018 data. Reported in Table 37 are the 28 communities that have a ranking of at least medium-high for either engagement or reliance.

Primary Port Criteria. The skate fishery primary ports are those that are substantially engaged in the fishery, and which are likely to be the most impacted by the alternatives under consideration. The primary ports meet at least one of the following criteria:

1. At least $1M average annual revenue of skates during 2010-2018 (Table 38), or
2. A ranking of high for engagement in and reliance on the skate fishery on average in 2014-2018 according to the NOAA Fisheries Community Social Vulnerability Indicators (Table 37).

Secondary Port Criteria. The skate fishery secondary ports are those that may not be as dependent or engaged in the fishery as the primary ports but are involved to a lesser extent. Because of the size and diversity of the skate fishery, it is unpractical to examine each secondary port individually. However, they are listed here to provide a broader scope of potential communities impacted by skate management measures. The secondary ports meet at least one of the following criteria:

1. At least $100,000 average annual revenue of skates, 2010-2018, or
2. A ranking of at least medium-high for engagement in or reliance on the skate fishery on average in 2014-2018 according to the NOAA Fisheries Community Social Vulnerability Indicators (Table 38).

Skate Primary and Secondary Ports. Based on these criteria, there are eight primary ports in the Northeast skate fishery (Table 39). Of these, the highest revenue ports are Chatham and New Bedford, Massachusetts and Point Judith, Rhode Island. There are 21 secondary ports from Massachusetts to North Carolina. The primary and secondary ports comprised 72% and 24% of total fishery revenue, respectively, during 2010-2018. There are 87 other ports that have had more minor participation (4%) in the fishery recently.

Of the primary ports, Chatham had the highest average revenue between 2010 and 2018, $1.7M, or 15% of total revenue in Chatham for all fisheries (Table 38). There were 59 active skate vessels during that time. Point Judith and New Bedford each had an average over $1.2M. The percent of total revenue was lower, just 0.3% and 2.8%, respectively. However, a much larger number of skate vessels landed in these ports, 167 and 178, respectively. Thus, although these three ports are important for the skate fishery, other fisheries dominate their overall fishing activity. For most of the secondary ports, the percent revenue from skates is also very low, from 0.3-12%, except for Sea Isle City, New Jersey (18%). Montauk, New York and Gloucester, Massachusetts had 106 and 152 active skate vessels during 2010-2018, higher than the other secondary ports, 5-96. Community profiles are available from the NEFSC Social Sciences Branch website (Clay et al. 2007).

Table 37. Skate fishing community engagement and reliance indicators, 2014-2018 average.

State	Community	Community Index	
		Engagement 2014-2018	Reliance 2014-2018
ME	Monhegan	Low	High
	Portland	Medium-High	Low
MA	Gloucester	High	Medium
	Boston	Medium-High	Low
	Scituate	Medium-High	Low
	Chatham	High	High
	Harwichport	Medium-High	Medium-High
	Woods Hole	Medium	Medium-High
	New Bedford	High	Medium
	Westport	High	Medium
	Chilmark	Medium	High
RI	Little Compton	High	High
	Newport	High	Medium
	Narragansett/Pt. Judith	High	High
CT	Stonington/Mystic/Pawcatuck	High	Medium
	New London	High	Medium
NY	Montauk	High	High
	Amagansett	Medium	High
	Wainscott	Low	Medium-High
	Hampton Bays/Shinnecock	High	Medium-High
	Oak Beach-Captree	Low	High
NJ	Belford	High	High
	Point Pleasant	High	Medium
	Barnegat Light/Long Beach	High	High
	Cape May	High	High
MD	Ocean City	Medium-High	Medium
VA	Newport News	Medium-High	Low
NC	Wanchese	Medium-High	Medium-High

Notes: This list includes those communities that have a ranking of at least medium-high for engagement or reliance.
Source: http://www.st.nmfs.noaa.gov/humandimensions/social-indicators/index.

Table 38. Fishing revenue (unadjusted for inflation) and vessels in top skate ports by revenue, calendar years 2010-2018.

Port	Average revenue, 2010-2018			Total active skate vessels, 2010-2018
	All fisheries	Skates only	% Skates	
Chatham, MA	$11,724,737	$1,704,647	15%	59
Point Judith, RI	$45,995,459	$1,294,973	2.8%	167
New Bedford, MA	$359,807,372	$1,229,694	0.3%	178
Newport, RI	$8,310,603	$411,274	4.9%	25
Little Compton, RI	$2,345,325	$280,600	12%	30
Long Beach, NJ	$26,247,037	$247,347	0.9%	59
Montauk, NY	$17,262,945	$230,299	1.3%	106
New London, CT	$5,030,350	$226,059	4.5%	30
Pt. Pleasant, NJ	$26,975,369	$175,347	0.7%	96
Sea Isle City, NJ	$879,404	$161,499	18%	5
Gloucester, MA	$47,936,941	$155,971	0.3%	152
Stonington, CT	$7,241,146	$136,587	1.9%	33
Hampton Bay, NY	$5,777,526	$133,139	2.3%	59
Westport, MA	$1,427,621	$101,323	7.1%	10
Other (n=103)	$290,196,969	$582,207	0.2%	
Total	**$857,158,805**	**$7,070,932**	**0.8%**	
Source: NMFS Commercial Fisheries Database, accessed September 2019.				

Table 39. Primary and secondary ports in the Northeast skate fishery.

State	Port	Average revenue, 2010-2018		Fishing Engagement or Reliance Indicator		Primary/ Secondary
		>$100K	>$1M	Med-High	High	
ME	Monhegan			√		Secondary
	Portland			√		Secondary
MA	Gloucester	√		√		Secondary
	Boston			√		Secondary
	Scituate			√		Secondary
	Chatham	√	√		√	Primary
	Harwichport			√		Secondary
	Woods Hole			√		Secondary
	New Bedford	√	√		√	Primary
	Westport	√		√		Secondary
	Chilmark			√		Secondary
RI	Little Compton	√			√	Primary
	Newport	√		√		Secondary
	Narragansett/Point Judith	√	√		√	Primary
CT	Stonington/Mystic/Pawcatuck	√		√		Secondary
	New London	√		√		Secondary
NY	Montauk	√			√	Primary
	Amagansett			√		Secondary
	Wainscott			√		Secondary
	Hampton Bays/ Shinnecock	√		√		Secondary
	Oak Beach - Captree			√		Secondary
NJ	Belford				√	Primary
	Point Pleasant	√		√		Secondary
	Barnegat Light/Long Beach	√			√	Primary
	Sea Isle City	√				Secondary
	Cape May				√	Primary
MD	Ocean City			√		Secondary
VA	Newport News			√		Secondary
NC	Wanchese			√		Secondary

The Engagement Index can be used to determine trends in a fishery over time. Those ports with high skate engagement in 2014-2018, generally had high engagement in 2004-2008 and 2019-2013, except for Westport, MA; Stonington and New London, CT; and Belford NJ (Table 40). There are 11 ports that have had high engagement during all three periods, indicating a stable presence in those communities.

Table 40. Changes in engagement over time for all primary and secondary skate ports, plus any port with medium-high or high skate engagement over the time series, 2004-2018.

State	Community	Engagement Index			
		2004-2008	2009-2013	2014-2018	2018 only
ME	Monhegan	Low	Low	Low	Low
	Portland	Med.-High	Med.-High	Med.-High	Medium-
NH	Portsmouth	Med.-High	Med.-High	Low	Low
MA	Gloucester	High	High	High	High
	Boston	High	High	Med.-High	Med.-High
	Scituate	High	High	Med.-High	Med.-High
	Marshfield	Med.-High	Medium	Medium	Medium
	Plymouth	Med.-High	Medium	Medium	Medium
	Provincetown	High	Med.-High	Medium	Medium
	Chatham	High	High	High	High
	Harwichport	Medium	Medium	Med.-High	Medium
	Woods Hole	Medium	Medium	Medium	Medium
	Fall River	Medium	High	Low	Low
	New Bedford	High	High	High	High
	Westport	Med.-High	Med.-High	High	Med.-High
	Chilmark	Low	Medium	Medium	Medium
RI	Tiverton	High	Medium	Medium	Medium
	Little Compton	High	High	High	High
	Newport	High	High	High	High
	Narragansett/Pt. Judith	High	High	High	High
CT	Stonington/Mystic/Pawcatuck	Med.-High	Medium	High	High
	New London	Medium	High	High	High
NY	Mattituck	Med.-High	Med.-High	Medium	Medium
	Montauk	High	High	High	High
	Amagansett	Medium	Medium	Medium	Medium
	Wainscott	Medium	Low	Low	Low
	Hampton Bays/Shinnecock	High	High	High	High
	Oak Beach-Captree	Low	Low	Low	Low
NJ	Belford	Med.-High	Med.-High	High	High
	Point Pleasant	High	High	High	High
	Barnegat Light/Long Beach	High	High	High	High
	Cape May	High	High	High	High
MD	Ocean City	Med.-High	Med.-High	Med.-High	Med.-High
VA	Newport News	Medium	Medium	Med.-High	Med.-High
NC	Wanchese	Medium	Med.-High	Med.-High	Medium

Source: http://www.st.nmfs.noaa.gov/humandimensions/social-indicators/index.

Social and Gentrification Pressure Vulnerabilities. The NOAA Fisheries Community Social Indicators (see also Jepson & Colburn 2013) are quantitative measures that describe different facets of social and economic well-being that can shape either an individual's or community's ability to adapt to change. The indicators represent different facets of the concepts of social and gentrification pressure vulnerability to provide context for understanding the vulnerabilities of coastal communities engaged in and/or reliant on commercial fishing activities. Provided here are these indicators for the primary and secondary skate ports. At least some data are missing for Wainscott and Oak Beach/Captree, NY because these communities are not included in the American Community Survey five-year estimates upon which the social and gentrification pressure vulnerability indicators are based. Therefore, their status in these categories could not be analyzed.

The Social Vulnerability Indicators. There are five social vulnerability indicators: Labor force structure, Housing characteristics, Personal disruption, Poverty, and Population composition. The variables used to construct each of these indices have been identified in the literature as representing different factors that may contribute to a community's vulnerability. The **Labor force structure** index characterizes the strength/weakness and stability/instability of the labor force. The **Housing characteristics** index is a measure of infrastructure vulnerability and includes factors that indicate housing that may be vulnerable to coastal hazards. The **Personal disruption** index represents factors that disrupt a community member's ability to respond to change because of personal circumstances affecting family life such as unemployment or educational level. The **Poverty** index is a commonly used indicator of vulnerable populations. The **Population composition** index shows the presence of populations who are traditionally considered more vulnerable due to circumstances often associated with low incomes and fewer resources. A high rank in any of these indicates a more vulnerable population.

Overall, both primary and secondary skate port communities exhibited medium to high vulnerability in at least one of the five social vulnerability indicators. For primary ports, only New Bedford, MA shows vulnerabilities in more than one of the five indicators. In fact, it has vulnerabilities in four out of the five indicators. For secondary ports, New London, CT and Newport News, VA scored medium to high for four out of the five indicators. For both primary and secondary ports, the most common indicator of vulnerability is Labor force structure.

Gentrification Pressure Indicators. Gentrification pressure indicators (Table 42) characterize factors that, over time, may indicate a threat to the viability of a commercial or recreational working waterfront, including the displacement of fishing and fishing-related infrastructure. The **Housing Disruption** index represents factors that indicate a fluctuating housing market where some fishing infrastructure displacement may occur due to rising home values and rents. The **Retiree migration** index characterizes areas with a higher concentration of retirees and elderly people in the population. The **Urban sprawl** index describes areas with increasing population and higher costs of living. A high rank in any of these indicates a population more vulnerable to gentrification.

All primary skate ports scored medium to high on at least two of the three gentrification pressure indicators. Similar results are found for secondary ports, with 16 out of 21 scoring medium or higher on at least two of the three indicators. This suggests that shoreside fishing infrastructure and fishing family homes may face rising property values (and taxes) from an influx of second homes and businesses catering to those new residents, which may displace the working waterfront.

Combined Social and Gentrification Pressure Vulnerabilities. Overall, five of the eight primary port communities have medium to high levels of vulnerability for four or more of the eight indicators (combined social and gentrification pressure). New Bedford, MA has six indicators at the medium to high level. For secondary ports, 10 of the 21 communities have medium to high levels of vulnerability for four or more of the eight indicators. Boston, MA has five. This indicates high social and gentrification pressure vulnerability overall for both the primary and secondary communities, though some individual communities exhibit low levels for one or more indicators.

Table 41. Social vulnerability in primary and secondary skate ports, 2018.

	State	Community	Labor Force Structure	Housing Characteristics	Personal Disruption	Poverty	Population Composition
Primary Skate Ports	MA	Chatham	High	Low	Low	Low	Low
		New Bedford	Low	Medium	MedHigh	High	MedHigh
	RI	Little Compton	Medium	Low	Low	Low	Low
		Narragansett/ Pt. Judith	Medium	Low	Low	Low	Low
	NY	Montauk	Medium	Low	Low	Low	Low
	NJ	Barnegat Light	High	Low	Low	Low	Low
		Belford	Low	Low	Low	Low	Low
		Cape May	MedHigh	Low	Low	Low	Low
Secondary Skate Ports	ME	Monhegan	Low	MedHigh	Low	MedHigh	Low
		Portland	Low	Medium	Low	Medium	Low
	MA	Boston	Low	Low	Medium	MedHigh	MedHigh
		Chilmark	MedHigh	Low	Low	Low	Low
		Gloucester	Low	Low	Low	Low	Low
		Harwich Port	High	Low	Low	Low	Low
		Scituate	Low	Low	Low	Low	Low
		Westport	Low	Low	Low	Low	Low
		Woods Hole	Medium	Low	Low	Low	Low
	CT	New London	Low	Medium	High	High	MedHigh
		Stonington	Low	Low	Low	Low	Low
	RI	Newport	Low	Low	Low	Medium	Low
	MD	Ocean City	Medium	MedHigh	Low	Low	Low
	NY	Amagansett	MedHigh	Low	Low	Low	Low
		Hampton Bays/ Shinnecock	Low	Low	Low	Low	Medium
		Oak Beach-Captree	High	N/A*	Low	N/A*	Low
		Wainscott	N/A*	N/A*	N/A*	N/A*	N/A*
	NJ	Pt. Pleasant Beach	Medium	Low	Low	Low	Low
		Sea Isle City	High	Low	Low	Low	Low
	VA	Newport News	Low	Medium	Medium	Medium	MedHigh
	NC	Wanchese	Low	MedHigh	Low	Low	Medium

*N/A indicates ranking is not available due to incomplete data.
Source: NOAA Fisheries Community Social Vulnerability Indices.

Table 42. Gentrification pressure in primary and secondary skate ports, 2018.

	State	Community	Housing Disruption	Retiree Migration	Urban Sprawl
Primary Skate Ports	MA	Chatham	High	High	Medium
		New Bedford	Medium	Low	MedHigh
	RI	Little Compton	MedHigh	MedHigh	Low
		Narragansett/Pt. Judith	MedHigh	Medium	Low
	NY	Montauk	High	MedHigh	MedHigh
	NJ	Barnegat Light	High	High	MedHigh
		Belford	High	Low	Medium
		Cape May	High	High	Medium
Secondary Skate Ports	ME	Monhegan	High	Low	Low
		Portland	MedHigh	Low	Medium
	MA	Boston	High	Low	High
		Chilmark	Low	High	High
		Gloucester	Medium	Low	Medium
		Harwich Port	Medium	High	Medium
		Scituate	MedHigh	Low	MedHigh
		Westport	Medium	Medium	Medium
		Woods Hole	Low	MedHigh	MedHigh
	RI	New London	High	Low	Medium
	CT	Stonington	Low	Low	Low
		Newport	Low	Medium	Low
	NY	Ocean City	High	MedHigh	High
		Amagansett	High	Medium	MedHigh
		Hampton Bays/Shinnecock	N/A*	High	N/A*
		Oak Beach-Captree	N/A*	N/A*	N/A*
	NJ	Wainscott	High	Medium	MedHigh
		Pt. Pleasant Beach	MedHigh	High	Medium
	MD	Sea Isle City	MedHigh	MedHigh	Low
	VA	Newport News	Low	Low	Low
	NC	Wanchese	Medium	Low	Low

*N/A indicates ranking is not available due to incomplete data.

1.6.4.1.2 Ports by fishery (wing and bait)

Wing fishery: During 2010-2018, skate wings (food) were landed in over 115 ports. Skate wing revenue was highest in Chatham and New Bedford, MA; and Point Judith and Little Compton, RI during that time (Table 43). In 2018, the top wing ports were Chatham and New Bedford, MA; Point Judith, RI, and Point Pleasant, NJ. The total skate wing revenue for 2018 ($5.6M) was slightly lower than the average for 2010-2018 ($5.8M). The top port for skate wing revenue has been Chatham, averaging $1.7M for 2010-2018, accounting for 29% of wing revenue. The second highest port for skate wings is now Point Judith, but the revenue in 2018 ($539K) was down 27% from the nine-year average ($741K). New Bedford skate wing revenues were $467K in 2018, much less than half its 2010-2018 average of $1.2 million.

Trawl and gillnet vessels land skate wings. Some trawlers target skate; others catching skate incidentally. Most of the gillnet vessels targeting skate are based largely in Chatham but also in New Bedford. There is a very small skate wing fleet in Virginia, though it has dramatically declined in recent years. Most of these are monkfish gillnets though some draggers caught skate incidentally at the height of the fishery.

Bait fishery: During 2010-2018, skate bait was landed in over 35 ports with bait revenue highest in Point Judith and Newport, RI during that time (Table 43). In 2018, the top bait ports were Point Judith, RI, and New London, CT. The total skate bait revenue for 2018 ($1.4M) was slightly higher than the average for 2010-2018 ($1.3M). The top port for skate bait revenue has been Point Judith, RI, averaging $554K for 2010-2018, accounting for 43% of bait revenue. The second highest port for skate wings is now New London, CT, with revenue in 2018 ($280K) up 204% from the nine-year average ($137K). These revenues are those reported by Federal dealers. Ports such as Montauk, NY have individual vessels which sell skate directly to lobster and other pot fishermen for bait.

Table 43. Skate revenue by disposition and port, for calendar years 2010-2018.

Port	Avg. 2010-2018	2018 only
Wing (food)	**$5,779,373**	**$5,617,183**
Chatham, MA	$1,689,116	$2,793,625
New Bedford, MA	$1,194,233	$467,668
Point Judith, RI	$740,775	$538,917
Little Compton, RI	$280,600	$173,131
Barnegat Light, NJ	$241,332	$202,637
Montauk, NY	$230,277	$246,397
Newport, RI	$181,871	$126,719
Point Pleasant, NJ	$174,092	$275,422
Gloucester, MA	$133,104	$82,331
Hampton Bay, NY	$154,923	$119,707
Stonington, CT	$124,995	$126,753
Westport, RI	$100,355	$55,057
Other Ports (n=104)	*$533,701*	*$408,819*
Bait	**$1,291,559**	**$1,403,155**
Point Judith, RI	$554,199	$714,467
Newport, RI	$229,402	$144,862
Sea Isle City, NJ	$148,630	$0
New London, CT	$137,160	$280,434
Other Ports (n=32)	*$222,168*	*$263,392*
Grand Total	**$7,070,932**	**$7,020,338**

1.6.4.1.3 Fishery by states

During 2010-2018, skates were landed in ten states, mostly in Massachusetts and Rhode Island (Table 44). The bait fishery is primarily located in Rhode Island, and the wing fishery in Massachusetts. The skate fishery is a small contribution (0.0-2.8%) to overall fishing revenue to these ten states.

Table 44. Skate landings and revenue by fishery and state, calendar year 2010-2018.

	Average revenue 2010-2018				
	Skates			All fisheries	% skates
	Bait	Food	Total		
ME	$72	$1,245	$1,316	$305,515,928	0.0%
NH	$5,737	$12,477	$18,214	$25,595,733	0.1%
MA	$139,232	$3,304,615	$3,443,847	$502,369,095	0.7%
RI	$785,590	$1,221,570	$2,007,160	$71,733,848	2.8%
CT	$155,177	$229,162	$384,338	$14,564,035	2.6%
NY	$156	$416,687	$416,843	$27,840,035	1.5%
NJ	$204,560	$494,964	$699,524	$159,086,127	0.4%
MD	$601	$21,258	$21,859	$7,065,590	0.3%
VA	$435	$71,943	$72,378	$60,801,601	0.1%
NC	$0	$5,345	$5,345	$18,558,375	0.0%

1.6.4.1.4 Environmental Justice

Executive Order 12898 requires federal agencies conduct their programs, policies, and activities in a manner to ensure individuals or populations are not excluded from participation in, or denied the benefits of, or subjected to discrimination because of their race, color, or national origin. These requirements of this executive order are meant to achieve what is generally referred to as environmental justice for communities that are affected by federal activities. Environmental justice is measured at the community level. Here, community is defined as a fishing community. Indicators of vulnerability for purposes of environmental justice can include but are not limited to income, race/ethnicity, household structure, education levels, and age. The focus of E.O. 12898 is to consider "the disproportionately high and adverse human health or environmental effects of [an agency's] programs, policies, and activities on minority populations and low-income populations in the United States and its territories…"

The poverty, population composition, and personal disruption indices (Table 41) can help identify the communities where environmental justice may be of concern. New Bedford and Boston, MA; New London, CT; and Newport News, VA are the primary and secondary skate ports that ranked medium to high for all three indices. Due to their rankings for indicators for environmental justice, these communities may be more vulnerable to changes in federal actions, due to factors described above as important indicators for environmental justice.

1.6.4.2 Communities for Other Fisheries

There are several other fisheries that are potentially impacted by this action. Summarized below are the key port communities that are important to each of these fisheries, as identified by the lead management entity for each. Where the management entity has not previously identified the relevant communities, a method was developed through an earlier NEFMC action and explained below. Many ports have coexisting fisheries, including the skate fishery. In all, about 50 communities have been identified as potentially impacted (Table 46). Section 1.3 contains more information about these fisheries.

American Lobster: The American lobster fishery is the primary end user of skate bait. Lobster is landed in many port communities on the Atlantic coast. The ASMFC does not identify key ports in the FMP for this fishery. In 2019, 17 of the top 20 ports for lobster landed value were in Maine (primarily Mid-Coast to eastern Maine), with one in New Hampshire and two in Massachusetts (Table 45). For purposes of this action, these 20 top ports are considered the primary lobster ports (Table 45). There are over 200 other ports that are the primary landing port or homeport to lobster vessels in about 15 states. Since about 8,000 state waters-only lobster licenses are issued annually, the fishery likely occurs in many other ports.

Northeast Multispecies: Skates are important incidentally to the commercial groundfish fishery and are a bait source for the recreational bait fishery. There are over 400 communities that have been the homeport or landing port to one or more commercial Northeast groundfish fishing vessels since 2008. Ports highly engaged in the groundfish fishery were identified in Framework 59 and Amendment 23 to the Northeast Multispecies FMP (NEFMC 2020a; b). Primary and secondary ports were identified in earlier actions (e.g., NEFMC 2019b). For purposes of this action, the highly engaged ports are considered the primary groundfish ports and others identified are secondary (Table 46).

Monkfish: Skates are important incidentally to the monkfish fishery and are a bait source for the recreational bait fishery. The primary and secondary monkfish ports (Table 46), using data in Framework 10 to the Monkfish FMP, are identified as:

- Primary ports: very high engagement in the fishery (score = 5-20) or having at least $1M of monkfish revenue on average from 2009-2013.
- Secondary ports: high engagement in the fishery (score = 1-4.99) or having at least $50K of monkfish revenue on average from 2009-2013.

Table 45. Top 20 (non-confidential) landing ports by lobster revenue, 2019, Maine to New Jersey.

State	Port	Top 20 landing port for lobster revenue		
		Revenue	# of vessels	# of dealers
ME	Jonesport	$10M	148	4
	Beals	$22M	283	5
	Harrington	$10M	57	4
	Milbridge	$12M	99	8
	Southwest Harbor	$11M	128	8
	Bass Harbor	$13M	130	7
	Swans Island	$9M	84	3
	Stonington	$49M	368	7
	Vinalhaven	$39M	219	5
	Owls Head	$13M	72	2
	S. Thomaston/Spruce Head	$18M	142	11
	Tenants Harbor	$8M	79	6
	Cushing	$11M	74	4
	Friendship	$24M	136	10
	Cundys Harbor	$11M	111	6
	Harpswell	$12M	109	12
	Portland	$15M	221	19
NH	Portsmouth/Newington	$33M	90	11
MA	Gloucester	$22M	182	24
	New Bedford	$13M	60	18
Source: ACCSP, accessed April 2020				

Table 46. Key port communities for the skate fishery and other fisheries potentially impacted by Amendment 5.

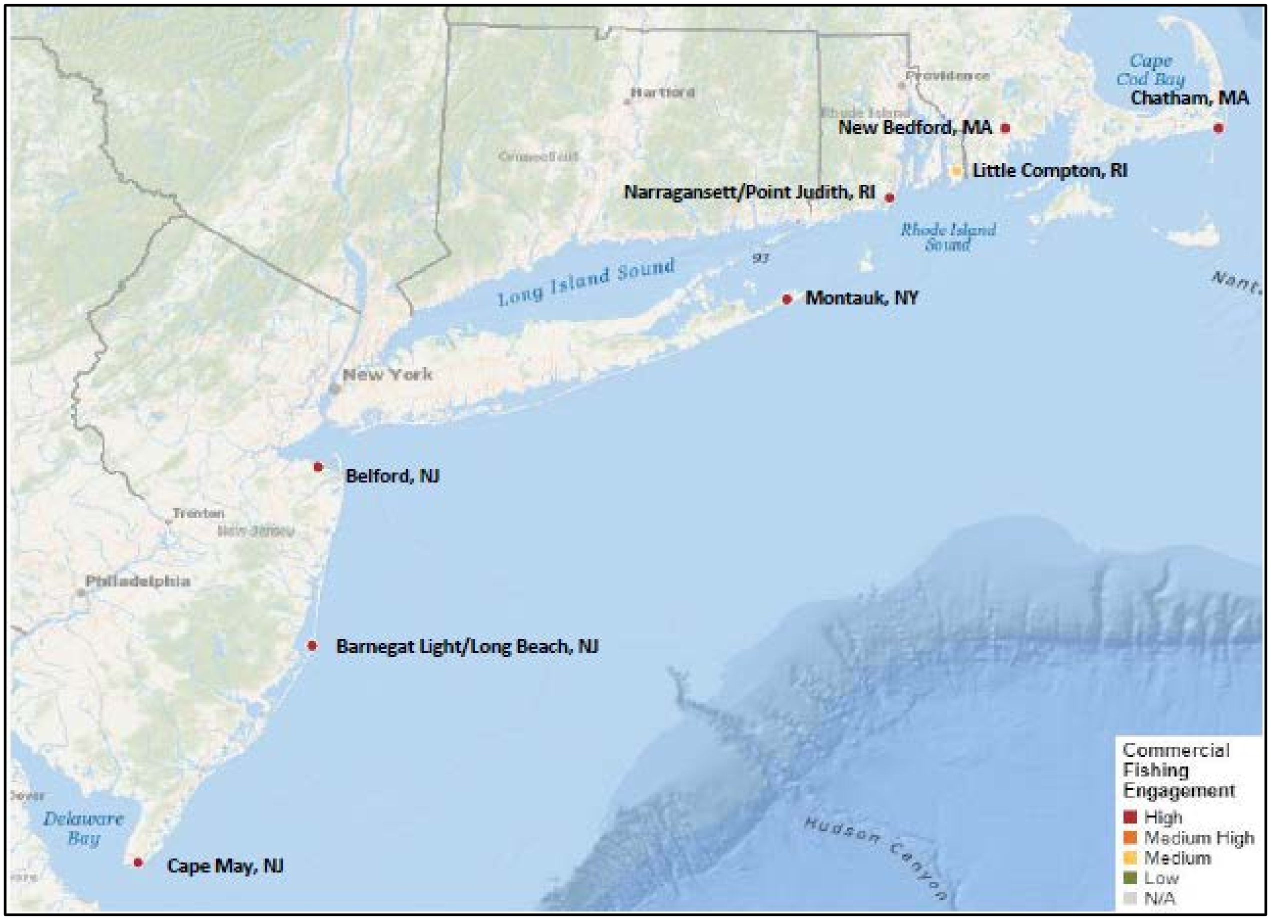
State	Port	Skate	Lobster	Groundfish	Monkfish
ME	Jonesport		L*		
	Beals		L*		
	Harrington		L*		
	Milbridge		L*		
	Southwest Harbor		L*		
	Bass Harbor		L*		
	Swans Island		L*		
	Stonington		L*		
	Vinalhaven		L*		
	Owls Head		L*		
	S. Thomaston/Spruce Head		L*	G	
	Monhegan	S			
	Tenants Harbor/Port Clyde		L*	G	M
	Cushing		L*		
	Friendship		L*		
	Boothbay Harbor			G	
	Cundys Harbor		L*	G	
	Harpswell		L*		
	Portland	S	L*	G*	M
	Saco			G	
	Kennebunkport/Cape Porpoise			G	
NH	All (e.g., Portsmouth, Rye, Hampton		L*	G	M
MA	Newburyport			G	
	Rockport			G	
	Gloucester	S	L*	G*	M*
	Boston	S		G*	M*
	Scituate	S		G*	M
	Marshfield			G	
	Plymouth			G	
	Sandwich			G	
	Barnstable			G	
	Dennis			G	
	Provincetown			G	
	Chatham	S*		G*	M
	Harwichport	S		G	
	Woods Hole	S		G	
	New Bedford/Fairhaven	S*	L*	G*	M*

	Nantucket			G	
	Chilmark	S			M
	Westport	S			M
RI	Tiverton				M
	Little Compton	S*			M
	Newport	S		G	M
	Narragansett/Point Judith	S*		G*	M*
	New Shoreham				M
CT	Stonington/Mystic/Pawcatuck	S		G	M
	New London	S			M
NY	Montauk	S*		G*	M*
	Amagansett	S			
	Wainscott	S			
	Hampton Bays/Shinnecock	S		G*	M
	Oak Beach - Captree	S			
NJ	Belford	S*			M
	Point Pleasant	S			M
	Waretown				M
	Barnegat				M
	Barnegat Light/Long Beach	S*			M*
	Sea Isle City	S			
	Waretown				M
	Cape May	S*			M
MD	Ocean City	S			M
VA	Greenbackville				M
	Chincoteague				M
	Newport News	S			M
NC	Wanchese	S			M
* A primary port for the fishery. Blank cells do not necessarily mean no activity.					

1.6.4.3 Port Descriptions

Described here are the eight fishing communities that are primary ports for the skate fishery (Map 3). Each contains demographic data collected by the U.S. Census, accessed in 2020 at: https://data.census.gov/cedsci. Fishery data therein are collected by NMFS, much of which are available on the NEFSC website (NEFSC 2017). Clay *et al.* (2007) has a detailed profile of each port, including important social and demographic information.

Map 3. Primary port communities for the skate fishery, with 2016 their commercial fishing engagement indicators.



Source: NOAA Fisheries Social Indicators of Fishing Communities (2020): https://www.st.nmfs.noaa.gov/data-and-tools/social-indicators/.

1.6.4.3.1 Massachusetts Ports

Chatham

General: Chatham is a fishing community in Barnstable County, Massachusetts. In 2017, Chatham had an estimated population of 6,149, a 0.4% increase from the year 2010 (6,125). In 2017, 5% of the civilian employed population aged 16 years and over worked in agriculture, forestry, fishing, hunting, and mining occupations in Chatham; the poverty rate was 10%; and the population was 92% white, non-Hispanic.

The commercial fishing engagement and reliance indices for Chatham in 2016 were both high. In 2019, Chatham was the homeport and primary landing port for 90 and 96 Federal fishing permits (i.e., vessels), respectively. Total landings in Chatham were valued at $16M, 2% of the state-wide total ($680M), landed by 162 vessels and sold to 36 dealers. American lobster ($4.3M) was the highest valued species, accounting for 27% of the total Chatham revenue, landed by 40 vessels and sold to 14 dealers (Table 47). The Chatham Fish Pier is an active offloading facility in Chatham. The Cape Cod Community Supported Fishery is based in West Chatham.

Skate fishery: Chatham is a primary port for the skate fishery, with an average revenue of $1.7M/year from 2010-2018 (highest of all ports), 15% of total revenue in Chatham during that time (Table 38). This revenue has been primarily from skate wings (Table 43). Skate fishing engagement and reliance indices on average in 2014-2018 were both high (Table 37), and engagement has been high since 2004 (Table 40). In 2019, there was $2.0M in "big skate" revenue (likely winter skate), landed by 27 vessels and sold to 5 dealers and it was the third highest species landed by value in Chatham (Table 47).

Table 47. Top five species landed by value in Chatham MA, calendar year 2019.

Species	Nominal revenue ($)	Vessels	Dealers
American lobster	$4.3M	40	14
Sea scallops	$2.3M	19	11
Big skate (likely winter skate)	$2.0M	27	5
Spiny dogfish	$1.3M	32	3
Softshell clam	$0.8M	6	10
Note: Data are preliminary. *Source:* NEFSC dealer data, accessed March 2020.			

New Bedford

General: New Bedford is a fishing community in Bristol County, Massachusetts. In 2017, New Bedford had an estimated population of 95,125, a 0.06% increase from the year 2010 (95,072). In 2017, 2% of the civilian employed population aged 16 years and over worked in agriculture, forestry, fishing, hunting, and mining occupations in New Bedford; the poverty rate was 23%; and the population was 64% white, non-Hispanic, 20% Hispanic or Latino, and 5% Black or African American alone.

The commercial fishing engagement and reliance indices for New Bedford in 2016 were high and medium, respectively. In 2019, New Bedford was the homeport and primary landing port for 243 and 262 Federal fishing permits (i.e., vessels), respectively. Total landings in New Bedford were valued at $451M, 66% of the state-wide total ($680M), landed by 483 vessels and sold to 76 dealers. Sea Scallop ($379M) was the highest valued species, accounting for 84% of the total New Bedford revenue, landed by 316 vessels and sold to 32 dealers (Table 48).

Skate fishery: New Bedford is a primary port for the skate fishery, with an average revenue of $1.2M/year from 2010-2018 (3rd highest of all ports), 0.3% of total revenue in New Bedford during that time (Table 38). This revenue has been primarily from skate wings (Table 43). Skate fishing engagement and reliance indices on average in 2014-2018 were high and medium, respectively (Table 37), and engagement has been high since 2004 (Table 40).

Table 48. Top five species landed by value in New Bedford MA, calendar year 2019.

Species	Nominal revenue ($)	Vessels	Dealers
Sea scallop	$379M	316	32
American lobster	$13M	56	17
Atlantic surfclam	$7.4M	16	6
Jonah crab	$6.1M	26	8
Note: Data are preliminary; data for one of the five top species landed are confidential. *Source:* NEFSC dealer data, accessed March 2020.			

1.6.4.3.2 Rhode Island Ports

Little Compton

General: Little Compton is a fishing community in Newport County, Massachusetts. In 2017, Little Compton had an estimated population of 3,521 an 18% increase from the year 2010 (2,879). In 2017, 2% of the civilian employed population aged 16 years and over worked in agriculture, forestry, fishing, hunting, and mining occupations in Little Compton; the poverty rate was 8.5%; and the population was 95% white, non-Hispanic.

The commercial fishing engagement and reliance indices for Little Compton in 2016 were both medium. In 2019, Little Compton was the homeport and primary landing port for 5 and 0 Federal fishing permits (i.e., vessels), respectively. Total landings in Little Compton were valued at $3.4M, 3% of the state-wide total ($108M), landed by 29 vessels and sold to 15 dealers. Monkfish ($1.1M) was the highest valued species, accounting for 32% of the total Little Compton revenue, landed by 29 vessels and sold to 15 dealers (Table 49).

Skate fishery: Little Compton is a primary port for the skate fishery, with an average revenue of $0.28M/year from 2010-2018 (5th highest of all ports), 12% of total revenue in Little Compton during that time (Table 38). This revenue has been primarily from skate wings (Table 43). Skate fishing engagement and reliance indices on average in 2014-2018 were both high (Table 37), and engagement has been high since 2004 (Table 40). In 2019, there was $0.34M in "big skate" revenue (likely winter skate), landed by 11 vessels and sold to 3 dealers and it was the fourth highest species landed by value in Little Compton (Table 49).

Table 49. Top five species landed by value in Little Compton RI, calendar year 2019.

Species	Nominal revenue ($)	Vessels	Dealers
Monkfish	$1.1M	15	4
Lobster	$0.62M	7	5
Jonah crab	$0.42M	6	5
Big skate (likely winter skate)	$0.34M	11	3
Black sea bass	$0.19M	13	4
Note: Data are preliminary. *Source:* NEFSC dealer data, accessed April 2020.			

Narragansett/Point Judith

General: Point Judith is a fishing community in the town of Narragansett, in Washington County, RI. In 2017, Narragansett had an estimated population of 15,601, a 2% decrease from the year 2010 (15,868). In 2017, 2% of the civilian employed population aged 16 years and over worked in agriculture, forestry, fishing, hunting, and mining occupations in Narragansett; the poverty rate was 18%; and the population was 94% white, non-Hispanic.

The commercial fishing engagement and reliance indices for Narragansett/Point Judith in 2016 were high and medium, respectively. In 2019, Narragansett and Point Judith were the homeport and primary landing port for 138 and 153 Federal fishing permits (i.e., vessels), respectively. Total landings in Point Judith were valued at $66M, 60% of the state-wide total ($108M), landed by 238 vessels and sold to 51 dealers. Sea scallop ($20M) was the highest valued species, accounting for 30% of the total Point Judith revenue, landed by 49 vessels and sold to 15 dealers (Table 50).

Skate fishery: Point Judith is a primary port for the skate fishery, with an average revenue of $1.3M/year from 2010-2018 (2nd highest of all ports), 2.8% of total revenue in Point Judith during that time (Table 38). This revenue has been from skate wings (57%) and bait (42%, Table 39). Skate fishing engagement and reliance indices on average in 2014-2018 were both high (Table 37) and engagement has been high since 2004 (Table 40).

Table 50. Top five species landed by value in Point Judith RI, calendar year 2019.

Species	Nominal revenue ($)	Vessels	Dealers
Sea scallop	$20M	49	15
Lologo squid	$19M	87	16
Lobster	$5.2M	54	9
Summer flounder	$4.8M	120	16
Silver hake	$3.4M	79	13
Note: Data are preliminary. *Source:* NEFSC dealer data, accessed April 2020.			

1.6.4.3.3 New York Ports

Montauk

General: Montauk is a fishing community on Long Island, New York. In 2017, Montauk had an estimated population of 3,662, a 14% increase from the year 2010 (3,157). In 2017, 4% of the civilian employed population aged 16 years and over worked in agriculture, forestry, fishing, hunting, and mining occupations in Montauk; the poverty rate was 5.4%; and the population was 86% white, non-Hispanic.

The commercial fishing engagement and reliance indices for Montauk in 2016 were both high. In 2019, Montauk was the homeport and primary landing port for 120 and 130 Federal fishing permits (i.e., vessels), respectively. Total landings in Montauk were valued at $18M, 15% of the state-wide total ($124M), landed by 133 vessels and sold to 39 dealers. Loligo squid ($4.5M) was the highest valued species, accounting for 30% of the total Montauk revenue, landed by 30 vessels and sold to 19 dealers (Table 51).

Skate fishery: Montauk is a primary port for the skate fishery, with an average revenue of $0.23M/year from 2010-2018 (7th highest of all ports), 1.3% of total revenue in Montauk during that time (Table 38). This revenue has been primarily from skate wings (Table 43). Skate fishing engagement and reliance indices on average in 2014-2018 were both high (Table 37), and engagement has been high since 2004 (Table 40).

Table 51. Top five species landed by value in Montauk NY, calendar year 2019.

Species	Nominal revenue ($)	Vessels	Dealers
Loligo squid	$4.5M	30	19
Tilefish	$3.2M	16	12
Scup	$2.4M	76	18
Summer flounder	$2.0M	68	23
Silver hake	$1.1M	31	16
Note: Data are preliminary. *Source:* NEFSC dealer data, accessed April 2020.			

1.6.4.3.4 New Jersey Ports

Belford

General: Belford is a fishing community in Monmouth County, New Jersey. In 2017, Belford had an estimated population of 1,743, a 20% increase from the year 2010 (1,396). In 2017, 0% of the civilian employed population aged 16 years and over worked in agriculture, forestry, fishing, hunting, and mining occupations in Belford; the poverty rate was 2.2%; and the population was 84% white, non-Hispanic.

The commercial fishing engagement and reliance indices for Belford in 2016 were both low. In 2019, Belford was the homeport and primary landing port for 15 Federal fishing permits (i.e., vessels), respectively. Total landings in Belford were valued at $1.9M, 1% of the state-wide total ($179M), and were landed by 19 vessels sold to three dealers (specific species are confidential).

Skate fishery: Belford is a primary port for the skate fishery, with an average revenue of under $0.1M/year from 2010-2018 (>14th highest of all ports, Table 38). Skate fishing engagement and reliance indices on average in 2014-2018 were both high (Table 37). Skate fishery engagement was medium-high in 2004-2013 and has been high since 2014 (Table 40).

Barnegat Light/Long Beach

General: Barnegat Light on Long Beach island is a fishing community in Ocean County, NJ. In 2017, Barnegat Light had an estimated population of 494, a 14% decrease from the year 2010 (574). In 2017, 5% of the civilian employed population aged 16 years and over worked in agriculture, forestry, fishing, hunting, and mining occupations in Barnegat Light; the poverty rate was 1%; and the population was 98% white, non-Hispanic.

The commercial fishing engagement and reliance indices for Barnegat Light in 2016 were both high. In 2019, Barnegat Light was the homeport and primary landing port for 65 and 69 Federal fishing permits (i.e., vessels), respectively. Total landings in Barnegat Light were valued at $25M, 14% of the state-wide total ($179M), landed by 55 vessels sold to 13 dealers. Sea scallops ($20M) was the highest valued species, accounting for 80% of the total Barnegat Light revenue, landed by 25 vessels and sold to 4 dealers (Table 52).

Skate fishery: Barnegat Light is a primary port for the skate fishery, with an average revenue of $0.25M/year from 2010-2018 (6th highest of all ports), 0.9% of total revenue in Barnegat Light during that time (Table 38). This revenue has been primarily from skate wings (Table 43). Skate fishing engagement and reliance indices on average in 2014-2018 were both high (Table 37), and engagement has been high since 2004 (Table 40).

Table 52. Top five species landed by value in Barnegat Light/Long Beach, calendar year 2019.

Species	Revenue ($)	Vessels	Dealers
Sea scallop	$20M	25	4
Monkfish	$0.96M	41	7
Summer flounder	$0.49M	18	4
Note: Data are preliminary; data for two of the five top species landed are confidential. *Source:* NEFSC dealer data, accessed March 2020.			

Cape May, New Jersey

General: Cape May is a fishing community in Cape May County, NJ. In 2017, Cape May had an estimated population of 3,500, a 3% decrease from the year 2010 (3,607). In 2017, 0.3% of the civilian employed population aged 16 years and over worked in agriculture, forestry, fishing, hunting, and mining occupations in Cape May; the poverty rate was 9%; and the population was 79% white, non-Hispanic and 15% Hispanic or Latino.

The commercial fishing engagement and reliance indices for Cape May in 2016 were both high. In 2019, Cape May was the homeport and primary landing port for 133 and 138 Federal fishing permits (i.e., vessels), respectively (GARFO 2019). Total landings in Cape May were valued at $82M, 46% of the state-wide total ($179M), and were landed by 181 vessels sold to 22 dealers. Sea scallops ($58M) was the highest valued species, accounting for 71% of the total Cape May revenue, landed by 140 vessels and sold to 11 dealers (Table 53).

Skate fishery: Cape May is a primary port for the skate fishery, with an average revenue of under $0.1M/year from 2010-2018 (> 14th highest of all ports), >0.01% of total revenue in Cape May during that time (Table 38). Skate fishing engagement and reliance indices on average in 2014-2018 were both high (Table 37), and engagement has been high since 2004 (Table 40).

Table 53. Top five species landed by value in Cape May, calendar year 2019.

Species	Revenue ($)	Vessels	Dealers
Sea scallop	$58M	140	11
Inshore longfin squid	$9.2M	15	3
Loligo squid	$5.3M	36	7
Note: Data are preliminary; data for two of the five top species landed are confidential. *Source:* NEFSC dealer data, accessed March 2020.			

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