Summer Flounder Fishery Information Document

June 2016

This document provides a brief overview of the biology, stock condition, management system, and fishery performance for summer flounder with an emphasis on 2015, the most recent complete fishing year.

1. Biology

Summer flounder (*Paralichthys dentatus*) spawn during the fall and winter over the open ocean areas of the continental shelf. From October to May, larvae and postlarvae migrate inshore, entering coastal and estuarine nursery areas. Juveniles are distributed inshore and in many estuaries throughout the range of the species during spring, summer, and fall. Adult summer flounder exhibit strong seasonal inshore-offshore movements, normally inhabiting shallow coastal and estuarine waters during the warmer months of the year and remaining offshore during the colder months.

Summer flounder habitat includes pelagic waters, demersal waters, saltmarsh creeks, seagrass beds, mudflats, and open bay areas from the Gulf of Maine through North Carolina. Summer flounder are opportunistic feeders; their prey includes a variety of fish and crustaceans. While the natural predators of adult summer flounder are not fully documented, larger predators (e.g., large sharks, rays, and monkfish) probably include summer flounder in their diets.[1]

Male and female growth rates vary substantially, with males growing more slowly. Males rarely live longer than 10 years, whereas females may live for up to 20 years and attain weights of about 25 lb.[2] In the 2013 benchmark stock assessment for summer flounder, the median length at maturity was estimated as 26.0 cm (10.2 inches) for male summer flounder, 29.2 cm (11.5 inches) for female summer flounder, and 26.8 cm (10.5 inches) for the sexes combined. The median age of maturity for summer flounder was determined to be 1.1 years for males, 1.4 years for females, and 1.2 years for both sexes combined.[3]

2. Status of the Stock

The most recent benchmark summer flounder stock assessment was completed and reviewed during the 57th Stock Assessment Workshop and Stock Assessment Review Committee (SAW/SARC 57).[3] This assessment uses a statistical catch at age model (the age-structured assessment program, or "ASAP" model). Stock assessment and peer review reports are available online at the Northeast Fisheries Science Center (NEFSC) website: http://www.nefsc.noaa.gov/saw/reports.html.

In June 2015, the NEFSC completed a stock assessment update for summer flounder, which incorporated data through 2014 into the population model used for the previous benchmark assessment. The 2015 assessment update indicated that the summer flounder stock was not overfished, but that overfishing was occurring in 2014, relative to the biological reference points established through the SAW/SARC 57 assessment. The fishing mortality rate (F) was estimated to be 0.359 in 2014, 16% above the threshold fishing mortality reference point of F_{MSY} = 0.309

(Figure 1). The 90% confidence interval for F in 2014 was 0.274 to 0.435. Spawning Stock Biomass (SSB) was estimated to be 88.90 million lb (40,323 mt) in 2014, or 65% of the SSB_{MSY} = 137.6 million lb (62,394 mt; Figure 2). The 90% confidence interval for SSB in 2014 was 35,486 to 49,918 mt.[4]

These results appear to be driven in part by low recruitment. The assessment update indicates that the previous benchmark assessment had overestimated recruitment for several of the preceding years. The summer flounder stock appears to have experienced four below-average year classes from 2010 to 2013. The revised recruitment estimates from the 2015 update resulted in reduced estimates of stock size compared to previous levels. The 2014 year class was estimated to be approximately at the time series average of 41 million fish. The assessment update also indicates that fishing mortality rates have been underestimated in recent years.[4]

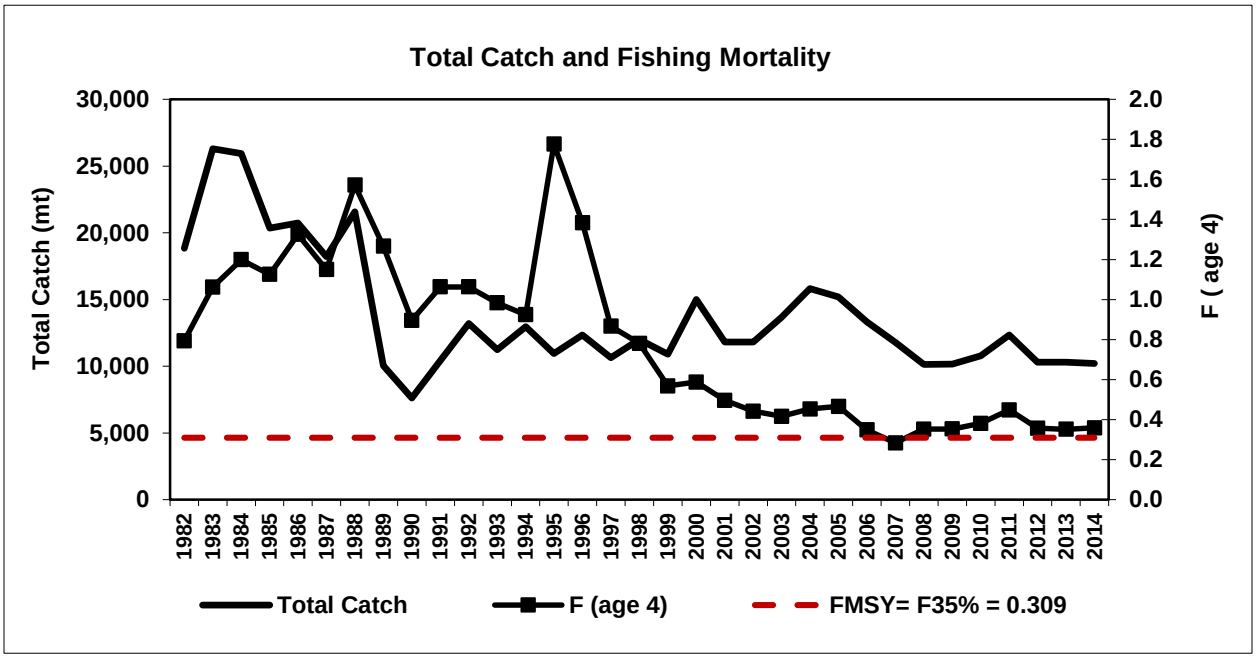

Figure 1: Total fishery catch and fully-recruited fishing mortality (F, peak at age 4) of summer flounder. The horizontal dashed red line is the 2013 SAW 57 fishing mortality threshold reference point proxy.[4]

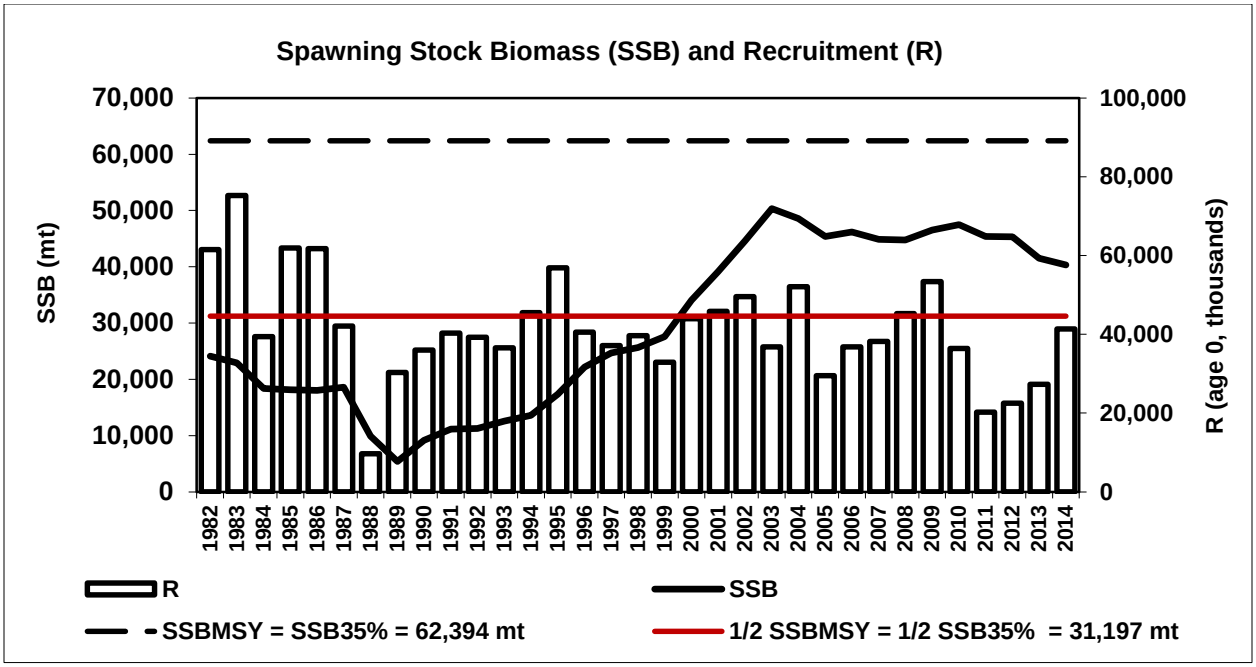

Figure 2: Summer flounder spawning stock biomass (SSB; solid line) and recruitment at age 0 (R; vertical bars) by calendar year. The horizontal dashed line is the 2013 SAW 57 biomass target reference point proxy, the horizontal red line is the biomass threshold reference point proxy.[4]

3. Management System and Overall Fishery Performance

The Mid-Atlantic Fishery Management Council (Council) and the Atlantic States Marine Fisheries Commission (Commission) work cooperatively to develop fishery regulations for summer flounder off the east coast of the United States. The Council and Commission work in conjunction with the National Marine Fisheries Service (NMFS), which serves as the federal implementation and enforcement entity. This cooperative management endeavor was developed because a significant portion of the catch is taken from both state (0-3 miles offshore) and federal waters (3-200 miles offshore, also known as the Exclusive Economic Zone, or EEZ).

The joint Fishery Management Plan (FMP) for summer flounder became effective in 1988, and established the management unit for summer flounder as U.S. waters in the western Atlantic Ocean from the southern border of North Carolina northward to the U.S.-Canadian border. The FMP also established measures to ensure effective management of summer flounder fisheries, which currently include catch and landings limits, commercial quotas, recreational harvest limits, minimum fish sizes, gear regulations, permit requirements, and other provisions as prescribed by the FMP.

There are large commercial and recreational fisheries for summer flounder. These fisheries are managed primarily using output controls (catch and landings limits), with 60 percent of the landings being allocated to the commercial fishery as a commercial quota and 40 percent allocated to the recreational fishery as a recreational harvest limit. Management also uses minimum fish sizes, gear regulations, permit requirements, and other provisions as prescribed by the FMP. Summer flounder was under a stock rebuilding strategy beginning in 2000 until it was declared rebuilt in 2011, based on an assessment update with data through 2010. Although the most recent

(2015) assessment update included a revised biomass time series indicating that estimated biomass never actually reached the target biomass, current biomass estimates are still above the minimum stock size threshold that would trigger a new rebuilding plan. The Summer Flounder FMP, including subsequent Amendments and Frameworks, are available on the Council website at: http://www.mafmc.org/fisheries/fmp/sf-s-bsb.

The Council's Scientific and Statistical Committee (SSC) recommends annual Acceptable Biological Catch (ABC) levels for summer flounder, which are then approved by the Council and Commission and submitted to NMFS for final approval and implementation. The ABC is divided into commercial and recreational Annual Catch Limits (ACLs), based on the landings allocation prescribed in the FMP and the recent distribution of discards between the commercial and recreational fisheries. The Council first implemented recreational and commercial ACLs, with a system of overage accountability, in 2012. Both the ABC and the ACLs are catch limits (i.e., include both projected landings and discards), while the commercial quota and the recreational harvest limit are landing limits. Table 1 shows summer flounder catch and landings limits from 2007 through 2018, as well as commercial and recreational landings through 2015.

Total (commercial and recreational combined) summer flounder landings generally declined throughout the early 1980's, dropping to a time series low of 14.4 million lb in 1990, and in 2015 were about 15.45 million lb total (Figure 3).[5,6]

Table 1: Summary of catch limits, landings limits, and landings for commercial and recreational summer flounder fisheries from 2007 through 2018.

Management measures	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017[c]	2018[c]
ABC (mil. lb)[a]	--	--	21.50	25.5	33.95	25.58	22.34	21.94	22.57	16.26	15.86	15.68
Commercial ACL (mil. lb)[a]	--	--	--	--	--	14.00	12.11	12.87	13.34	9.42	9.19	9.10
Commercial quota (mil. lb)[b]	9.79	9.32	10.74	12.79	17.38	12.73	11.44	10.51	11.07	8.12	7.91	7.89
Commercial landings (mil lb.)	10.04	9.21	10.94	13.04	16.56	13.03	12.49	11.07	10.59	--	--	--
% of commercial quota landed	103%	99%	102%	102%	95%	102%	109%	105%	96%	--	--	--
Recreational ACL (mil. lb)	--	--	--	--	--	11.58	10.23	9.07	9.44	6.83	6.67	6.56
Recreational harvest limit (mil. lb)[b]	6.68	6.21	7.16	8.59	11.58	8.49	7.63	7.01	7.38	5.42	5.28	5.26
Recreational landings (mil. lb)	9.34	8.15	6.03	5.11	5.96	6.49	7.39	7.40	4.87	--	--	--
% of recreational harvest limit landed	140%	131%	84%	59%	51%	76%	97%	106%	66%	--	--	--

[a] The ABC is the annual Acceptable Biological Catch for the entire summer flounder fishery, and is divided into sector-specific Annual Catch Limits (ACLs) for the commercial and recreational fisheries. The ABC and ACLs include both landings and discards.

[b] Commercial quotas and recreational harvest limits reflect the removal of projected discards from the sector-specific ACLs. For 2006-2014, these limits are also adjusted for Research Set Aside (RSA). Quotas and harvest limits for 2015-2016 do not reflect an adjustment for RSA due to the suspension of the program in 2014.

[c] Currently implemented; subject to change based on SSC review and subsequent Council and Commission review.

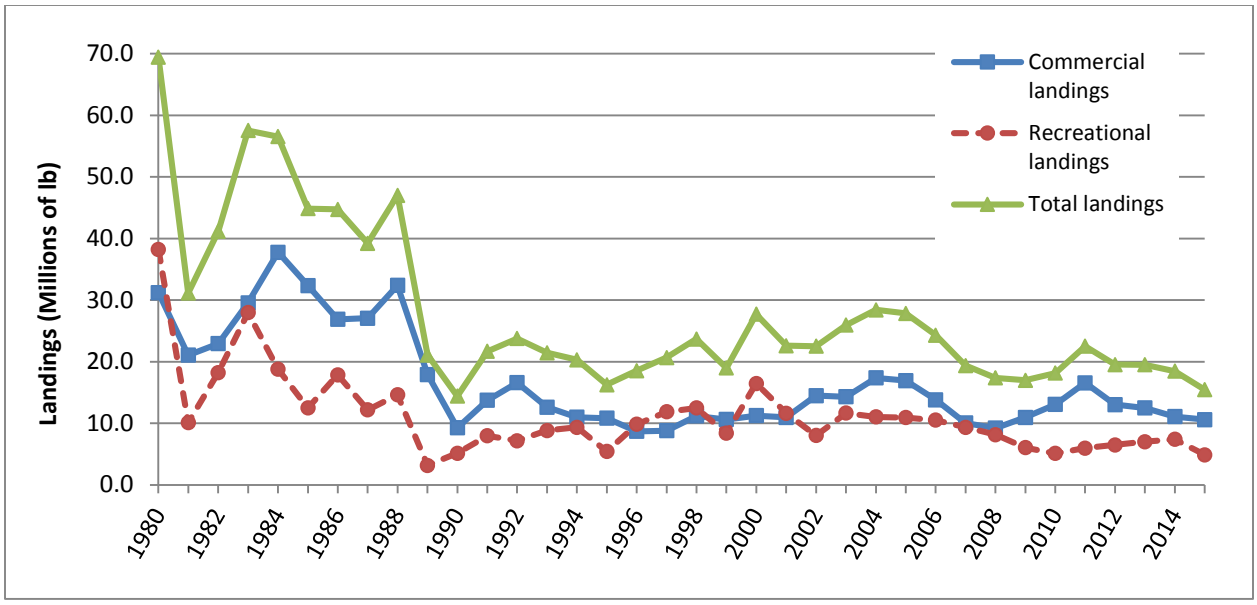

Figure 3: Commercial and recreational summer flounder landings in millions of pounds, Maine-North Carolina, 1980-2015.[5,6]

4. Commercial Summer Flounder Measures and Fishery Performance

Commercial landings of summer flounder peaked in 1984 at 37.77 million pounds, and reached a low of 8.80 million pounds in 1997 (Figure 3). In 2015, commercial fishermen landed approximately 10.59 million pounds of summer flounder (corresponding to 96% of the commercial quota).[5]

In federal waters, a moratorium permit is required to fish commercially for summer flounder. Permit data for 2015 indicate that 783 vessels held commercial permits for summer flounder.[7]

The commercial quota is divided among the states based on the allocation percentages given in Table 2 and each state sets measures to achieve their state-specific commercial quotas.

Table 2: State-by-state percent share of commercial summer flounder allocation.

State	Allocation (%)
ME	0.04756
NH	0.00046
MA	6.82046
RI	15.68298
CT	2.25708
NY	7.64699
NJ	16.72499
DE	0.01779
MD	2.03910
VA	21.31676
NC	27.44584
Total	100

Vessel Trip Report (VTR) data for 2015 indicate that the bulk of the summer flounder landings were taken by bottom otter trawls (96 percent), with other gear types (e.g., scallop trawls, sink gill nets, hand lines, scallop dredges, and beam trawls) each accounting for 1 percent or less of landings.[8] Current regulations require a 14-inch total length minimum fish size in the commercial fishery. Trawl nets are required to have 5.5-inch diamond or 6-inch square minimum mesh in the entire net for vessels possessing more than the threshold amount of summer flounder (i.e., 200 lb from November 1-April 30 and 100 lb from May 1-October 31).

VTR data were also used to identify all NMFS statistical areas that accounted for more than 5 percent of the summer flounder commercial catch in 2015 (Table 3; Figure 4). Statistical area 616 was responsible for the highest percentage of the catch, with statistical area 537 having the highest number of trips that caught summer flounder (Table 3).[8]

Table 3: Statistical areas that accounted for at least 5 percent of the total summer flounder catch in 2015, with associated number of trips.[7]

Statistical Area	Percent of 2015 Commercial Summer Flounder Catch	Number of Trips
616	27%	594
613	18%	1,828
537	17%	1,894
612	7%	1,372
622	5%	128

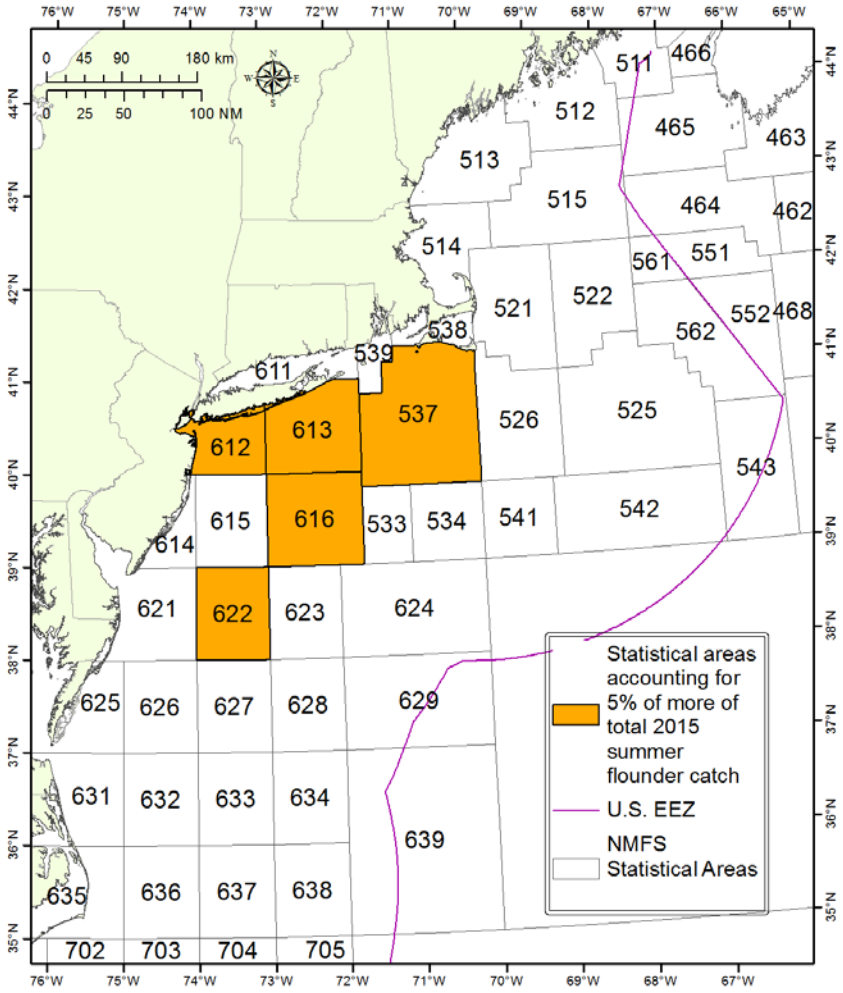

Figure 4: NMFS Statistical Areas, highlighting those that each accounted for more than 5% of the commercial summer flounder catch in 2015.[8]

For the years 1994 through 2015, NMFS dealer data indicate that summer flounder total ex-vessel revenue (adjusted to 2015 dollars to account for inflation) from Maine to North Carolina ranged from a low of $21.30 million in 1996 to a high of $34.80 million in 2004. The adjusted mean price per pound for summer flounder ranged from a low of $1.74 in 2011 ($1.84 in 2011 dollars) to a high of $2.96 in 2015. In 2015, 10.59 million pounds of summer flounder were landed generating $31.34 million in total ex-vessel revenue (an average of $2.96 per pound; Figure 5).[5]

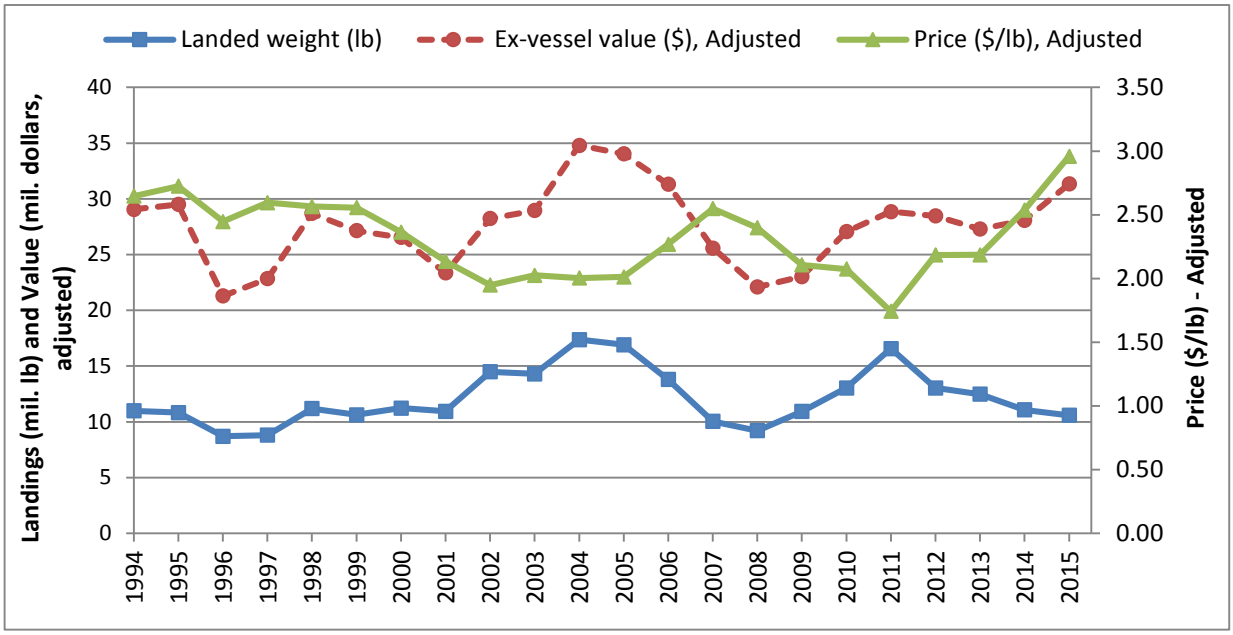

Figure 5: Landings, ex-vessel value, and price per pound for summer flounder, Maine through North Carolina, 1994-2015. Ex-vessel value and price are adjusted to real 2015 dollars.[5]

At least 100,000 lb of summer flounder were landed by commercial fishermen at each of 19 ports in eight states in 2015. These 19 ports accounted for approximately 90% of all 2015 commercial summer flounder landings. Beaufort, NC and Point Judith, RI were the leading ports in 2015 in terms of pounds of summer flounder landed, while Point Judith, RI was the leading port in 2015 in terms of the number of vessels landing summer flounder (Table 4).[5] The ports and communities that are dependent on summer flounder are fully described in Amendment 13 to the FMP (available at http://www.mafmc.org/sf-s-bsb). Detailed community profiles developed by the Northeast Fisheries Science Center's Social Science Branch can be found at www.mafmc.org/communities/.

Table 4: Ports reporting at least 100,000 lb of summer flounder in 2015, and the corresponding percentage of total 2015 commercial summer flounder landings and number of vessels.[5]

Port	Summer Flounder Landings (lb)	% of total commercial summer flounder landings	Number of vessels
BEAUFORT, NC	1,510,448	14	58
POINT JUDITH, RI	1,496,172	14	131
HAMPTON, VA	1,109,598	10	61
PT. PLEASANT, NJ	778,231	7	47
NEWPORT NEWS, VA	701,833	7	39
CAPE MAY, NJ	488,065	5	56
MONTAUK, NY	434,593	4	71
WANCHESE, NC	431,942	4	19
CHINCOTEAGUE, VA	393,785	4	33
ENGELHARD, NC	335,277	3	15
HOBUCKEN, NC	322,195	3	13
NEW BEDFORD, MA	293,866	3	67
ORIENTAL, NC	262,555	2	9
BELFORD, NJ	260,235	2	22
STONINGTON, CT	172,752	2	19
OCEAN CITY, MD	157,526	1	12
HAMPTON BAYS, NY	156,278	1	27
LONG BEACH/BARNEGAT LIGHT, NJ	125,008	1	19
HYANNIS, MA	108,344	1	13

210 federally permitted dealers from Maine through North Carolina bought summer flounder in 2015. More dealers bought summer flounder in New York than in any other state (Table 5). All dealers bought approximately $31.34 million worth of summer flounder in 2015.[5]

Table 5: Dealers reporting buying summer flounder, by state in 2015.[5]

State	MA	RI	CT	NY	NJ	DE	MD	VA	NC
Number Of Dealers	35	31	15	48	33	0	5	15	28

5. Recreational Summer Flounder Measures and Fishery Performance

There is a significant recreational fishery for summer flounder, primarily in state waters when the fish migrate inshore during the warm summer months. The Council and Commission determine annually whether to manage the recreational fishery under coastwide measures or conservation equivalency. Under conservation equivalency, state- or region- specific measures are developed through the Commission's management process and submitted to NMFS. The combined state or regional measures must achieve the same level of conservation as would a set of coastwide measures developed to adhere to the overall recreational harvest limit. If NMFS considers the combination of the state- or region- specific measures to be "equivalent" to the coastwide measures, they may then waive the coastwide regulation in federal waters. Anglers fishing in federal waters are then subject to the measures of the state in which they land summer flounder.

The recreational fishery has been managed using conservation equivalency each year since 2001. From 2001 through 2013, measures were developed under state-by-state conservation equivalency. Since 2014, a regional approach has been used, under which the states within each region must have identical size limits, possession limits, and season length. The 2016 regional conservation equivalency measures are given in Table 6.

Table 6: Summer flounder recreational fishing measures in 2016, by state, under regional conservation equivalency. 2016 regions include: 1) Massachusetts, 2) Rhode Island, 3) Connecticut, New York, and New Jersey, 4) Delaware, Maryland, The Potomac River Fisheries Commission, and Virginia, and 5) North Carolina.

State	Minimum Size (inches)	Possession Limit	Open Season
Massachusetts	16	5 fish	May 22-September 23
Rhode Island	18	8 fish	May 1-December 31
Connecticut	18	5 fish	May 17- September 21
CT Shore Program (46 designed shore sites)	16		
New York	18	5 fish	May 17- September 21
New Jersey[a]	18	5 fish	May 21-September 25
NJ Shore program site (Island Beach State Park)	16	2 fish	
New Jersey/Delaware Bay COLREGS[b]	17	4 fish	
Delaware	16	4 fish	January 1- December 31
Maryland	16	4 fish	January 1- December 31
PRFC	16	4 fish	January 1- December 31
Virginia	16	4 fish	January 1- December 31
North Carolina	15	6 fish	January 1- December 31

[a] New Jersey east of the COLREGS line at Cape May, NJ will have management measures consistent with the northern region of Connecticut – New York.

[b] New Jersey west of the COLREGS line at Cape May, NJ inside Delaware Bay will have a similar size limit to the southern region (DE-VA), the same possession limit as the southern region (DE-VA), and the same season length as the northern region of Connecticut – New York.

Recreational data for years 2004 and later are available from the Marine Recreational Information Program (MRIP). For years prior to 2004, recreational data were generated by the Marine Recreational Fishery Statistics Survey (MRFSS). Recreational catch and landings for summer flounder peaked in 1983 with 32.11 million fish caught and 21.00 million fish landed. Catch reached a low in 1989 with 2.69 million fish caught, while landings reached a low in 2010 with 1.50 million fish landed (Table 7).[6]

For-hire vessels carrying passengers in federal waters must obtain a federal party/charter permit. In 2015, there were 797 party and charter vessels that held summer flounder federal for-hire permits.[7] Many of these vessels also hold recreational permits for scup and black sea bass.

Table 7: Recreational summer flounder landings data from the NMFS recreational statistics databases, Maine through North Carolina, 1981-2015.[6]

Year	Catch (number of fish)	Landings (number of fish)	Landings (pounds)
1981	13,578,785	9,566,572	10,081,007
1982	23,562,021	15,472,707	18,233,138
1983	32,062,267	20,996,301	27,969,295
1984	29,784,927	17,475,175	18,764,676
1985	13,525,922	11,066,190	12,489,675
1986	25,292,462	11,620,860	17,861,285
1987	21,023,452	7,864,761	12,167,247
1988	17,170,745	9,959,663	14,624,185
1989	2,676,595	1,716,760	3,158,017
1990	9,100,815	3,793,584	5,134,329
1991	16,074,808	6,067,646	7,959,826
1992	11,909,547	5,002,105	7,147,691
1993	22,904,141	6,494,043	8,830,913
1994	17,725,046	6,702,691	9,327,506
1995	16,307,633	3,325,720	5,421,091
1996	18,994,408	6,996,988	9,820,342
1997	20,027,081	7,166,820	11,865,860
1998	22,085,840	6,979,092	12,476,562
1999	21,377,717	4,106,991	8,366,201
2000	25,384,431	7,801,077	16,467,526
2001	28,187,211	5,293,609	11,636,795
2002	16,674,292	3,262,156	8,008,117
2003	20,531,910	4,558,673	11,638,491
2004	20,336,204	4,316,499	11,021,888
2005	25,805,580	4,027,461	10,915,346
2006	21,400,013	3,950,286	10,504,638
2007	20,731,505	3,107,579	9,336,707
2008	22,896,843	2,349,870	8,150,663
2009	24,085,187	1,806,183	6,030,377
2010	23,721,588	1,501,464	5,108,353
2011	21,558,692	1,839,877	5,955,713
2012	16,528,450	2,272,225	6,489,809
2013	16,151,328	2,534,353	7,386,648
2014	19,457,025	2,459,208	7,398,557
2015	12,470,397	1,674,126	4,866,014

On average, an estimated 88 percent of the landings (in numbers of fish) occurred in state waters over the past ten years, and about 82 percent of landings came from state waters in 2015 (Table 8). The majority of summer flounder were landed in New York and New Jersey in 2015 (Table 9).[6]

Table 8: Estimated percentage of summer flounder recreational landings in state vs. federal waters, Maine through North Carolina, 2006-2015.[6]

Year	State <= 3 mi	EEZ > 3 mi
2006	90.4%	9.6%
2007	88.9%	11.1%
2008	96.8%	3.2%
2009	90.8%	9.2%
2010	92.3%	7.7%
2011	95.4%	4.6%
2012	87.8%	12.2%
2013	77.0%	23.0%
2014	76.8%	23.2%
2015	82.0%	18.0%
Avg. 2006 - 2015	**87.8%**	**12.2%**
Avg. 2013 - 2015	**78.6%**	**21.4%**

Table 9: State contribution (as a percentage) to total recreational landings of summer flounder (in numbers of fish), from Maine through North Carolina, 2014 and 2015.[6]

State	2014	2015
Maine	0.0%	0.0%
New Hampshire	0.0%	0.0%
Massachusetts	4.6%	4.7%
Rhode Island	7.5%	9.8%
Connecticut	4.9%	5.8%
New York	20.7%	32.4%
New Jersey	47.8%	29.7%
Delaware	3.8%	3.1%
Maryland	3.2%	2.7%
Virginia	5.7%	9.5%
North Carolina	1.9%	2.4%
Total	**100%**	**100%**

MRIP data indicate that about 81% of recreational summer flounder landings in 2015 were caught by anglers fishing on private or rental boats, about 17% from anglers aboard party or charter boats, and less than 3% from shore (Table 10).[6]

Table 10: The number of summer flounder landed by recreational fishing mode, Maine through North Carolina, 1981-2015.[6]

Year	Shore (numbers of fish)	Party/Charter (numbers of fish)	Private/Rental (numbers of fish)
1981	3,145,685	1,362,253	5,058,634
1982	1,120,527	5,936,005	8,416,175
1983	3,963,678	3,574,224	13,458,399
1984	1,355,597	2,495,734	13,623,844
1985	786,186	1,152,247	9,127,757
1986	1,237,032	1,608,908	8,774,920
1987	406,094	1,150,095	6,308,572
1988	945,862	1,134,356	7,879,445
1989	180,268	141,318	1,395,174
1990	261,899	413,241	3,118,444
1991	565,402	597,609	4,904,635
1992	275,472	375,244	4,351,389
1993	342,226	1,013,463	5,138,354
1994	447,183	836,361	5,419,147
1995	241,904	267,348	2,816,468
1996	206,929	659,878	6,130,181
1997	255,063	930,635	5,981,122
1998	316,312	360,777	6,302,003
1999	213,444	300,807	3,592,740
2000	569,613	648,754	6,582,710
2001	226,994	329,701	4,736,914
2002	154,960	261,552	2,845,644
2003	203,719	389,140	3,965,814
2004	200,367	463,777	3,652,355
2005	104,294	498,611	3,424,556
2006	154,416	315,934	3,479,936
2007	98,419	499,161	2,509,999
2008	79,338	171,950	2,098,582
2009	62,693	176,999	1,566,491
2010	59,810	160,108	1,281,546
2011	34,850	137,786	1,667,241
2012	106,342	169,476	1,996,407
2013	132,805	284,046	2,117,502
2014	79,917	440,752	1,938,539
2015	47,683	327,538	1,301,574
% of Total, 1981-2015	9%	14%	78%
% of Total, 2011-2015	4%	11%	85%

6. References

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[5] Unpublished NMFS dealer data.

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[7] Unpublished NMFS permit data.

[8] Unpublished NMFS Vessel Trip Report (VTR) data.