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NOAA Technical Memorandum NMFS-F/NEC-71

**Allocation of Statewide-Reported  
MRFSS Catch and Landings  
Statistics between Areas:  
Application to Winter Flounder**

**U.S. DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
National Marine Fisheries Service  
Northeast Fisheries Center  
Woods Hole, Massachusetts**

**September 1989**

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# **Allocation of Statewide-Reported MRFSS Catch and Landings Statistics Between Areas: Application to Winter Flounder**

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## EXECUTIVE SUMMARY

A method is described for allocating statewide-reported catch and landings statistics [coming from the Marine Recreational Fisheries Statistics Survey (MRFSS)] between two groups when both contribute to the state's catches and landings. The method, based on an analysis of landings recorded at each intercept site used in the MRFSS, has been applied to landings of winter flounder from Massachusetts during 1979-87. Landings from Barnstable and Plymouth Counties, Massachusetts, with sites on both the northern and southern sides of Cape Cod, were assigned to either the Gulf of Maine or the Southern New England - Middle Atlantic area, based on the proportion of intercept landings recorded from each of the northern and southern sites. Landings from the northern sites of Barnstable and Plymouth Counties were then combined with the landings from the remaining northern counties of Massachusetts, and with the landings from New Hampshire and Maine, and were designated as Gulf of Maine landings. Likewise, landings from the southern sites of Barnstable and Plymouth Counties, combined with the landings from the remaining southern counties of Massachusetts, and with the landings from Rhode Island, Connecticut, New York, and New Jersey, were designated as Southern New England - Middle Atlantic landings.

Results indicate that about 88 percent of Massachusetts recreational landings (in weight) of winter flounder were taken from the Gulf of Maine area during 1979-87. Recreational landings were roughly equal between the two areas during 1979-82, but during 1983-86, about 84 percent of the landings were reported from the Southern New England - Middle Atlantic area. In 1987, the Southern New England - Middle Atlantic area contributed about 68 percent of the landings.

When recreational landings were combined with commercial landings, the data indicate that recreational landings contributed an average of 52 percent of the total landings from the Gulf of Maine area during the period, while in the Southern New England - Middle Atlantic area, recreational landings contributed 36 percent of the total.

The method described is applicable to other species and areas (with additional work determining specific site locations) in the historical MRFSS data base, but will not be necessary after 1990 when an additional area variable is added to the survey.





## INTRODUCTION

Winter flounder (*Pseudopleuronectes americanus* Walbaum) is an important component of both the commercial and recreational fisheries off the northeastern coast of the United States. According to the Marine Recreational Fishery Statistics Survey (MRFSS), it clearly is one of the most desired species in the recreational fishery and ranks among the top three species in numbers caught in the coastal waters of the North Atlantic region from Maine to Connecticut. In the Mid-Atlantic region from New York to Virginia, it has ranked consistently in the top eight species in numbers caught since 1979.

Since the inception of the annual MRFSS in 1979, catches of winter flounder have been reported by region (North Atlantic, Mid-Atlantic, etc.) and state (U.S. Dept. of Commerce 1984, 1985a, 1985b, 1986, 1987; unpublished U.S. Department of Commerce data). A concern of assessment biologists with this reporting scheme is that, while Cape Cod, Massachusetts, forms a natural boundary between individuals belonging to groups north and south of the cape, recreational catch statistics are reported for the entire state, and are not easily separable into the northern and southern areas. This limitation to the catch data base has made effective assessment of the inshore stocks difficult. In the assessments conducted to date, recreational landings statistics were reported by region/state (Conserva-

tion & Utilization Division, Northeast Fisheries Center 1988; Foster 1987), and analyses of overall removals from component stocks were not possible.

In the two Massachusetts counties that have intercept sites on both the northern and southern sides of Cape Cod (Barnstable and Plymouth), sites were assigned to either the Gulf of Maine or Southern New England - Middle Atlantic area depending on the sites' specific locations. Catches from these two counties were then allocated to the appropriate area based on the proportion of intercept catches landed from each of the sites.

This report presents the results of allocation of total catch and landings from the winter flounder recreational fishery during 1979-87. It also presents catch and landings statistics by state and area, and examines the effects of the addition of the recreational catch to commercial landings by state and area. The method is applicable to other species and areas (with additional work determining site locations) in the MRFSS data base.

## METHODS

The first step in the allocation process was to assign Massachusetts counties to northern or southern areas and to identify those counties which had shorelines in both areas (Figure 1). The following table provides a summary of the counties and the areas to which they were assigned:

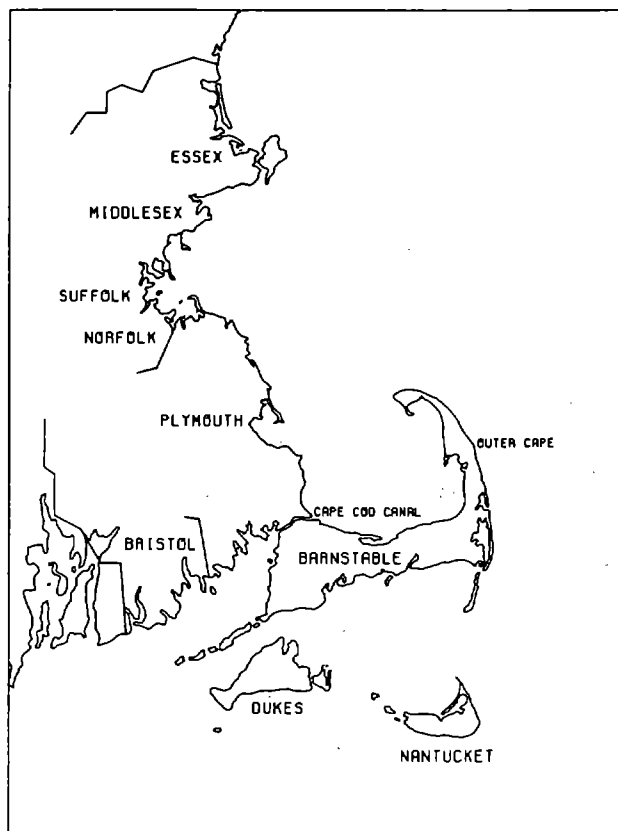


Figure 1. Approximate location of Massachusetts coastal counties.

County	MRFSS Code	Area Assigned
Essex	9	Northern
Middlesex	17	Northern
Norfolk	21	Northern
Suffolk	25	Northern
Bristol	5	Southern
Dukes	7	Southern
Nantucket	19	Southern
Barnstable	1	Northern/Southern
Plymouth	23	Northern/Southern

For Barnstable and Plymouth Counties, it was necessary to determine the actual location of sites visited by MRFSS agents and to assign each site to the northern or southern area. This areal assignment assumes that fishermen intercepted at northern sites had fished in waters north of Cape Cod, and that fishermen intercepted at southern sites had fished in waters south of Cape Cod. Sites of concern were those located in or very close to the Cape Cod Canal and on the outer cape. Canal sites were assigned to the northern area (Howe and Coates 1975; Pierce and Howe 1977; and A. Howe, pers. comm.), while outer cape sites were assigned to the southern area. For each year, intercept

catches (*i.e.*, Type A catches in the MRFSS sampling scheme -- those available for identification) in numbers were separated into bimonthly periods (*i.e.*, "waves" in the MRFSS sampling scheme) and assigned to one of the two areas based on site location.

For counties that had all of their sites in one area, Type A catches were assigned by wave to the appropriate area north or south of the cape. Total catches from each area (northern and southern) were then summed, and percentages were calculated of the total intercept catch taken from each area (*i.e.*, northern counties and northern sites from Barnstable and Plymouth Counties versus southern counties and southern sites from Barnstable and Plymouth Counties).

Expanded catch estimates in numbers (Types A+B1+B2, where B1 = catches used for bait, filleted, discarded dead, *etc.*; and B2 = catches released alive) for the entire state were then summed by wave. The area:total ratios were applied to these wave-specific estimates and then summed over waves to obtain the total Massachusetts catch by northern or southern area. Intercept catches, and therefore calculated ratios, were assumed to reflect total catch by area and wave.

Expanded catch estimates in numbers were summed over the range of the stock area. Massachusetts catches north of Cape Cod were combined with catches from Maine and New Hampshire, and designated as Gulf of Maine catches, while those catches south of Cape Cod were combined with catches from Rhode Island, Connecticut, New York, and New Jersey, and were designated as Southern New England - Middle Atlantic catches. Expanded estimates in weight were calculated after the procedure detailed in Terceiro (1987), *i.e.*:

$$\text{Total Catch (kg)} = [\text{Total Type A (kg)/Total Type A (no.)}] \cdot [\text{Type A+B1+B2 (no.)}]$$

where the mean weight of total Type A catches from the North Atlantic region were applied to Maine, New Hampshire, Massachusetts, and Rhode Island Type A+B1+B2 numbers, and the mean weight of total Type A catches from the Mid-Atlantic region were applied to Connecticut, New York, and New Jersey Type A+B1+B2 numbers.

To estimate total removals from the population, catches released alive (Type B2) were eliminated from the total expanded catches estimated above. Type B2 catch (numbers) was estimated by area, as described for Type A catch. However, since there were no estimates of Type B2 catch in weight, the mean weight of Type A individuals was applied to Type B2 numbers to estimate the weight of the Type B2 catch. This probably resulted in an overestimate of the Type B2 catch in weight since smaller individuals are typically released alive, and larger individuals are kept and made available to MRFSS interviewers for weighing. Estimates of total landings were then calculated as:

$$\text{Total Landings (kg)} = [\text{Total Catch (kg)}] - [\text{Total Type B2 Catch (kg)}].$$

## RESULTS

A summary of the number of sites visited and number of intercepts in which winter flounder were caught by year and area is given in Table 1. There were a total of 511 sites identified as possible intercept locations in Massachusetts, 265 (52 percent) of which were found in the northern area and 246 (48 percent) in the southern area. In all years except 1986, the number of different sites visited in the northern area were greater than the number in the southern area for Barnstable and Plymouth Counties as well as for the other counties in the state. While only 40 percent of the total possible sites in Barnstable and Plymouth Counties are located in the northern area, an average of 56 percent of the sites visited each year were from the northern area. Of the remaining counties, 65 percent of the total possible sites are located in the northern area with an average of 80 percent of the sites visited each year coming from that area. This differential distribution of sites visited in the state may bias the catch statistics in favor of the northern area, especially during those years when very low percentages of the total sites visited were in the southern area of the state. In Barnstable and Plymouth Counties, the annual percentages of winter flounder intercepts in the northern area versus the southern area were roughly constant, averaging 60 percent, except in 1986 when the annual value was 20 percent. In the other counties, the annual percentages of intercepts, northern versus southern, averaged 87 percent except in 1986 when the annual value was 33 percent.

Based on allocation of intercept catch (Type A only) between northern and southern areas of Massachusetts, the annual percentages of Massachusetts intercept catch in numbers from the northern area averaged 85 percent, and the annual percentages of Massachusetts landings in weight from the northern area averaged 88 percent, during 1979-87 (Tables 2 and 3). Wave 4 (July-August) produced the highest percentage of intercept catch (in numbers) coming from the northern area (93 percent). There were no intercept catches of winter flounder reported from Wave 1 (January-February) since no intercept sampling takes place north of Georgia during this wave. Total intercept catches (Type A in numbers) by year and wave from northern and southern areas of Barnstable and Plymouth Counties, Massachusetts, are given in detail in Appendix Table 1. Total intercept catches by year and wave from other counties in Massachusetts, separated into northern or southern areas, are given in detail in Appendix Table 2.

Total recreational landings (Type A+B1) from Maine to New Jersey were at a high of 11,470 metric tons (mt) in 1979, but declined sharply in 1980 and averaged 6,900 mt during 1980-84 before increasing to 9,952 mt in 1985. The landings then dropped to their lowest level of 3,618 mt in 1986, followed by an increase to 5,958 mt in 1987 (Table 3, Figure 2). Trends in total catch (Table 4) were similar to those exhibited for the landings statistics.

Table 1. Number of sites visited and number of intercepts by MRFSS agents for each area in Massachusetts during 1979-87

Year	Barnstable and Plymouth Counties				Total	Other Counties		
	North	Canal	South	Outer Cape		North <sup>1</sup>	South <sup>2</sup>	Total
<b>Sites Visited</b>								
1979	15	-	7	-	22	37	2	39
1980	12	-	3	2	17	37	2	39
1981	13	-	10	-	23	14	-	14
1982	16	-	8	2	26	17	2	19
1983	18	-	18	-	36	13	3	16
1984	15	1	14	-	30	4	2	6
1985	8	-	7	-	15	3	-	3
1986	5	-	7	-	12	1	5	6
1987	8	-	7	-	15	9	3	12
<b>Total Possible</b>	<b>121</b>	<b>7</b>	<b>159</b>	<b>14</b>	<b>301</b>	<b>137</b>	<b>73</b>	<b>210</b>
<b>Intercepts</b>								
1979	42	-	21	-	63	106	3	109
1980	55	-	18	2	75	152	2	154
1981	45	-	23	-	68	34	-	34
1982	90	-	21	2	113	101	2	103
1983	123	-	126	-	249	46	4	50
1984	65	1	67	-	133	11	6	17
1985	39	-	15	-	54	4	-	4
1986	12	-	49	-	61	12	24	36
1987	48	-	30	-	78	163	5	168

<sup>1</sup>Includes Essex, Middlesex, Suffolk, and Norfolk Counties.

<sup>2</sup>Includes Bristol, Dukes, and Nantucket Counties.

Recreational landings from the Gulf of Maine area declined from a high of 6,145 mt in 1979 to an average of 3,805 mt during 1980-82 before dropping sharply again to average 1,516 mt during 1983-85. The reported landings in 1986 were only 281 mt, but increased to 1,928 mt in 1987 (Table 3, Figure 2). The Southern New England - Middle Atlantic area reported landings averaging 3,078 mt during 1980-82, after which landings increased to average 6,426 in 1983-85. In 1986, landings dropped by almost one half to 3,338 mt, and rose only slightly to 4,030 mt in 1987 (Table 3, Figure 2).

Percentages of recreational landings by area were roughly equal between the two areas during 1979-82, averaging 55 and 45 percent from the northern and southern areas, respectively. During 1983-86, however, landings from the Southern New England - Middle Atlantic area averaged of 84 percent of the total. In 1987, while the southern area still reported a higher percentage of the total (68 percent), the percentage was slightly closer to those during 1979-82 (Table 3, Figure 3).

When recreational landings statistics were compared to commercial landings statistics by individual state, the data demonstrated that for Connecticut, New York, and New Jersey, recreational landings made up over 50 percent

of the total landings on average during 1979-87 (Table 5). For New York and New Jersey, recreational landings exceeded commercial landings each year, while in Connecticut, recreational exceeded commercial in six of nine years. For Massachusetts, recreational landings averaged 23 percent of total landings during 1979-87, with a low of 7 percent in 1986 and a high of 43 percent in 1979. For Rhode Island, recreational landings averaged only 14 percent of total landings, whereas for Maine and New Hampshire, recreational landings averaged 8 and 40 percent, respectively. While the average percentage contributed by New Hampshire recreational landings was quite high, annual values in that state exceeded 50 percent only twice in the time series (1979 and 1980).

Total winter flounder landings (commercial and recreational) summed over area indicate that recreational landings make up a significant percentage of the total from both the Gulf of Maine area, averaging 52 percent, and the Southern New England - Middle Atlantic area, averaging 36 percent, during 1979-87 (Table 6). Landings from the Gulf of Maine decreased from a high of 8,166 mt in 1979 to average 6,350 mt during 1980-82, and again declined to an average of 3,308 mt during 1983-85, before dropping sharply to only 1,547 mt in 1986. The estimated landings

Table 2. Proportion of intercept catch<sup>1</sup> (numbers) of winter flounder by bimonthly period (wave) from Massachusetts by area during 1979-87

Year	Wave					
	1 (Jan-Feb)	2 (Mar-Apr)	3 (May-Jun)	4 (Jul-Aug)	5 (Sep-Oct)	6 (Nov-Dec)
<b>Northern Counties</b>						
1979	-	.983	.942	.937	1.000	1.000
1980	-	.973	.991	1.000	.986	1.000
1981	-	1.000	.993	.970	.975	1.000
1982	-	.995	.932	.949	1.000	1.000
1983	-	.484	.728	.990	.625	.922
1984	-	-	.602	.987	.989	.027
1985	-	.782	.994	1.000	.737	1.000
1986	-	-	.940	.500	.941	-
1987	-	.510	.993	1.000	.962	.918
<b>Mean</b>	-	<b>.636</b>	<b>.902</b>	<b>.926</b>	<b>.913</b>	<b>.856</b>
<b>Southern Counties</b>						
1979	-	.017	.058	.063	-	-
1980	-	.027	.009	-	.014	-
1981	-	-	.007	.030	.025	-
1982	-	.005	.068	.051	<.001	-
1983	-	.516	.272	.010	.375	.078
1984	-	1.000	.398	.013	.011	.973
1985	-	.218	.006	-	.263	-
1986	-	1.000	.060	.500	.059	-
1987	-	.490	.007	-	.038	.082
<b>Mean</b>	-	<b>.364</b>	<b>.098</b>	<b>.074</b>	<b>.087</b>	<b>.144</b>

<sup>1</sup>Includes Type A only.

in 1987 increased to 3,135 mt, similar to the 1983-85 mean (Table 6, Figure 4). Landings from the Southern New England - Middle Atlantic area remained relatively constant during 1979-85, averaging 13,837 mt, and ranging from a low of 12,368 mt in 1979 to a high of 15,250 mt in 1984. In 1986, landings from this stock also declined sharply to 8,274 mt, and increased slightly to 9,219 mt in 1987 (Table 6, Figure 5).

## DISCUSSION

The allocation of recreational landings to stock areas both north and south of Cape Cod, Massachusetts, will result in improved analysis of the condition of the winter flounder population in the inshore waters of the Northeast. While the stock structure of winter flounder in these waters is still uncertain, the method outlined in this report can be applied to any region (once specific intercept sites in that region are assigned to stock areas), including New York catches of winter flounder, with catches allocated to either Long Island Sound or the Middle Atlantic waters south of Long Island. Moreover, the addition of an "area" variable to the MRFSS intercept and expanded catch data base will

make future allocations of recreational landings far easier than the process described herein. The area variable will be added to the Barnstable and Plymouth County, Massachusetts, sites beginning in January 1990.

The actual level of total recreational removals of winter flounder from the population is still unknown, but probably lies somewhere between total recreational catch (Types A+B1+B2) and total recreational landings (Type A+B1) estimates, depending on the degree of hooking mortality operating on the B2 catch (fish released alive). Based on this analysis, Type B2 catch averaged about 14 percent of the total recreational catch from the Gulf of Maine area during 1979-87, while it averaged about 25 percent from the Southern New England - Middle Atlantic area (Table 4). The increased percentage of B2 catch from southern waters may be due to an increased proportion of small individuals in that area. There are no estimates of the hooking mortality level for winter flounder or other flatfish, with the exception of Pacific halibut where hooking mortality ranged between 8 and 24 percent (International Pacific Halibut Commission 1988). One of the few studies discussing the effects of anatomical trauma on marine fish compared the effects of catching soft-coral reef fishes caught by angling and trawling (Rogers *et al.* 1986). In that

Table 3. Recreational landings<sup>1</sup> (metric tons) of winter flounder by state from the Gulf of Maine and Southern New England - Middle Atlantic areas during 1979-87

State	1979	1980	1981	1982	1983	1984	1985	1986	1987
<b>Gulf of Maine</b>									
ME	179.2	208.5	29.8	0.0	0.0	0.0	0.0	33.5	1.9
NH	92.2	118.9	34.4	15.9	40.9	57.5	17.1	22.1	18.6
MA	5874.0	3148.6	3603.0	4254.6	1308.4	1133.3	1989.4	224.8	1907.5
<b>Total</b>	<b>6145.4</b>	<b>3476.0</b>	<b>3667.2</b>	<b>4270.6</b>	<b>1349.3</b>	<b>1190.8</b>	<b>2006.5</b>	<b>280.5</b>	<b>1928.0</b>
<b>Southern New England - Middle Atlantic</b>									
MA	101.1	26.4	53.2	93.9	446.3	350.8	211.8	145.8	70.7
RI	151.5	76.5	110.8	311.6	261.5	330.2	912.5	1368.0	607.2
CT	576.4	524.0	319.0	412.6	301.6	704.2	598.0	272.3	738.3
NY	3950.5	1870.5	2393.6	1106.7	3286.0	3663.2	4087.0	1326.7	2425.5
NJ	545.4	222.3	446.8	1264.8	668.3	1319.4	2136.1	225.1	188.6
<b>Total</b>	<b>5324.9</b>	<b>2719.6</b>	<b>3323.4</b>	<b>3189.5</b>	<b>4963.8</b>	<b>6367.7</b>	<b>7945.4</b>	<b>3337.9</b>	<b>4030.3</b>
<b>Combined Areas</b>									
<b>Total</b>	<b>11470.3</b>	<b>6195.6</b>	<b>6990.5</b>	<b>7460.1</b>	<b>6313.0</b>	<b>7558.6</b>	<b>9951.9</b>	<b>3618.4</b>	<b>5958.3</b>
<b>Percent by Area</b>									
% GOM	53.6	56.1	52.5	57.2	21.4	15.8	20.2	7.8	32.4
% SNE-MA	46.4	43.9	47.5	42.8	78.6	84.2	79.8	92.2	67.6

<sup>1</sup>Includes Type A+B1 only (assumes no hooking mortality).

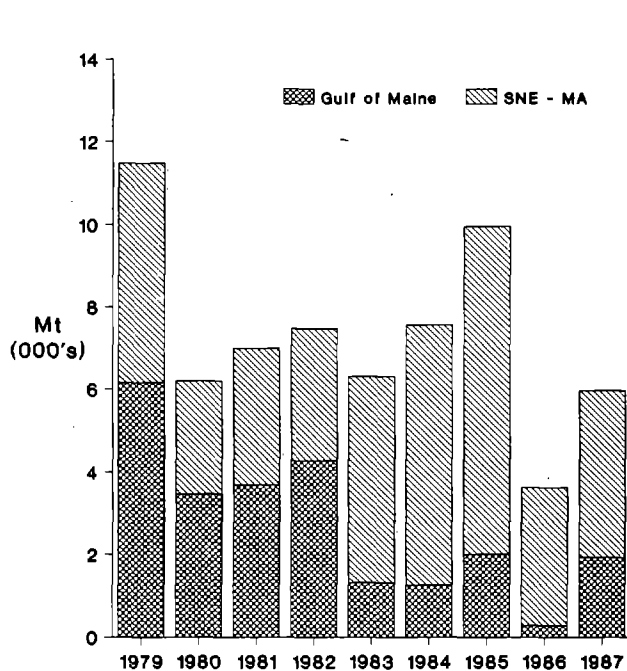


Figure 2. Recreational landings (metric tons) of winter flounder from the Gulf of Maine and Southern New England - Middle Atlantic areas during 1979-87.

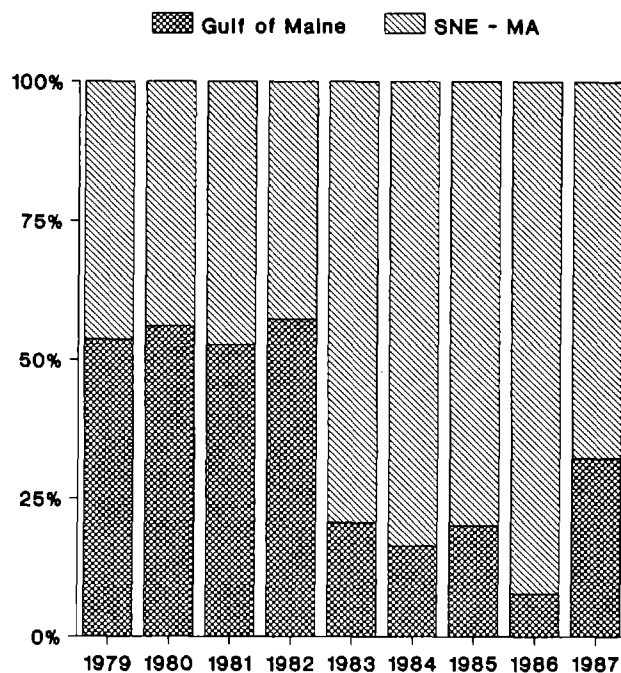


Figure 3. Percentage of recreational landings (metric tons) of winter flounder from the Gulf of Maine and Southern New England - Middle Atlantic areas during 1979-87.

Table 4. Recreational catch<sup>1</sup> (metric tons) of winter flounder by state from the Gulf of Maine and Southern New England - Middle Atlantic areas during 1979-87

State	1979	1980	1981	1982	1983	1984	1985	1986	1987
<b>Gulf of Maine</b>									
ME	183.8	211.7	30.7	-	-	-	-	34.7	1.9
NH	160.5	191.8	61.9	19.4	49.0	67.2	17.1	23.8	21.9
MA	6306.0	3496.1	4113.5	4631.5	1479.1	1249.1	2327.7	329.8	2380.1
<b>Total</b>	<b>6650.3</b>	<b>3899.6</b>	<b>4206.0</b>	<b>4650.9</b>	<b>1528.1</b>	<b>1316.3</b>	<b>2344.8</b>	<b>388.4</b>	<b>2403.8</b>
<b>Southern New England - Middle Atlantic</b>									
MA	121.8	29.1	62.9	96.8	510.5	398.1	265.2	192.0	92.0
RI	233.0	101.5	124.7	342.7	331.7	425.5	1020.9	1804.4	779.4
CT	752.4	663.1	368.3	478.6	371.6	797.7	733.3	299.6	854.5
NY	5457.1	2638.0	3391.4	1381.1	4182.0	5323.5	5922.1	1816.9	3169.7
NJ	853.9	318.5	513.4	1783.8	927.6	1664.1	2920.0	275.2	227.7
<b>Total</b>	<b>7418.2</b>	<b>3750.3</b>	<b>4460.7</b>	<b>4082.9</b>	<b>6323.4</b>	<b>8608.8</b>	<b>10861.5</b>	<b>4388.1</b>	<b>5123.2</b>
<b>Combined Areas</b>									
<b>Total</b>	<b>14068.5</b>	<b>7649.9</b>	<b>8666.7</b>	<b>8733.8</b>	<b>7851.5</b>	<b>9925.1</b>	<b>13206.3</b>	<b>4776.4</b>	<b>7527.1</b>
<b>Percent by Area</b>									
% GOM	47.3	51.0	48.5	53.3	19.5	13.3	17.8	8.1	31.9
% SNE-MA	52.7	49.0	51.5	46.7	80.5	86.7	82.2	91.9	68.1
<b>Type B2 Percent of Total</b>									
% GOM	7.6	10.9	12.8	8.2	11.7	9.5	14.6	27.8	19.8
% SNE-MA	28.2	27.5	25.5	21.9	21.5	26.0	26.8	23.9	21.3
<b>Total</b>	<b>18.5</b>	<b>19.0</b>	<b>19.3</b>	<b>14.6</b>	<b>19.6</b>	<b>23.8</b>	<b>24.7</b>	<b>24.2</b>	<b>20.8</b>

<sup>1</sup>Includes Type A+B1+B2 (assumes 100% hooking mortality).

study, the authors reported that up to 27 percent of black sea bass caught by angling suffered trauma sufficiently severe to produce fatalities. The effect of trauma was probably related to the body morphology of individual species; however, this estimate cannot be applied to winter flounder. Studies examining the effects of hooking and releasing small winter flounder and other species are necessary to effectively determine the actual level of removals from populations of recreationally caught species.

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Table 5. Commercial and recreational<sup>1</sup> landings (metric tons) of winter flounder by state during 1979-87

	ME	NH	MA	RI	CT	NY	NJ
1979							
Recreational	179.2	92.2	5975.1	151.5	576.4	3950.5	545.4
Commercial	447.2	22.5	7715.5	2788.0	240.1	674.5	94.8
% Recreational	28.6	80.4	43.6	5.2	70.6	85.4	85.2
1980							
Recreational	208.5	118.9	3175.0	76.5	524.0	1870.5	222.3
Commercial	566.3	26.5	11752.1	3971.1	227.5	754.3	66.9
% Recreational	26.9	81.8	21.3	1.9	69.7	71.3	76.9
1981							
Recreational	29.8	34.4	3656.2	110.8	319.0	2393.6	446.8
Commercial	668.8	44.5	11668.1	4178.1	523.1	953.4	235.5
% Recreational	4.3	43.6	23.9	2.6	37.9	71.5	65.5
1982							
Recreational	-	15.9	4348.5	311.6	4126.0	1106.7	1264.8
Commercial	897.6	104.5	9599.1	3480.0	514.6	836.9	120.4
% Recreational	-	13.2	31.2	8.2	88.9	56.9	91.3
1983							
Recreational	-	40.9	1754.7	261.5	301.6	3286.0	668.3
Commercial	677.7	76.7	10138.6	3087.5	531.4	660.9	141.7
% Recreational	-	34.8	14.8	7.8	36.2	83.3	82.5
1984							
Recreational	-	57.5	1484.1	330.2	704.2	3663.2	1319.4
Commercial	424.8	94.6	9522.4	3295.2	593.7	614.4	87.5
% Recreational	-	37.8	13.5	9.1	54.3	85.6	93.8
1985							
Recreational	-	17.1	2201.2	912.5	598.0	4087.0	2136.1
Commercial	332.5	74.9	6332.5	2888.8	541.5	576.7	216.3
% Recreational	-	18.6	25.8	24.0	52.5	87.6	90.8
1986							
Recreational	33.5	22.1	370.6	1368.0	272.3	1326.7	225.1
Commercial	294.0	51.3	4755.5	1948.1	294.8	406.9	168.2
% Recreational	10.2	30.1	7.2	41.3	48.0	76.5	57.2
1987							
Recreational	1.9	18.6	1978.2	607.2	738.3	2425.5	188.6
Commercial	241.3	92.5	5374.2	1736.4	643.2	556.6	103.4
% Recreational	0.8	16.7	26.9	25.9	53.4	81.3	64.6
<b>Average % Recreational</b>	<b>7.9</b>	<b>39.7</b>	<b>23.1</b>	<b>14.0</b>	<b>56.8</b>	<b>77.7</b>	<b>78.6</b>

<sup>1</sup>Includes Type A+B1.

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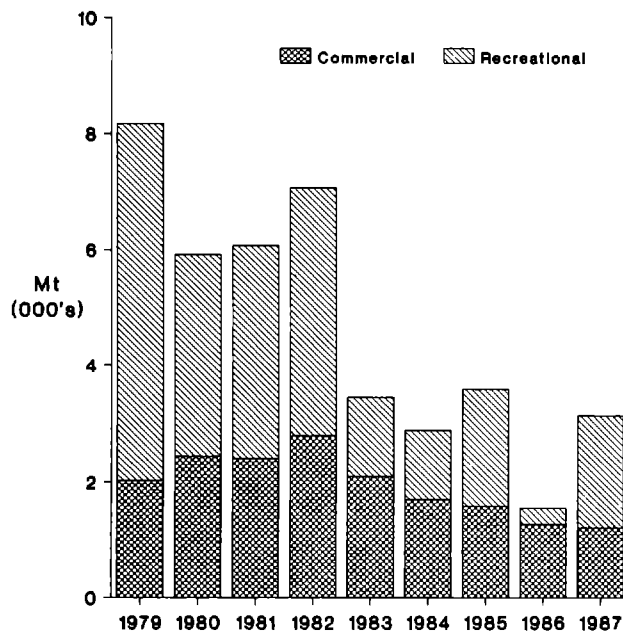


Figure 4. Commercial and recreational landings of winter flounder from the Gulf of Maine area during 1979-87.

Table 6. Commercial and recreational<sup>1</sup> landings (metric tons) of winter flounder from the Gulf of Maine and Southern New England - Middle Atlantic areas during 1979-87

Year	Commercial	Recreational	Total	Percent Recreational
<b>Gulf of Maine</b>				
1979	2,021	6,145	8,166	75.3
1980	2,437	3,476	5,913	58.8
1981	2,406	3,667	6,073	60.4
1982	2,793	4,271	7,064	60.5
1983	2,096	1,349	3,445	39.2
1984	1,698	1,191	2,889	41.2
1985	1,582	2,007	3,589	60.0
1986	1,266	281	1,547	18.2
1987	1,207	1,928	3,135	61.5
				<b>Mean = 52.3</b>
<b>Southern New England - Middle Atlantic</b>				
1979	7,043	5,325	12,368	43.1
1980	10,867	2,720	13,587	20.0
1981	11,557	3,323	14,880	22.3
1982	9,438	3,190	12,628	25.3
1983	8,659	4,964	13,623	36.4
1984	8,882	6,368	15,250	41.8
1985	6,579	7,945	14,524	54.7
1986	4,936	3,338	8,274	40.3
1987	5,189	4,030	9,219	43.7
				<b>Mean = 36.4</b>

<sup>1</sup>Includes Type A+B1.

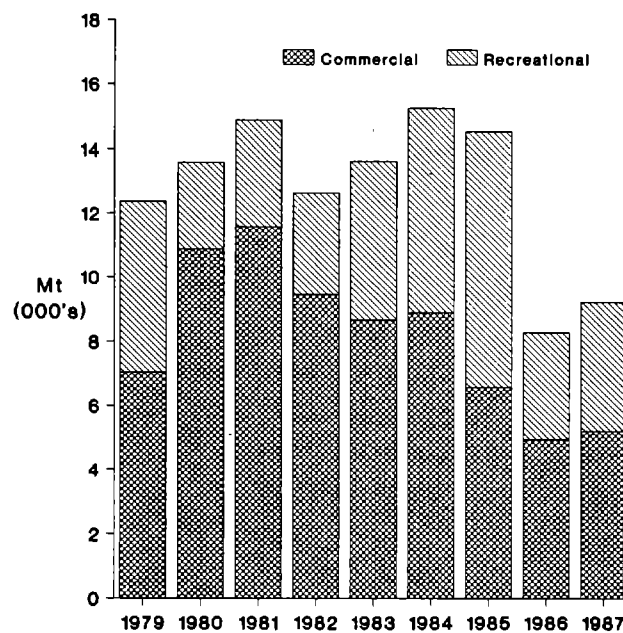


Figure 5. Commercial and recreational landings (metric tons) of winter flounder from the Southern New England - Middle Atlantic area during 1979-87.



Appendix Table 1. MRFSS intercept catch (Type A, thousands of individuals) from Barnstable and Plymouth Counties during 1979-87

County	Wave						Total
	1	2	3	4	5	6	
<b>Year: 1979</b>							
<b>CATCH BY COUNTY (numbers)</b>							
Barnstable	0	0	82	148	0	0	230
Plymouth	0	0	1040	964	1112	8	3124
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>1122</b>	<b>1112</b>	<b>1112</b>	<b>8</b>	<b>3354</b>
<b>CATCH BY STOCK AREA</b>							
<b>Northern Cape and North</b>							
Barnstable	0	0	0	145	0	0	145
Plymouth	0	0	825	533	1112	8	2478
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>825</b>	<b>678</b>	<b>1112</b>	<b>8</b>	<b>2623</b>
<b>Southern Cape and South</b>							
Barnstable	0	0	82	3	0	0	85
Plymouth	0	0	215	431	0	0	646
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>297</b>	<b>434</b>	<b>0</b>	<b>0</b>	<b>731</b>
<b>PROPORTIONS BY STOCK AREA</b>							
North	0.000	0.000	0.735	0.610	1.000	1.000	0.782
South	0.000	0.000	0.265	0.390	0.000	0.000	0.218
<b>Year: 1980</b>							
<b>CATCH BY COUNTY (numbers)</b>							
Barnstable	0	20	1	25	21	0	67
Plymouth	0	521	769	202	671	5	2168
<b>TOTAL</b>	<b>0</b>	<b>541</b>	<b>770</b>	<b>227</b>	<b>692</b>	<b>5</b>	<b>2235</b>
<b>CATCH BY STOCK AREA</b>							
<b>Northern Cape and North</b>							
Barnstable	0	0	0	25	17	0	42
Plymouth	0	521	728	202	610	5	2066
<b>TOTAL</b>	<b>0</b>	<b>521</b>	<b>728</b>	<b>227</b>	<b>627</b>	<b>5</b>	<b>2108</b>
<b>Southern Cape and South</b>							
Barnstable	0	20	0	0	0	0	20
Plymouth	0	0	41	0	61	0	102
<b>TOTAL</b>	<b>0</b>	<b>20</b>	<b>41</b>	<b>0</b>	<b>61</b>	<b>0</b>	<b>122</b>
<b>Outer Cape</b>							
Barnstable	0	0	1	0	4	0	5
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>5</b>
<b>PROPORTIONS BY STOCK AREA</b>							
North	0.000	0.963	0.945	1.000	0.906	1.000	0.943
South	0.000	0.037	0.053	0.000	0.088	0.000	0.055
Outer Cape	0.000	0.000	0.001	0.000	0.006	0.000	0.002

Appendix Table 1. continued.

County	Wave						Total
	1	2	3	4	5	6	
<b>Year: 1981</b>							
<b>CATCH BY COUNTY (numbers)</b>							
Barnstable	0	0	36	788	244	177	1245
Plymouth	0	143	0	1418	4640	740	6941
<b>TOTAL</b>	<b>0</b>	<b>143</b>	<b>36</b>	<b>2206</b>	<b>4884</b>	<b>917</b>	<b>8186</b>
<b>CATCH BY STOCK AREA</b>							
<b>Northern Cape and North</b>							
Barnstable	0	0	0	767	0	177	944
Plymouth	0	143	0	1349	4630	740	6862
<b>TOTAL</b>	<b>0</b>	<b>143</b>	<b>0</b>	<b>2116</b>	<b>4630</b>	<b>917</b>	<b>7806</b>
<b>Southern Cape and South</b>							
Barnstable	0	0	36	21	244	0	301
Plymouth	0	0	0	69	10	0	79
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>36</b>	<b>90</b>	<b>254</b>	<b>0</b>	<b>380</b>
<b>PROPORTIONS BY STOCK AREA</b>							
North	0.000	1.000	0.000	0.959	0.948	1.000	0.954
South	0.000	0.000	1.000	0.041	0.052	0.000	0.046
<b>Year: 1982</b>							
<b>CATCH BY COUNTY (numbers)</b>							
Barnstable	0	4	436	847	167	922	2376
Plymouth	0	71	290	311	2369	0	3041
<b>TOTAL</b>	<b>0</b>	<b>75</b>	<b>726</b>	<b>1158</b>	<b>2536</b>	<b>922</b>	<b>5417</b>
<b>CATCH BY STOCK AREA</b>							
<b>Northern Cape and North</b>							
Barnstable	0	0	27	594	163	922	1706
Plymouth	0	67	290	311	2369	0	3037
<b>TOTAL</b>	<b>0</b>	<b>67</b>	<b>317</b>	<b>905</b>	<b>2532</b>	<b>922</b>	<b>4743</b>
<b>Southern Cape and South</b>							
Barnstable	0	4	409	133	4	0	550
Plymouth	0	4	0	0	0	0	4
<b>TOTAL</b>	<b>0</b>	<b>8</b>	<b>409</b>	<b>133</b>	<b>4</b>	<b>0</b>	<b>554</b>
<b>Outer Cape</b>							
Barnstable	0	0	0	120	0	0	120
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>120</b>	<b>0</b>	<b>0</b>	<b>120</b>
<b>PROPORTIONS BY STOCK AREA</b>							
North	0.000	0.893	0.437	0.782	0.998	1.000	0.876
South	0.000	0.107	0.563	0.115	0.002	0.000	0.102
Outer Cape	0.000	0.000	0.000	0.104	0.000	0.000	0.022

Appendix Table 1. continued.

County	Wave						Total
	1	2	3	4	5	6	
<b>Year: 1983</b>							
<b>CATCH BY COUNTY (numbers)</b>							
Barnstable	0	1160	1665	136	1161	393	4515
Plymouth	0	281	2436	467	977	0	4161
<b>TOTAL</b>	<b>0</b>	<b>1441</b>	<b>4101</b>	<b>603</b>	<b>2138</b>	<b>393</b>	<b>8676</b>
<b>CATCH BY STOCK AREA</b>							
<b>Northern Cape and North</b>							
Barnstable	0	363	318	119	291	365	1456
Plymouth	0	148	1799	467	977	0	3391
<b>TOTAL</b>	<b>0</b>	<b>511</b>	<b>2117</b>	<b>586</b>	<b>1268</b>	<b>365</b>	<b>4847</b>
<b>Southern Cape and South</b>							
Barnstable	0	797	1347	17	870	28	3059
Plymouth	0	133	637	0	0	0	770
<b>TOTAL</b>	<b>0</b>	<b>930</b>	<b>1984</b>	<b>17</b>	<b>870</b>	<b>28</b>	<b>3829</b>
<b>PROPORTIONS BY STOCK AREA</b>							
North	0.000	0.355	0.516	0.972	0.593	0.929	0.559
South	0.000	0.645	0.484	0.028	0.407	0.071	0.441
<b>Year: 1984</b>							
<b>CATCH BY COUNTY (numbers)</b>							
Barnstable	0	336	1155	269	121	147	2028
Plymouth	0	0	125	1702	2914	0	4741
<b>TOTAL</b>	<b>0</b>	<b>336</b>	<b>1280</b>	<b>1971</b>	<b>3035</b>	<b>147</b>	<b>6769</b>
<b>CATCH BY STOCK AREA</b>							
<b>Northern Cape and North</b>							
Barnstable	0	0	645	261	106	0	1012
Plymouth	0	0	125	1702	2913	0	4740
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>770</b>	<b>1963</b>	<b>3019</b>	<b>0</b>	<b>5752</b>
<b>Southern Cape and South</b>							
Barnstable	0	336	510	8	15	143	1012
Plymouth	0	0	0	0	1	0	1
<b>TOTAL</b>	<b>0</b>	<b>336</b>	<b>510</b>	<b>8</b>	<b>16</b>	<b>143</b>	<b>1013</b>
<b>Cape Cod Canal</b>							
Barnstable	0	0	0	0	0	4	4
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>4</b>
<b>PROPORTIONS BY STOCK AREA</b>							
North	0.000	0.000	0.602	0.996	0.995	0.000	0.850
South	0.000	1.000	0.398	0.004	0.005	0.973	0.150
Canal Area	0.000	0.000	0.000	0.000	0.000	0.027	0.001

Appendix Table 1. continued.

County	Wave						Total
	1	2	3	4	5	6	
<b>Year: 1985</b>							
<b>CATCH BY COUNTY (numbers)</b>							
Barnstable	0	154	600	16	19	2	791
Plymouth	0	583	4081	0	0	0	4664
<b>TOTAL</b>	<b>0</b>	<b>737</b>	<b>4681</b>	<b>16</b>	<b>19</b>	<b>2</b>	<b>5455</b>
<b>CATCH BY STOCK AREA</b>							
<b>Northern Cape and North</b>							
Barnstable	0	0	600	16	14	2	632
Plymouth	0	576	4054	0	0	0	4630
<b>TOTAL</b>	<b>0</b>	<b>576</b>	<b>4654</b>	<b>16</b>	<b>14</b>	<b>2</b>	<b>5262</b>
<b>Southern Cape and South</b>							
Barnstable	0	154	0	0	5	0	159
Plymouth	0	7	27	0	0	0	34
<b>TOTAL</b>	<b>0</b>	<b>161</b>	<b>27</b>	<b>0</b>	<b>5</b>	<b>0</b>	<b>193</b>
<b>PROPORTIONS BY STOCK AREA</b>							
North	0.000	0.782	0.994	1.000	0.737	1.000	0.965
South	0.000	0.218	0.006	0.000	0.263	0.000	0.035
<b>Year: 1986</b>							
<b>CATCH BY COUNTY (numbers)</b>							
Barnstable	0	470	224	1	16	0	711
Plymouth	0	17	2389	0	1	0	2407
<b>TOTAL</b>	<b>0</b>	<b>487</b>	<b>2613</b>	<b>1</b>	<b>17</b>	<b>0</b>	<b>3118</b>
<b>CATCH BY STOCK AREA</b>							
<b>Northern Cape and North</b>							
Barnstable	0	0	101	1	16	0	118
Plymouth	0	0	2364	0	0	0	2364
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>2465</b>	<b>1</b>	<b>16</b>	<b>0</b>	<b>2482</b>
<b>Southern Cape and South</b>							
Barnstable	0	470	123	0	0	0	593
Plymouth	0	17	25	0	1	0	43
<b>TOTAL</b>	<b>0</b>	<b>487</b>	<b>148</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>636</b>
<b>PROPORTIONS BY STOCK AREA</b>							
North	0.000	0.000	0.943	1.000	0.941	0.000	0.796
South	0.000	1.000	0.057	0.000	0.059	0.000	0.204

Appendix Table 1. continued.

County	Wave						Total
	1	2	3	4	5	6	
<b>Year: 1987</b>							
<b>CATCH BY COUNTY (numbers)</b>							
Barnstable	0	0	125	0	474	82	681
Plymouth	0	0	2709	1	10	61	2781
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>2834</b>	<b>1</b>	<b>484</b>	<b>143</b>	<b>3462</b>
<b>CATCH BY STOCK AREA</b>							
<b>Northern Cape and North</b>							
Barnstable	0	0	100	0	373	54	527
Plymouth	0	0	2709	1	0	61	2771
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>2809</b>	<b>1</b>	<b>373</b>	<b>115</b>	<b>3298</b>
<b>Southern Cape and South</b>							
Barnstable	0	0	25	0	101	28	154
Plymouth	0	0	0	0	10	0	10
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>25</b>	<b>0</b>	<b>111</b>	<b>28</b>	<b>164</b>
<b>PROPORTIONS BY STOCK AREA</b>							
North	0.000	0.000	0.991	1.000	0.771	0.804	0.953
South	0.000	0.000	0.009	0.000	0.229	0.196	0.047

Appendix Table 2. MRFSS intercept catch (Type A, thousands of individuals) from Massachusetts counties, excluding Barnstable and Plymouth, during 1979-87

County	Wave						Total
	1	2	3	4	5	6	
<b>Year: 1979</b>							
<b>CATCH BY COUNTY (number)</b>							
Bristol	0	2	0	0	0	0	2
Essex	0	73	1152	258	23	5	1511
Middlesex	0	40	1	0	0	0	41
Nantucket	0	0	0	16	0	0	16
Norfolk	0	0	2602	5982	1055	0	9639
Suffolk	0	1	579	236	128	15	959
<b>TOTAL</b>	<b>0</b>	<b>116</b>	<b>4334</b>	<b>6492</b>	<b>1206</b>	<b>20</b>	<b>12168</b>
<b>CATCH BY STOCK AREA</b>							
<b>Northern Counties</b>							
Essex	0	73	1152	258	23	5	1511
Middlesex	0	40	1	0	0	0	41
Norfolk	0	0	2602	5982	1055	0	9639
Suffolk	0	1	579	236	128	15	959
<b>TOTAL</b>	<b>0</b>	<b>114</b>	<b>4334</b>	<b>6476</b>	<b>1206</b>	<b>20</b>	<b>12150</b>
<b>Southern Counties</b>							
Bristol	0	2	0	0	0	0	2
Nantucket	0	0	0	16	0	0	16
<b>TOTAL</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>16</b>	<b>0</b>	<b>0</b>	<b>18</b>
<b>PROPORTIONS BY STOCK AREA</b>							
Northern Counties	.000	.983	1.000	.998	1.000	1.000	.999
Southern Counties	.000	.017	.000	.002	.000	.000	.001
<b>Year: 1980</b>							
<b>CATCH BY COUNTY (number)</b>							
Bristol	0	1	1	0	0	0	2
Essex	0	243	41	599	391	0	1274
Middlesex	0	0	0	0	1	0	1
Norfolk	0	0	1661	225	3371	0	5257
Suffolk	0	0	2267	48	16	0	2331
<b>TOTAL</b>	<b>0</b>	<b>244</b>	<b>3970</b>	<b>872</b>	<b>3779</b>	<b>0</b>	<b>8865</b>
<b>CATCH BY STOCK AREA</b>							
<b>Northern Counties</b>							
Essex	0	243	41	599	391	0	1274
Middlesex	0	0	0	0	1	0	1
Norfolk	0	0	1661	225	3371	0	5257
Suffolk	0	0	2267	48	16	0	2331
<b>TOTAL</b>	<b>0</b>	<b>243</b>	<b>3969</b>	<b>872</b>	<b>3779</b>	<b>0</b>	<b>8863</b>
<b>Southern Counties</b>							
Bristol	0	1	1	0	0	0	2
<b>TOTAL</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>
<b>PROPORTIONS BY STOCK AREA</b>							
Northern Counties	.000	.996	1.000	1.000	1.000	.000	1.000
Southern Counties	.000	.004	<0.001	.000	.000	.000	<0.001

Appendix Table 2. continued.

County	Wave						Total
	1	2	3	4	5	6	
<b>Year: 1981</b>							
<b>CATCH BY COUNTY (number)</b>							
Essex	0	0	20	651	561	0	1232
Norfolk	0	0	4695	50	4140	0	8885
Suffolk	0	0	296	134	509	0	939
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>5011</b>	<b>835</b>	<b>5210</b>	<b>0</b>	<b>11056</b>
<b>CATCH BY STOCK AREA</b>							
<b>Northern Counties</b>							
Essex	0	0	20	651	561	0	1232
Norfolk	0	0	4695	50	4140	0	8885
Suffolk	0	0	296	134	509	0	939
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>5011</b>	<b>835</b>	<b>5210</b>	<b>0</b>	<b>11056</b>
<b>PROPORTIONS BY STOCK AREA</b>							
Northern Counties	.000	.000	1.000	1.000	1.000	.000	1.000
Southern Counties	.000	.000	.000	.000	.000	.000	.000
<b>Year: 1982</b>							
<b>CATCH BY COUNTY (number)</b>							
Bristol	0	0	81	0	1	0	82
Essex	0	1421	662	81	326	0	2490
Norfolk	0	9	5557	3190	10993	0	19749
Suffolk	0	0	201	553	2156	69	2979
<b>TOTAL</b>	<b>0</b>	<b>1430</b>	<b>6501</b>	<b>3824</b>	<b>13476</b>	<b>69</b>	<b>25300</b>
<b>CATCH BY STOCK AREA</b>							
<b>Northern Counties</b>							
Essex	0	1421	662	81	326	0	2490
Norfolk	0	9	5557	3190	10993	0	19749
Suffolk	0	0	201	553	2156	69	2979
<b>TOTAL</b>	<b>0</b>	<b>1430</b>	<b>6420</b>	<b>3824</b>	<b>13475</b>	<b>69</b>	<b>25218</b>
<b>Southern Counties</b>							
Bristol	0	0	81	0	1	0	82
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>81</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>82</b>
<b>PROPORTIONS BY STOCK AREA</b>							
Northern Counties	.000	1.000	.988	1.000	1.000	1.000	.997
Southern Counties	.000	.000	.012	.000	<0.001	.000	.003

Appendix Table 2. continued.

County	Wave						Total
	1	2	3	4	5	6	
<b>Year: 1983</b>							
<b>CATCH BY COUNTY (number)</b>							
Bristol	0	15	0	1	1	0	17
Essex	0	162	229	243	173	0	807
Norfolk	0	0	2967	926	0	0	3893
Suffolk	0	215	0	0	9	0	224
<b>TOTAL</b>	<b>0</b>	<b>392</b>	<b>3196</b>	<b>1170</b>	<b>183</b>	<b>0</b>	<b>4941</b>
<b>CATCH BY STOCK AREA</b>							
<b>Northern Counties</b>							
Essex	0	162	229	243	173	0	807
Norfolk	0	0	2967	926	0	0	3893
Suffolk	0	215	0	0	9	0	224
<b>TOTAL</b>	<b>0</b>	<b>377</b>	<b>3196</b>	<b>1169</b>	<b>182</b>	<b>0</b>	<b>4924</b>
<b>Southern Counties</b>							
Bristol	0	15	0	1	1	0	17
<b>TOTAL</b>	<b>0</b>	<b>15</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>17</b>
<b>PROPORTIONS BY STOCK AREA</b>							
Northern Counties	.000	.962	1.000	.999	.995	.000	.997
Southern Counties	.000	.038	.000	.001	.005	.000	.003
<b>Year: 1984</b>							
<b>CATCH BY COUNTY (number)</b>							
Bristol	0	0	0	19	18	0	37
Essex	0	0	1	2	0	0	3
Norfolk	0	0	0	17	0	0	17
Suffolk	0	0	0	32	1	0	33
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>70</b>	<b>19</b>	<b>0</b>	<b>90</b>
<b>CATCH BY STOCK AREA</b>							
<b>Northern Counties</b>							
Essex	0	0	1	2	0	0	3
Norfolk	0	0	0	17	0	0	17
Suffolk	0	0	0	32	1	0	33
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>51</b>	<b>1</b>	<b>0</b>	<b>53</b>
<b>Southern Counties</b>							
Bristol	0	0	0	19	18	0	37
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>19</b>	<b>18</b>	<b>0</b>	<b>37</b>
<b>PROPORTIONS BY STOCK AREA</b>							
Northern Counties	.000	.000	1.000	.729	.053	.000	.589
Southern Counties	.000	.000	.000	.271	.947	.000	.411



Appendix Table 2. continued.

County	Wave						Total
	1	2	3	4	5	6	
<b>Year: 1985</b>							
<b>CATCH BY COUNTY (number)</b>							
Essex	0	0	5	1	0	0	6
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>5</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>6</b>
<b>CATCH BY STOCK AREA</b>							
<b>Northern Counties</b>							
Essex	0	0	5	1	0	0	6
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>5</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>6</b>
<b>PROPORTIONS BY STOCK AREA</b>							
Northern Counties	.000	.000	1.000	1.000	.000	.000	1.000
Southern Counties	.000	.000	.000	.000	.000	.000	.000
<b>Year: 1986</b>							
<b>CATCH BY COUNTY (number)</b>							
Bristol	0	1351	200	1	0	0	1552
Dukes	0	0	24	0	0	0	24
Norfolk	0	0	3382	0	0	0	3382
<b>TOTAL</b>	<b>0</b>	<b>1351</b>	<b>3606</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>4958</b>
<b>CATCH BY STOCK AREA</b>							
<b>Northern Counties</b>							
Norfolk	0	0	3382	0	0	0	3382
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>3382</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3382</b>
<b>Southern Counties</b>							
Bristol	0	1351	200	1	0	0	1552
Dukes	0	0	24	0	0	0	24
<b>TOTAL</b>	<b>0</b>	<b>1351</b>	<b>224</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>1576</b>
<b>PROPORTIONS BY STOCK AREA</b>							
Northern Counties	.000	.000	.938	.000	.000	.000	.682
Southern Counties	.000	1.000	.062	1.000	.000	.000	.318

Appendix Table 2. continued.

County	Wave						Total
	1	2	3	4	5	6	
<b>Year: 1987</b>							
<b>CATCH BY COUNTY (number)</b>							
Bristol	0	102	0	0	0	0	102
Dukes	0	0	0	0	36	0	36
Essex	0	106	11	4	0	0	121
Norfolk	0	0	90	0	2557	200	2847
Suffolk	0	0	732	0	809	0	1541
<b>TOTAL</b>	<b>0</b>	<b>208</b>	<b>833</b>	<b>4</b>	<b>3402</b>	<b>200</b>	<b>4647</b>
<b>CATCH BY STOCK AREA</b>							
<b>Northern Counties</b>							
Essex	0	106	11	4	0	0	121
Norfolk	0	0	90	0	2557	200	2847
Suffolk	0	0	732	0	809	0	1541
<b>TOTAL</b>	<b>0</b>	<b>106</b>	<b>833</b>	<b>4</b>	<b>3366</b>	<b>200</b>	<b>4509</b>
<b>Southern Counties</b>							
Bristol	0	102	0	0	0	0	102
Dukes	0	0	0	0	36	0	36
<b>TOTAL</b>	<b>0</b>	<b>102</b>	<b>0</b>	<b>0</b>	<b>36</b>	<b>0</b>	<b>138</b>
<b>PROPORTIONS BY STOCK AREA</b>							
Northern Counties	.000	.510	1.000	1.000	.989	1.000	.970
Southern Counties	.000	.490	.000	.000	.011	.000	.030

(continued from inside front cover)

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