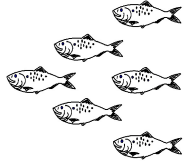




Forecast for the 2008 Gulf and Atlantic Menhaden Purse-Seine Fisheries and Review of the 2007 Fishing Season



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by the
Sustainable Fisheries Branch
National Marine Fisheries Service - Beaufort, NC

INTRODUCTION

The 2008 fishing year is the thirty-sixth year for which quantitative forecasts of purse-seine landings of gulf and Atlantic menhaden have been made by the National Marine Fisheries Service. The forecasts are based on a multiple regression equation that relates landings and fishing effort over a series of years. Our 2008 forecasts of landings are conditioned on estimates of expected fishing effort for the upcoming fishing year. Estimates of fishing effort are vessel-specific and are derived from 1) industry input, that is, the number of vessels that companies expect to be active during the upcoming fishing year, and 2) historical performance (catch and effort) of the vessels expected to participate in the fishery. In the Atlantic menhaden fishery, actual purse-seine landings have differed an average of 13% from those forecast for the thirty-five year period, 1973-2007. Landings in the gulf menhaden fishery have differed from those forecast by an average of 15% for the same period.

In this forecast report, we review the 2007 gulf and Atlantic menhaden fishing seasons in terms of

- landings and fleet size,
- age composition of the catch,
- status of the 2007 forecasts, and

we forecast landings for the 2008 gulf and Atlantic menhaden fishing seasons.

GULF MENHADEN FISHERY

Gulf Menhaden Landings, Fishing Conditions, and Vessel Participation in 2007

Final purse-seine landings of gulf menhaden for reduction in 2007 amounted to 453,832 metric tons (1,493 million standard fish). This is down 2% from total landings in 2006 (464,393 t), and down 8% from the previous five-year mean (491,704 t) (Fig. 1). Landings in 2007 were the second lowest reported since 1992.

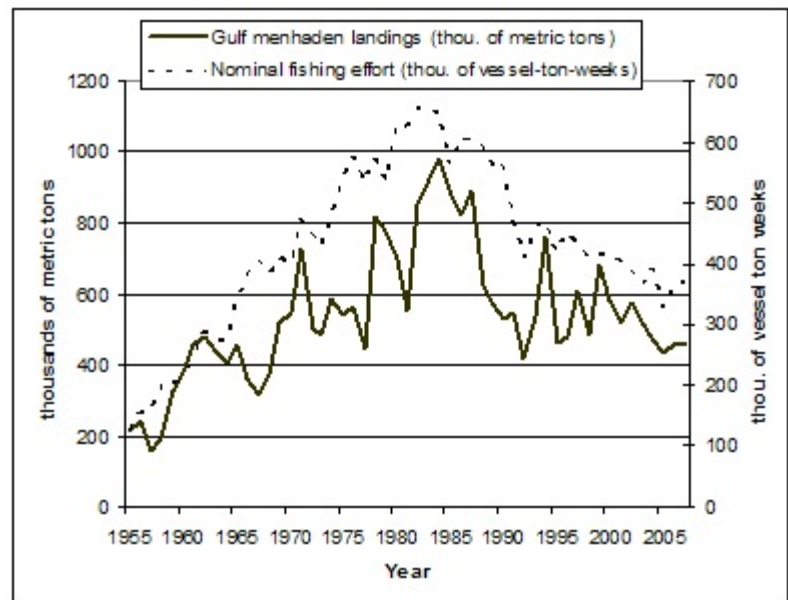


Figure 1. Gulf menhaden landings and nominal fishing effort, 1955-2007.

Gulf menhaden landings by month during 2007 were unimodal with peak landings in July (Fig. 2). Landings in April (13,700 t) were poor and comparable to landings in April 2004 (13,500 t). Landings in May 2007 (51,100 t) improved, but were below landings in May for the previous three years, and were the lowest landings for that month since May 1991 (27,941 t). Landings in June 2007 climbed to 89,700 t, then landings in July peaked for the fishing season at 110,800 t. Landings declined in August (90,700 t), and continued their decent in September (66,700 t) and October (31,100 t).

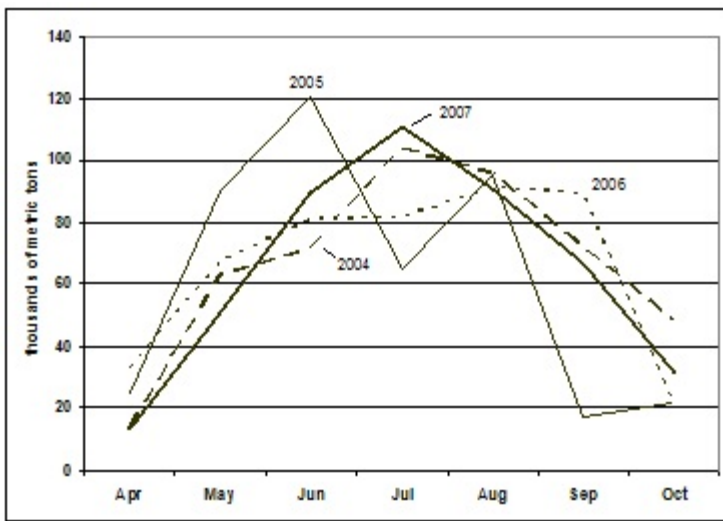


Figure 2. Gulf menhaden landings by month, 2004-2007.

The 2007 gulf menhaden season opened on April 16 with four fish factories active: Moss Point, Mississippi, and Empire, Abbeville, and Cameron, Louisiana. Weather in the northern Gulf of Mexico through early June 2007 was windy and cool. During the initial seven to eight weeks of the 2007 fishing season catches were poor and fish oil yields were low, unlike April and May of the previous year when near-record spring catches prevailed at some factories. Some fishermen noted that it was “the worst start for the fishery in years”. Moreover, several factories had difficulties crewing vessels in their respective fleets.

Fair weather finally prevailed by mid-June and catches improved significantly, as did fish oil yields. Peak landings for the 2007 fishing season occurred in July. Good catches continued through mid-August, then several tropical systems disrupted fishing activities. During the latter half of August Tropical Storm Erin struck the Texas coast with tremendous amounts of rain, while Hurricane Dean made landfall in the Yucatan. Hurricane Humberto hit eastern Texas in mid-September and the fleet again lost considerable sea-time. Windy conditions persisted in October with several weak tropical systems lingering in the western Gulf of Mexico.

A total of 41 vessels reported unloading gulf menhaden for reduction in 2007 - 38 regular steamers, two run boats, and one bait boat. The run boats do not fish, but rather transfer menhaden from the fishing grounds to the factory. The bait vessel unloaded menhaden primarily for bait, but occasionally unloaded for reduction at one of the fish factories.

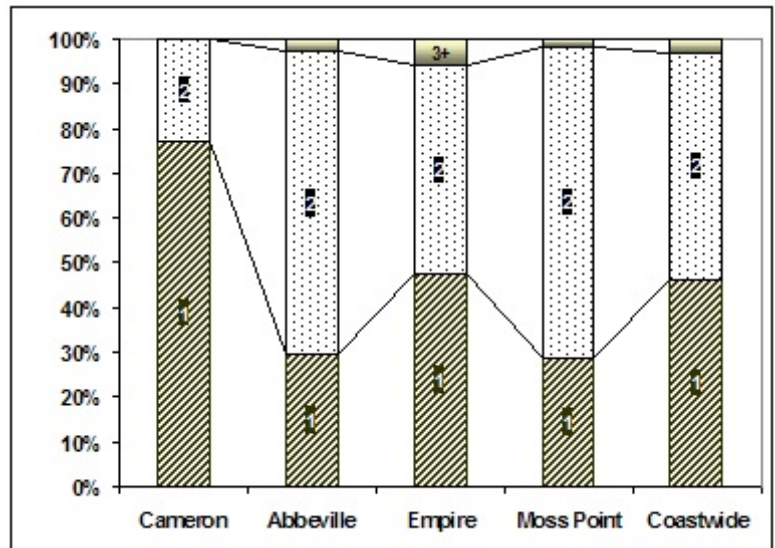


Figure 3. Percent estimated numbers at-age of gulf menhaden by port in 2007.

Age Composition of Gulf Menhaden in 2007

About 3,900 gulf menhaden were aged from the 2007 port samples (Fig. 3). From the catch-at-age matrix (not the ‘raw’ port samples), coastwide age-2 fish (51%) slightly outnumbered age-1 fish (46%). At Moss Point age-2 gulf menhaden comprised 70% of the catch, while age-1's comprised 29%. At Empire age-1 (47%) and age-2 fish (47%) were equally represented. At Abbeville age-2's (68%) predominated over age-1's (29%), while at Cameron age-1 gulf menhaden (77%) outnumbered age-2 fish (23%) by more than three-to-one. Comparisons of age compositions in the Gulf fishery for recent years are shown in Table 1.

Year	Age-1	Age-2	Est. total number of fish caught in billions	Landings in thou. of metric t
2007*	46%	51%	4.76	453.8
2006	46%	47%	4.90	464.4
2005	44%	52%	4.51	433.8
2004	56%	35%	5.00	468.7
2003	36%	57%	5.28	517.1

Fishing Effort in 2007 and Review of the 2007 Forecast for Gulf Menhaden

Nominal fishing effort for the gulf menhaden fishery during 2007 is estimated at 369,200 vessel ton weeks; this is nearly equivalent to nominal fishing effort in 2006 (367,200 vessel ton weeks), yet 2007 was the sixth consecutive year in which nominal fishing effort was less than 400,000 vessel ton weeks.

In March 2007, we anticipated that nominal fishing effort during 2007 could amount to 375,000 vessel ton weeks with 43 vessels participating in the fishery. With this level of anticipated fishing effort, we forecasted 2007 gulf menhaden landings of 478,000 t with 80% confidence levels of 356,000 and 600,000 t. Nominal fishing effort in 2007 (369,200 vessel ton weeks) was 2% less than we expected at the beginning of the fishing season. A “hindcast” using our forecast model and actual nominal fishing effort in 2007 produced a post-season forecast of 471,000 t with 80% confidence levels of 349,000 and 593,000 t. Actual landings of 453,832 t were 4% less than our post-season forecast.

Forecast for the 2008 Gulf Menhaden Fishing Season

We expect that four menhaden factories (Moss Point, MS, and Empire, Abbeville, and Cameron, LA) will process gulf menhaden in 2008. Our best estimate of vessel participation is for 42 vessels: 40 regular steamers and two run boats. The bait operation with one vessel in the Morgan City area will not operate in 2008. Based on average nominal fishing effort for recent years by vessels expected to be active in 2008, we expect that nominal fishing effort in 2008 may be about 365,000 vessel ton weeks. With 365,000 vessel ton weeks of effort, we forecast 2008 gulf menhaden landings of 460,000 t, with 80% confidence levels of 339,000 and 582,000 t (Fig. 4).

The moderate level of representation by age-1 gulf menhaden (the 2006 year class) in the 2007 catch-at-age matrix (Table 1) suggests that age-2 fish should be relatively abundant during 2008 in areas where they historically comprise a large proportion of the catch, that is, Moss Point, MS, and Abbeville, LA. Preliminary data from a bag-seine survey of eastern Texas bays conducted by Texas Parks and Wildlife Department (catch per unit effort of age-0 gulf menhaden during 2007) suggest age-1 fish may be abundant in nearshore waters of eastern Texas and western Louisiana in

2008; this favors the Cameron fleet which traditionally catches a high proportion of age-1 gulf menhaden.

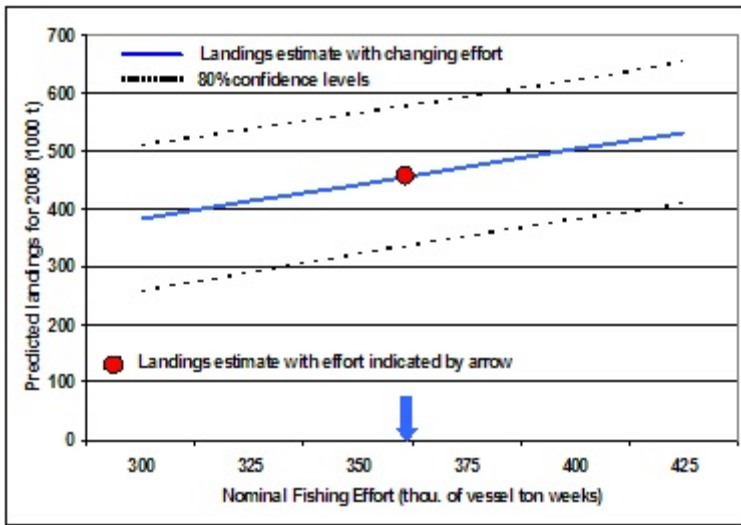


Figure 4. Forecast for the 2008 gulf menhaden fishery.

ATLANTIC MENHADEN FISHERY

Atlantic Menhaden Landings, Fishing Conditions, and Vessel Participation in 2007

Final catch information indicated that 2007 landings of Atlantic menhaden for reduction amounted to 174,455 t (574 million standard fish) (Fig. 5). This was 11% more than purse-seine landings for the 2006 season (157,385 t), and 5% greater than average landings for the previous five years (165,556 t). As in the previous two years, only one menhaden factory, the plant at Reedville, VA (with 10 vessels), operated on the Atlantic coast in 2007. The fish factory in Beaufort, NC, closed after the 2004 fishing season.

Atlantic menhaden landings were fair in May (8,700 t), improved considerably in June (29,500 t) - in fact, landings in June 2007 were the best for that month since 1991 when 42,200 t were landed. Landings declined slightly in July 2007 (28,600 t), and peaked in August (40,400 t) (Fig. 6). Landings declined moderately during September

(29,500 t) and October (25,800 t), then declined further in November (9,600 t) and December (2,400 t).

As during the previous year, winter 2006-07 was relatively mild. Pound nets in Chesapeake Bay again made fair catches of Atlantic menhaden in March and April 2007. Port agents in southern New England reported significant catches of large menhaden in fish traps in Rhode Island and Massachusetts by mid-May. 2007 was the third consecutive year in which adult menhaden were abundant in nearshore waters of southern New England. In fact, gill net catches of Atlantic menhaden for bait were reported in southern Maine during July. Also as has been observed in recent years, large concentrations of age-0 menhaden, or “peanuts”, occurred in coastal waters of southern New England from August to October.

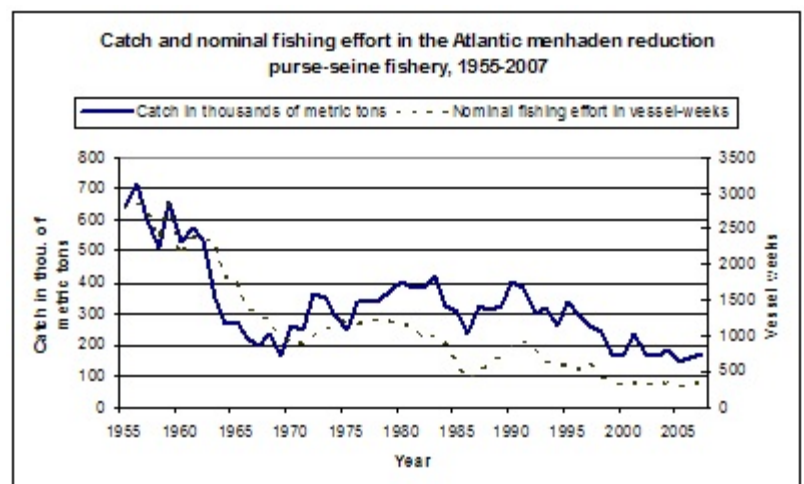


Figure 5. Atlantic menhaden landings and nominal fishing effort, 1955-2007.

Initial landings for reduction in Chesapeake Bay were made on May 15, however, catches through the remainder of the month were modest. Landings improved considerably during June; best catches came from bayside and oceanside of Virginia’s Eastern Shore, and in the ocean off Chincoteague and Delaware Bay. Most fishing effort in July was concentrated near the mouth of Chesapeake Bay and along the barrier island

Age Composition of Atlantic Menhaden in 2007

About 3,800 Atlantic menhaden were aged from the 2007 port samples. From the catch-at-age matrix (not the 'raw' port samples), coastwide age-2 fish (65%) outnumbered age-1 fish (26%) by a wide margin (Table 2 and Figure 7). Age-3 fish (7%) ranked a distant third, while age-0 fish represented less than 1% of the catch.

Catches off the coasts of New Jersey and Delaware during 2007 consisted almost entirely of age-2 (76%), age-3 (17%), and age-4 (4%) Atlantic menhaden. Catches from Chesapeake Bay and ocean areas near the mouth of the Bay during summer favored age-2 menhaden (63%) over age-1's (31%). During the fall fishery off Virginia and North Carolina, age-2 (58%) fish predominated, followed by age-3's (22%) and age-1's (15%).

Year	Age-0	Age-1	Age-2	Age-3+
2007	<1%	26%	65%	9%
2006	1%	40%	40%	19%
2005	2%	12%	59%	27%
2004	2%	22%	67%	9%
2003	9%	19%	64%	9%

The high proportion of age-2 Atlantic menhaden across all regional segments of the 2007 fishery tends to confirm that the 2005 year class is relatively strong as compared to adjacent year classes. The 2005 year class as age-3 fish in 2008 may be a dominant component of the fishery off New Jersey and southern New England this coming summer.

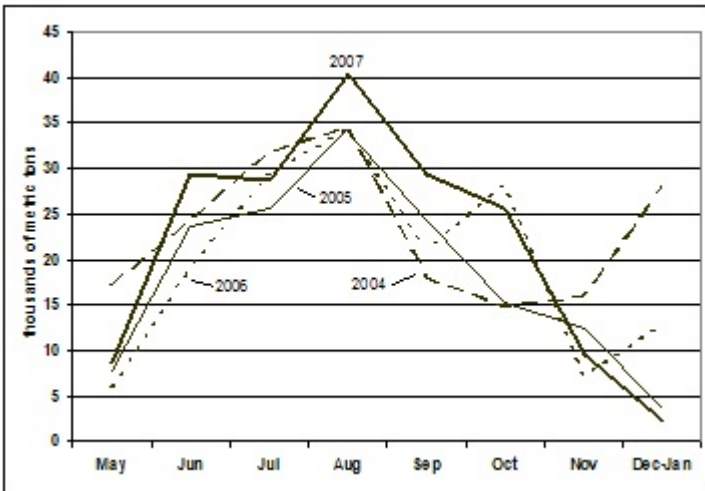


Figure 6. Atlantic menhaden landings by month, 2004-2007.

beaches of Virginia's Eastern Shore. Good catches also occurred off the central coast of New Jersey beyond three miles from shore. In August best catches occurred near Smith Point adjacent the fish factory and in lower Chesapeake Bay from York River Spit to the Chesapeake Bay Bridge Tunnel; numerous trips were also made to the New Jersey coast. Similar to fishing patterns in summer, best catches in September and October were concentrated near Smith Point, lower Chesapeake Bay, the ocean off Virginia's Eastern Shore, and off the New Jersey coast. Weather in November was windy and catches were poor; most fishing occurred off Smith Point and the Rappahannock River, with a few sets off the northern Outer Banks of North Carolina. Fishing in December was again limited by weather with most sets in the ocean off Virginia Beach, and a few sets off the North Carolina coast. Final sets of the 2007 fishing season were made on December 12.

Thirteen vessels reported landing Atlantic menhaden for reduction in 2007. Ten large purse-seine vessels fished regularly from the fish factory at Reedville. Three small bait vessels, or "snapper" rigs, occasionally unloaded their catch at the reduction factory.

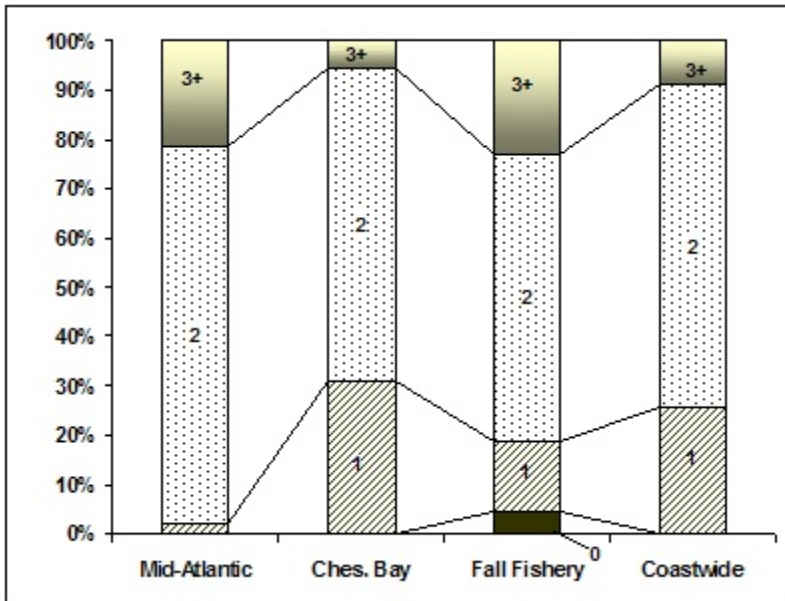


Figure 7. Percent estimated numbers at-age of Atlantic menhaden by area in 2007.

Fishing Effort in 2007 and Review of the 2007 Forecast for Atlantic Menhaden

During 2007, thirteen purse-seine vessels (10 regular steamers and three “snapper” boats) unloaded Atlantic menhaden for reduction, and nominal fishing effort was estimated at 333 vessel weeks, up from 322 vessel weeks expended in 2006. The increase in nominal effort is because of “snapper” boats unloading more frequently in 2007 for reduction at the fish factory: that is, when bait markets are “soft” or when average size of fish in the catch is less than bait market expectations.

Last March, we anticipated that nominal fishing effort in 2007 could amount to 300 vessel weeks, and we forecasted 2007 Atlantic menhaden landings of 173,000 t with 80% confidence levels of 104,000 and 242,000 t. According to the historical relationship of landings and fishing effort for the Atlantic menhaden fishery, nominal fishing effort of 333 vessel weeks produced a post-season forecast of 179,000 t with 80% confidence levels between 110,000 and 249,000 t. Actual landings of 174,455 t were 3% less than our post-season forecast.

Forecast for the 2008 Atlantic Menhaden Fishing Season

In 2008, we expect that the fish factory in Reedville, VA, with a total of ten vessels will be the only menhaden reduction plant active on the Atlantic coast. We estimate that nominal fishing effort in 2008 could amount to 310 vessel weeks. With this level of fishing effort, we forecast 2008 Atlantic menhaden landings of 185,000 t with 80% confidence levels of 117,000 and 254,000 t (Fig. 8).

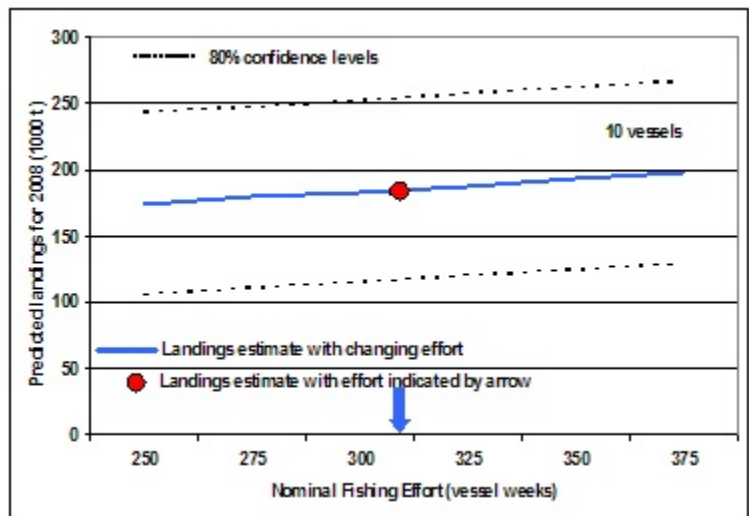


Figure 8. Forecast for the 2008 Atlantic menhaden fishery.

Combined 2007 Gulf and Atlantic Menhaden Landings

Combined landings by the gulf and Atlantic menhaden purse-seine fisheries for reduction during the 2007 calendar year amounted to 1.39 billion pounds, up slightly from landings during the 2006 calendar year which amounted to 1.37 billion pounds.

**Fishing effort and landings in the gulf menhaden purse-seine fishery,
1955-2007**

Year	Fishing effort 1000 vessel-ton- weeks	Landings 1000 metric tons	Year	Fishing effort 1000 vessel-ton- weeks	Landings 1000 metric tons
<i>1955</i>	122.9	213.3	<i>1981</i>	623.0	552.6
<i>1956</i>	155.1	244.0	<i>1982</i>	653.8	853.9
<i>1957</i>	155.2	159.3	<i>1983</i>	655.8	923.5
<i>1958</i>	202.8	196.2	<i>1984</i>	645.9	982.8
<i>1959</i>	205.8	325.9	<i>1985</i>	560.6	881.1
<i>1960</i>	211.7	376.8	<i>1986</i>	606.5	822.1
<i>1961</i>	241.6	455.9	<i>1987</i>	604.2	894.2
<i>1962</i>	289.0	479.0	<i>1988</i>	594.1	623.7
<i>1963</i>	277.3	437.5	<i>1989</i>	555.3	569.6
<i>1964</i>	272.9	407.8	<i>1990</i>	563.1	528.3
<i>1965</i>	335.6	461.2	<i>1991</i>	472.3	544.3
<i>1966</i>	381.3	357.6	<i>1992</i>	408.0	421.4
<i>1967</i>	404.7	316.1	<i>1993</i>	455.2	539.2
<i>1968</i>	382.8	371.9	<i>1994</i>	472.0	761.6
<i>1969</i>	411.0	521.5	<i>1995</i>	417.0	463.9
<i>1970</i>	400.0	545.9	<i>1996</i>	451.7	479.4
<i>1971</i>	472.9	728.5	<i>1997</i>	430.2	611.2
<i>1972</i>	447.5	501.9	<i>1998</i>	409.3	486.2
<i>1973</i>	426.2	486.4	<i>1999</i>	414.5	684.3
<i>1974</i>	485.5	587.4	<i>2000</i>	417.6	579.3
<i>1975</i>	538.0	542.6	<i>2001</i>	400.6	521.3
<i>1976</i>	575.8	561.2	<i>2002</i>	386.7	574.5
<i>1977</i>	532.7	447.1	<i>2003</i>	363.2	517.1
<i>1978</i>	574.3	820.0	<i>2004</i>	390.5	468.7
<i>1979</i>	533.9	777.9	<i>2005</i>	326.0	433.8
<i>1980</i>	627.6	701.3	<i>2006</i>	367.2	464.4
			<i>2007</i>	369.2	453.8

**Fishing effort and landings in the Atlantic menhaden purse-seine fishery,
1955-2007**

Year	Fishing effort vessel-weeks	Landings 1000 metric tons	Year	Fishing effort vessel-weeks	Landings 1000 metric tons
<i>1955</i>	2748	641.4	<i>1981</i>	1133	381.3
<i>1956</i>	2878	712.1	<i>1982</i>	948	382.4
<i>1957</i>	2775	602.8	<i>1983</i>	995	418.6
<i>1958</i>	2343	510.0	<i>1984</i>	892	326.3
<i>1959</i>	2847	659.1	<i>1985</i>	577	306.7
<i>1960</i>	2097	529.8	<i>1986</i>	377	238.0
<i>1961</i>	2371	575.9	<i>1987</i>	531	327.0
<i>1962</i>	2351	537.7	<i>1988</i>	604	309.3
<i>1963</i>	2331	346.9	<i>1989</i>	725	322.0
<i>1964</i>	1807	269.2	<i>1990</i>	826	401.2
<i>1965</i>	1805	273.4	<i>1991</i>	926	381.4
<i>1966</i>	1386	219.6	<i>1992</i>	794	297.6
<i>1967</i>	1316	193.5	<i>1993</i>	626	320.6
<i>1968</i>	1209	234.8	<i>1994</i>	573	260.0
<i>1969</i>	995	161.6	<i>1995</i>	600	339.9
<i>1970</i>	906	259.4	<i>1996</i>	528	292.9
<i>1971</i>	897	250.3	<i>1997</i>	616	259.1
<i>1972</i>	973	365.9	<i>1998</i>	437	245.9
<i>1973</i>	1099	346.9	<i>1999</i>	382	171.2
<i>1974</i>	1145	292.2	<i>2000</i>	311	167.2
<i>1975</i>	1218	250.2	<i>2001</i>	334	233.7
<i>1976</i>	1163	340.5	<i>2002</i>	318	174.0
<i>1977</i>	1239	341.1	<i>2003</i>	302	166.1
<i>1978</i>	1210	344.1	<i>2004</i>	345	183.4
<i>1979</i>	1198	375.7	<i>2005</i>	291	146.9
<i>1980</i>	1158	401.5	<i>2006</i>	322	157.4
			<i>2007</i>	333	174.5

