# FISHERY MANAGEMENT PLAN REVIEW FOR WEAKFISH (Cynoscion regalis) 2004 FISHING YEAR 

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## FISHERY MANAGEMENT PLAN REVIEW FOR WEAKFISH (Cynoscion regalis)

## I. Status of the Fisheries Management Plan

The Atlantic States Marine Fisheries Commission (ASMFC) approved Amendment 4 to the Weakfish Fishery Management Plan in November 2002. The amendment was initially implemented in 2003. This review is of activities of the 2004 fishery and is the second under Amendment 4.

The ASMFC adopted its first Fishery Management Plan for Weakfish in 1985. Amendment 1 to the FMP, which superseded the original plan, was adopted in 1992, and Amendment 2 was adopted in October 1994. Weakfish are currently managed under the guidelines contained in Amendment 3, which was approved by the Commission in May 1996 and completely replaced all previous amendments. Amendment 3 and Addendum 1 have been replaced by Amendment 4.

The goal of Amendment 4 is to utilize interstate management so that Atlantic coastal weakfish recover to healthy levels which will maintain commercial and recreational harvest consistent with self-sustaining spawning stock and to provide for restoration and maintenance of essential habitat. The management objectives are:

1) to establish and maintain an overfishing definition that includes target and threshold fishing mortality rates and a threshold spawning stock biomass to prevent overfihing and maintain a sustainable weakfish population;
2) to restore the weakfish age and size structure to that necessary for the restoration of the fishery;
3) to return weakfish to their previous geographic range;
4) to achieve compatible and equitable management measures among jurisdictions throughout the fishery management unit, including states’ waters and the federal EEZ;
5) to promote cooperative interstate research, monitoring and law enforcement necessary to support management of weakfish;
6) to promote identification and conservation of habitat essential for the long term stability in the population of weakfish; and
7) to establish standards and procedures for both the implementation of Amendment 4 and for determination of states' compliance with provisions of the management plan.

Weakfish are managed under this plan as a single stock throughout their coastal range. All states from Massachusetts to Florida and the Potomac River Fisheries Commission have a declared interest in the Weakfish FMP. Responsibility for the FMP is assigned to the Weakfish Management Board, Plan Review Team, Technical Committee, Stock Assessment SubCommittee and Advisory Panel.

## II. Status of the Stock

A weakfish stock assessment of data through 1998 was conducted in 1999 and reviewed by the Stock Assessment Review Committee for peer review at the $30^{\text {th }}$ Northeast Regional Stock Assessment Workshop (NMFS 2000). This report indicated that weakfish were "at a high level
of abundance and subject to low fishing mortality rates." This assessment was updated in 2002 with data through 2000.

The 2002 update (Kahn 2002) indicated that the management measures put in place in Amendment 3 resulted in positive trends for the weakfish population. The absolute magnitude of impact should be viewed with caution given the uncertainty of the fishing mortality and spawning stock biomass estimates for the most recent year of the assessment, which is often the case with these final year estimates. The update assessment indicated that weakfish were at a high level of abundance and fishing mortality appeared to be low.

A 'work in progress' stock assessment was presented to SARC in November 2004 for peer review. The Stock Assessment Subcommittee (SAS) explored a variety of assessment approaches but did not find a clear indication of the status of the stock. Commercial and recreational landings for 2003 are at time series lows (Figure 1). But fishery-independent surveys are showing relatively high abundance of weakfish.

The SARC reviewers provided their insights regarding the work done to date on the assessment. The comments are as follows:
o Reviewers confirmed a clear disconnect between what the survey data and catch data are telling us. (They suggested the survey data shows high survivability and high recruitment rates, while the catch data shows high survivability and low recruitment rates.)
o The disconnect is a function of the data and will be apparent regardless of the model used.
o Extensive diagnostic analysis of the data may allow the committee to select useful datasets and help resolve the disconnect.
o The current assessment and model results present two very different scenarios to the managers: 1) the stock is in wonderful condition or 2 ) the stock is in trouble

The SAS completed its most recent assessment in early 2005 and presented it to the Board. The subcommittee explored a variety of assessment techniques and runs and considers the results of the Gompertz surplus production model to be the best estimates of recent stock size and trends, F levels and trends and stock productivity. The model estimated biological reference points of $\mathrm{B}_{\text {MSY }}=23,540 \mathrm{mt}$ and $\mathrm{F}_{\text {MSY }}=0.33$. However, these estimates are not necessarily directly comparable to the reference points in Amendment 4. The SAS concluded that fishing mortality appeared not to be the primary cause of driving down abundance in recent years, but that natural mortality was likely the main cause.

## III. Status of the Fishery

The majority of commercially and recreationally caught weakfish are landed from state waters. The dominant commercial gears used include gill nets, pound nets, haul seines, and trawls. The majority of commercial landings occur in the fall and winter months, presumably as the fish congregate to migrate. The recreational fishery catches weakfish using live or cut bait, jigging, trolling and chumming. Recreational harvests typically peak in the warmer months (May through October) when effort tends to be greatest.

Typically recreational landings are recorded in numbers and commercial landings are recorded in pounds. However, Tables 1 and 3 use recreational landings in pounds to compare the landings of the fisheries. Both commercial and recreational landings have been consistently falling for at least the past 5 years and are at a time series low.

## Commercial Fishery --

The NMFS compiles commercial weakfish landings. The data are cooperatively collected by the NMFS and state fishery agencies from state mandated trip-tickets, landing weigh-out reports from seafood dealers, federal logbooks, shipboard and portside interviews and biological sampling of catches.

The commercial weakfish fishery occurs during the fall and winter as the species migrates from estuaries to overwintering grounds in the South Atlantic (Hogarth et al. 1995). Weakfish are taken primarily by trawls, pound nets, gill nets and haul seines. Weakfish landings were dominated by the trawl fishery from the 1950's through the mid -1980's, when gill net landings began to account for the majority of the landings. Gill net landings in the latter half of the 1990's were about double that of the trawl fishery.

From 2000 to 2003, there was an increasing trend of the commercial fishery accounting for a higher percentage of the total catch (Table 1). However, this trend appears to have stopped in 2004. Coastwide commercial weakfish landings have ranged from a time series high of 21.2 million pounds in 1986 to a low of 1.2 million pounds (excluding landings from New York and Massachusetts) in 2004 (Table 2).

New Jersey, North Carolina and Virginia have dominated commercial weakfish landings since 1950. North Carolina has annually landed the most weakfish since 1972 and Virginia has consistently ranked second since 1993. North Carolina has accounted for about half of all the weakfish commercially landed since 1951.

## Recreational Fishery -

Recreational catch statistics are collected by the NMFS in the Marine Recreational Fisheries Statistics Survey (MRFSS). Effort data is collected through telephone interviews. Catch expansions are based on angler interviews and biological sampling conducted by trained interviewers stationed at fishing access sites.

Recreational landings hit a time series high of 11.7 million pounds in 1983. Landings were relatively high from 1983-1988, but abruptly fell in 1989. Annual recreational landings fluctuated between 1.1 million and 4.1 million pounds from 1993 to 2002. The lowest landings on record (860,065 pounds) occurred in 2004. The number of fish released alive by anglers has been relatively high since 1993. For trends of state landings in pounds, please see Table 3.

Recreational landings from the EEZ accounted for only about 13 percent of the coastwide landings since 1981. Over half of the recreational harvest came from inshore saltwater and brackish water bodies such as bays, estuaries, and sounds. Virginia, New Jersey, Maryland and Delaware have accounted for 86 percent of the coastwide harvest since 1981. New Jersey has
accounted for nearly $40 \%$ of the recreational harvest since 1994. However, these last two trends may be shifting in recent years.

## IV. Status of Research and Monitoring

## Fishery-Independent Surveys/Studies

Young-of-the-year indices of relative abundance are produced by Rhode Island, New York, Delaware, Maryland (2 different indices), Virginia, North Carolina and Florida. North Carolina also produces an age 1 index, while Connecticut, New Jersey and Delaware produce agestructured indices of relative abundance from research trawl surveys. The National Marine Fisheries Service also produces an age-structured index for the Mid-Atlantic coast, while SEAMAP produces one for the South Atlantic Coast.

## Biological Sampling

The Marine Recreational Fisheries Statistics Survey collects data on recreational landings. North Carolina, Virginia, Maryland and Delaware regularly collect biological data from commercial landings, including age data. Little biological data (i.e. otolith ages and lengths) has been collected from other states.

Biological sampling of commercial landings is an important component of catch-at-age analysis, such as the virtual population analysis currently used to assess weakfish status. In 2004, some states sampled adequately when compared to their landings, and others did not. Adequate sampling is required by Amendment 4 and should not be delayed further.

Development of sampling programs for states with significant commercial and/or recreational landings is needed to insure accurate assessments. Recent research suggests there are many separate weakfish spawning stocks. Consequently, assuming the catch composition of northern areas is equivalent to that of southern areas is highly questionable and weakens confidence in assessment results.

## V. Research Needs for Weakfish

## Biological:

High Priority
Collect catch and effort data including size and age composition of the catch, determine stock mortality throughout the range, and define gear characteristics. In particular, increase length-frequency sampling, particularly in fisheries from Maryland and further north.

Develop latitudinal / seasonal / gear specific age length keys for the Atlantic coast. Increase sample sizes to consider gear specific keys.

Derive estimates of discard mortality rates and the magnitude of discards for all commercial gear types from both directed and non-directed fisheries. In particular, quantify trawl bycatch, refine estimates of mortality for below minimum size fish, and focus on factors such as distance from shore and geographical differences.

Update the scale - otolith comparison for weakfish.

## Medium Priority

Define reproductive biology of weakfish, including size at sexual maturity, maturity schedules, fecundity, and spawning periodicity. Continue research on female spawning patterns: what is the seasonal and geographical extent of "batch" spawning; do females exhibit spawning site fidelity?

Conduct hydrophonic studies to delineate weakfish spawning habitat locations and environmental preferences (temperature, depth, substrate, etc.) and enable quantification of spawning habitat.

Compile existing data on larval and juvenile distribution from existing databases in order to obtain preliminary indications of spawning and nursery habitat location and extent.

Continue studies on mesh-size selectivity; up-to-date (1995) information is available only for North Carolina's gill net fishery. Mesh-size selectivity studies for trawl fisheries are particularly sparse.

## Low Priority

Identify stocks and determine coastal movements and the extent of stock mixing, including characterization of stocks in overwintering grounds. (e.g. tagging)

Biological studies should be conducted to better understand migratory aspects and how this relates to observed trends in weight at age.

Continue studies on recreational hook-and-release mortality rates, including factors such as depth, warmer water temperatures, and fish size in the analysis. Studies are needed in deep and warm water conditions. Further consideration of release mortality in both the recreational and commercial fisheries is needed, and methods investigated to improve survival among released fish.

Document the impact of power plants and other water intakes on larval, post larval and juvenile weakfish mortality in spawning and nursery areas, and calculate the resultant impact to adult sock size.

Define restrictions necessary for implementation of projects in spawning and overwintering areas and develop policies on limiting development projects seasonally or spatially.

Develop a coastwide tagging database.
Develop a spawner recruit relationship and examine the relationships between parental stock size and environmental factors on year-class strength.

## Social

Assemble socio-demographic-economic data as it becomes available from ACCSP.

## Economic

Assemble socio-demographic-economic data as it becomes available from ACCSP.
Detailed information on production activities (e.g., fishing effort and labor used by gear, vessel characteristics, areas fished, etc.) and costs and earnings for the harvesting and processing sectors

Information on retail sales and demand for weakfish in order to estimate the demand and economic benefits of at-home and away-from home consumption of weakfish

Development of bioeconomic models that link the underlying population dynamics to the economic aspects of the commercial and recreational fisheries

Distribution of weakfish to the various markets and across states

Information on the margins of various stages of processing and marketing also need to be obtained; this information is necessary to construct mathematical models that can be used to estimate the economic impacts of management and regulation

A directed data collection program for weakfish including the same variables presently collected by NMFS in support of MRFSS and by the economic add-on. Data collected includes information on travel distance, mode of angling, expenditures, area fished, catch on previous trips, and other information.

Development of commercial decision-making or behavioral models to explain how fishers might respond to various regulations

Estimation and assessment of consumer (net economic benefits to consumers) and producer (net economic benefits or profits to producers) surplus; the sum of consumer and producer surplus is a measure of the net economic value to society of a good or service

Development of input/output models for all states having commercial weakfish activity, or alternatively, full-blown economic impact models, which might consist of input/output models or General Equilibrium models

Determination of the economic value derived from recreational angling including the economic value of a catch and release fishery

## Habitat

Conduct hydropohonic studies to delineate weakfish spawning habitat locations and environmental preferences (temperature, depth, substrate, etc) and enable quantification of spawning habitat.

Compile existing data on larval and juvenile distribution from existing databases in order to obtain preliminary indications of spawning and nursery habitat location and extent.

Document the impact of power plants and other water intakes on larval, post larval and juvenile weakfish mortality in spawning and nursery areas, and calculate the resulting impacts on adult stock size.

Define restrictions necessary for implementation of projects in spawning and overwintering areas and develop policies on limiting development projects seasonally or spatially.

## VI. Status of Management Measures

Under Amendment 3, each state was required to implement harvest reduction strategies designed to recover weakfish over a 5 -year period. Restoration of historic age and size structure, represented currently by the average percentage of fish numbers at each age from 1979 to 1994, was also a plan goal. According to the 26th SAW, the projected fishing mortality for 1996 was achieved and according to the most recent stock assessment fishing mortality is below the Amendment 3 target of 0.50 . The 2002 update of the stock assessment estimated that the fishing mortality was below the Amendment 4 target of 0.31 with Spawning Stock Biomass (SSB) above the threshold of 31.8 million pounds. However, the most recent stock assessment with data through 2003 shows the SSB threshold may have been triggered.

The intent of Amendment 4 is to establish a control rule to accurately categorize the status of the stock by considering both fishing mortality and spawning stock biomass, simultaneously. The control rule is established with targets and thresholds for fishing mortality and a threshold for spawning stock biomass. The use of fishing mortality targets and thresholds and a threshold (spawning stock) biomass provides managers with a series of factors to use when evaluating the status of the stock. Because of changing conditions in the fishery, the fishing mortality and SSB percentages should be used when evaluating biological reference points (i.e. $\mathrm{F}_{30 \%}$ should be used, not necessarily 0.31 ).

Amendment 4 maintains current commercial fishery management measures. However, a new recreational reference period, revised reference points, and a weakfish population, which has changed since the adoption of Amendment 3, led to changes in the recreational management measures to reduce high creel limits in some states where the limits were no longer appropriate.

## VII. Current State-by-State Implementation per Compliance Requirements

New York, New Jersey, and Maryland are out of compliance with Amendment 4 to the Weakfish Fishery Management Plan for failing to collect the required number of biological samples in 2004. All other states and jurisdictions are in compliance with Amendment 4 in 2004. The states of Connecticut, South Carolina, Georgia and Florida requested de minimis status as defined in Amendment 4, however, South Carolina and Florida did not qualify. Massachusetts qualified for de minimis status but did not request it.

## VII. Status of Assessment Advice

Virtual population analysis was used for the most recent assessments (ADAPT VPA in FACT, Northeast Fishery Science Center). This is a type of analysis that uses data on the number of fish caught at various ages or lengths to estimate fishing mortality as well as numbers of spawning individuals in a population. The stock assessment subcommittee is exploring other approaches for future assessments including using a separable virtual population analysis and relative exploitation. The Plan Review Team supports the continued exploration of these additional approaches for the assessment for weakfish.

## VIII. Recommendations

The Plan Review Team recommends that:

- All states continue the commercial and recreational measures, and monitoring requirements and recommendations of Amendment 4. Particular attention should be given to achieving the biological sampling requirements (Section 3.0).


## IX. References

Hogarth, W. T., T. Meyer, P. Perra and R. H. Shaefer. 1995. Final environmental impact statement and draft regulatory impact review for a regulatory amendment for the Atlantic Coast weakfish fishery in the Exclusive Economic Zone (EEZ). U. S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Office of Fisheries Conservation and Management, Recreational and Interjurisdictional Fisheries Division, Silver Spring, MD. 84 pp.

Kahn, D. M. 2002. Stock assessment of weakfish through 2000, including estimates of stock size on January 1, 2001. Unpublished.

NMFS, Northeast Fishery Science Center. 2000. Report of the $30^{\text {th }}$ Northeast Regional Stock Assessment Workshop ( $30^{\text {th }}$ SAW): Stock Assessment Review Committee (SARC) consensus summary of assessments. Northeast Fish. Sci. Cent. Ref. Doc. 900-03, Woods Hole, MA.


Figure 1. Annual coastwide weakfish landings (1982-2004). Commercial landings for 2004 do not include New York and Massachusetts landings and are considered preliminary.

Table 1. Comparison of Atlantic coast commercial and recreational weakfish landings

| YEAR | Recreational <br> Landings (pounds) | Commercial <br> Landings (pounds) | Total <br> Pounds | \% Total as <br> Commercial |
| ---: | ---: | ---: | ---: | ---: |
| 1982 | $8,285,323$ | $19,478,274$ | $27,763,597$ | $70 \%$ |
| 1983 | $11,730,620$ | $17,475,003$ | $29,205,623$ | $60 \%$ |


| 1984 | $7,013,779$ | $19,773,587$ | $26,787,366$ | $74 \%$ |
| :---: | ---: | ---: | ---: | ---: |
| 1985 | $5,489,027$ | $16,953,357$ | $22,442,384$ | $76 \%$ |
| 1986 | $10,141,785$ | $21,187,973$ | $31,329,758$ | $68 \%$ |
| 1987 | $6,749,894$ | $17,072,159$ | $23,822,053$ | $72 \%$ |
| 1988 | $6,331,649$ | $20,526,402$ | $26,858,051$ | $76 \%$ |
| 1989 | $2,177,234$ | $14,162,178$ | $16,339,412$ | $87 \%$ |
| 1990 | $1,347,259$ | $9,438,190$ | $10,785,449$ | $88 \%$ |
| 1991 | $2,130,564$ | $8,692,760$ | $10,823,324$ | $80 \%$ |
| 1992 | $1,398,977$ | $7,453,788$ | $8,852,765$ | $84 \%$ |
| 1993 | $1,102,338$ | $6,853,579$ | $7,955,917$ | $86 \%$ |
| 1994 | $1,795,515$ | $6,190,520$ | $7,986,035$ | $78 \%$ |
| 1995 | $1,855,546$ | $7,098,826$ | $8,954,372$ | $79 \%$ |
| 1996 | $2,925,391$ | $6,940,578$ | $9,865,969$ | $70 \%$ |
| 1997 | $3,692,716$ | $7,297,859$ | $10,990,575$ | $66 \%$ |
| 1998 | $4,044,973$ | $8,424,725$ | $12,469,698$ | $68 \%$ |
| 1999 | $3,143,428$ | $6,907,836$ | $10,051,264$ | $69 \%$ |
| 2000 | $4,154,793$ | $5,400,529$ | $9,555,322$ | $57 \%$ |
| 2001 | $2,722,629$ | $4,999,539$ | $7,722,168$ | $65 \%$ |
| 2002 | $2,192,603$ | $4,772,978$ | $6,965,581$ | $69 \%$ |
| 2003 | 864,960 | $2,002,525$ | $2,867,485$ | $70 \%$ |
| $2004 *$ | 860,065 | $1,201,222$ | $2,061,287$ | $58 \%$ |
|  |  |  |  |  |

*Commercial landings for New York and Massachusetts were not available at the time of this report and, therefore, are not included in the coastwide total.

Table 2: Atlantic coast commercial fisheries landings (in pounds), by state and year (1982-2004).

| Year | E. FL | GA | SC | NC | VA | MD | DE | NJ | NY | CT | RI | MA | Total Pounds |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1982 | 176,203 | 596 | 443 | 12,052,232 | 2,149,200 | 249,200 | 1,294,500 | 2,073,500 | 1,257,100 | 25,600 | 176,800 | 22,900 | 19,478,274 |
| 1983 | 117,720 | 2,749 | 0 | 10,233,734 | 2,592,900 | 390,000 | 901,800 | 2,172,700 | 850,000 | 42,800 | 163,700 | 6,900 | 17,475,003 |
| 1984 | 125,799 | 862 | 0 | 12,990,726 | 2,109,000 | 325,000 | 782,400 | 2,751,600 | 484,500 | 31,300 | 167,600 | 4,800 | 19,773,587 |
| 1985 | 132,291 | 82 | 0 | 9,821,188 | 2,082,186 | 316,110 | 990,800 | 3,030,100 | 386,200 | 28,200 | 163,100 | 3,100 | 16,953,357 |
| 1986 | 108,726 | 75 | 0 | 14,309,372 | 1,994,100 | 336,700 | 723,500 | 3,208,600 | 359,900 | 13,700 | 127,600 | 5,700 | 21,187,973 |
| 1987 | 123,081 | 189 | 0 | 11,508,389 | 1,962,800 | 366,900 | 577,800 | 2,094,100 | 329,100 | 29,500 | 78,600 | 1,700 | 17,072,159 |
| 1988 | 115,124 | 0 | 0 | 15,091,878 | 1,473,200 | 832,600 | 530,700 | 2,332,800 | 124,500 | 2,400 | 19,400 | 3,800 | 20,526,402 |
| 1989 | 171,318 | 0 | 113 | 10,115,747 | 1,025,200 | 743,800 | 530,200 | 1,458,500 | 103,500 | 2,300 | 9,600 | 1,900 | 14,162,178 |
| 1990 | 137,188 | 33 | 0 | 5,802,159 | 1,207,560 | 662,361 | 613,000 | 968,318 | 19,924 | 1,281 | 24,646 | 1,720 | 9,438,190 |
| 1991 | 164,925 | 0 | 0 | 5,308,574 | 1,059,679 | 328,251 | 497,300 | 1,174,181 | 111,629 | 21,300 | 25,009 | 1,912 | 8,692,760 |
| 1992 | 147,858 | 0 | 0 | 4,862,551 | 549,961 | 385,426 | 362,400 | 940,695 | 168,087 | 3,500 | 30,277 | 3,033 | 7,453,788 |
| 1993 | 144,347 | 0 | 0 | 4,309,249 | 1,088,047 | 181,863 | 194,700 | 834,446 | 88,379 | 1,477 | 9,991 | 1,080 | 6,853,579 |
| 1994 | 179,582 | 0 | 0 | 3,490,002 | 1,294,224 | 140,907 | 261,900 | 695,280 | 99,470 | 11,000 | 18,155 |  | 6,190,520 |
| 1995 | 50,310 | 0 | 0 | 4,113,310 | 1,485,065 | 69,417 | 281,200 | 867,263 | 172,567 | 6,431 | 52,728 | 535 | 7,098,826 |
| 1996 | 4,493 | 0 | 0 | 3,977,671 | 1,587,186 | 132,795 |  | 822,041 | 365,646 | 6,937 | 43,723 | 86 | 6,940,578 |
| 1997 | 11,720 | 0 | 0 | 3,561,099 | 1,557,980 | 192,634 | 558,919 | 1,036,488 | 336,795 | 10,958 | 31,211 | 55 | 7,297,859 |
| 1998 | 11,518 | 0 | 0 | 3,354,060 | 1,863,928 | 244,467 | 552,644 | 1,805,938 | 500,183 | 14,482 | 77,095 | 410 | 8,424,725 |
| 1999 | 17,486 | 0 | 0 | 2,617,623 | 1,674,117 | 223,455 | 440,295 | 1,292,749 | 490,596 | 22,172 | 126,793 | 2,550 | 6,907,836 |
| 2000 | 9,430 | 0 | 0 | 1,869,073 | 1,362,829 | 208,315 | 328,813 | 1,071,428 | 352,832 | 7,920 | 189,362 | 527 | 5,400,529 |
| 2001 | 10,821 | 0 | 0 | 1,960,380 | 1,121,961 | 185,815 | 187,642 | 837,550 | 578,797 | 6,774 | 109,568 | 231 | 4,999,539 |
| 2002 | 5,746 | 0 | 0 | 1,828,052 | 1,144,068 | 111,391 | 172,810 | 863,088 | 513,977 | 10,223 | 122,781 | 842 | 4,772,978 |
| 2003 | 3,803 | 0 | 0 | 848,847 | 459,385 | 47,409 | 91,476 | 340,269 | 144,416 | 3,059 | 63,337 | 524 | 2,002,525 |
| $\begin{array}{r} 2004 \\ \text { (prelim) } \end{array}$ | 2,577 | 100 | 4 | 685,408 | 325,918 | 49,519 | 48,905 | 48,845 | Not available | 6,088 | 33,858 | Not available | 1,201,222 |

[^0]Table 3. Atlantic coast recreational fisheries landings (in pounds), by state and year (1982-2004).

| Year | E. FL | GA | SC | NC | VA | MD | DE | NJ | NY | CT | RI | MA | Total Pounds |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1982 | 48,137 | 0 | 14,786 | 276,047 | 2,994,879 | 2,127,679 | 1,330,769 | 613,223 | 725,194 | 0 | 154,609 | 0 | 8,285,323 |
| 1983 | 348,175 | 12,165 | 4,515 | 338,100 | 738,671 | 1,215,376 | 2,205,140 | 6,080,018 | 164,227 | 12,976 | 588,805 | 22,452 | 11,730,620 |
| 1984 | 368,237 | 0 | 5,150 | 189,031 | 850,169 | 254,962 | 1,279,594 | 3,987,542 | 51,464 | 11,358 | 0 | 16,272 | 7,013,779 |
| 1985 | 21,907 | 3,422 | 105,151 | 184,485 | 508,980 | 898,313 | 1,102,095 | 1,876,608 | 638,913 | 17,269 | 131,884 | 0 | 5,489,027 |
| 1986 | 100,805 | 12,621 | 44,185 | 417,470 | 2,032,394 | 2,406,643 | 1,598,932 | 3,184,095 | 242,217 | 61,281 | 41,142 | 0 | 10,141,785 |
| 1987 | 45,637 | 9,491 | 23,781 | 710,002 | 647,692 | 831,615 | 1,072,198 | 3,353,362 | 51,830 | 4,286 | 0 | 0 | 6,749,894 |
| 1988 | 89,004 | 0 | 1,841 | 359,606 | 1,677,694 | 1,679,702 | 1,664,477 | 833,198 | 26,127 | 0 | 0 | 0 | 6,331,649 |
| 1989 | 111,105 | 8,175 | 5,963 | 139,979 | 424,463 | 344,658 | 521,648 | 575,110 | 46,133 | 0 | 0 | 0 | 2,177,234 |
| 1990 | 55,538 | 961 | 11,186 | 63,420 | 256,690 | 388,662 | 207,131 | 358,457 | 4,317 | 0 | 897 | 0 | 1,347,259 |
| 1991 | 81,173 | 5,597 | 25,210 | 99,824 | 280,075 | 278,176 | 427,778 | 896,800 | 35,931 | 0 | 0 | 0 | 2,130,564 |
| 1992 | 51,127 | 1,014 | 40,459 | 27,363 | 206,710 | 121,403 | 232,204 | 677,811 | 19,824 | 908 | 20,154 | 0 | 1,398,977 |
| 1993 | 109,827 | 12,791 | 6,929 | 78,982 | 89,992 | 173,952 | 291,627 | 312,839 | 18,889 | 6,510 | 0 | 0 | 1,102,338 |
| 1994 | 149,038 | 783 | 25,163 | 149,159 | 142,265 | 300,831 | 319,491 | 706,206 | 2,579 | 0 | 0 | 0 | 1,795,515 |
| 1995 | 43,413 | 21,283 | 22,875 | 72,412 | 211,494 | 141,511 | 419,527 | 898,564 | 24,467 | 0 | 0 | 0 | 1,855,546 |
| 1996 | 17,218 | 5,060 | 4,980 | 79,317 | 194,485 | 185,074 | 690,121 | 1,730,055 | 19,081 | 0 | 0 | 0 | 2,925,391 |
| 1997 | 65,690 | 34,356 | 1,728 | 165,032 | 463,652 | 188,339 | 734,800 | 1,817,034 | 220,718 | 1,367 | 0 | 0 | 3,692,716 |
| 1998 | 19,237 | 690 | 11,288 | 192,210 | 839,245 | 377,820 | 616,422 | 1,910,868 | 63,298 | 9,808 | 0 | 4,087 | 4,044,973 |
| 1999 | 98,457 | 1,614 | 4,383 | 161,291 | 399,588 | 544,474 | 484,157 | 1,374,169 | 63,058 | 6,371 | 5,866 | 0 | 3,143,428 |
| 2000 | 111,211 | 3,503 | 6,312 | 87,926 | 496,205 | 696,662 | 635,339 | 1,916,093 | 164,525 | 35,095 | 1,922 | 0 | 4,154,793 |
| 2001 | 39,806 | 2,983 | 0 | 158,423 | 373,206 | 567,625 | 172,969 | 1,251,150 | 151,584 | 4,883 | 0 | 0 | 2,722,629 |
| 2002 | 59,145 | 683 | 50,141 | 82,747 | 295,397 | 174,064 | 243,156 | 1,213,557 | 58,627 | 11,285 | 3,801 | 0 | 2,192,603 |
| 2003 | 22,183 | 1,327 | 4,306 | 161,474 | 215,522 | 24,698 | 57,866 | 333,690 | 37,106 | 3,536 | 2,379 | 873 | 864,960 |
| 2004 | 36,249 | 11,305 | 119,428 | 267,625 | 102,051 | 34,229 | 6,742 | 263,465 | 18,995 | 0 | 0 | 0 | 860,085 |

[^1]
[^0]:    Source: NMFS 2005 and State Reports 2005

[^1]:    Source: NMFS 2005

