

Atlantic States Marine Fisheries Commission

**ADDENDUM I
TO AMENDMENT 6
TO THE ATLANTIC STRIPED BASS
FISHERY MANAGEMENT PLAN**

Bycatch Data Collection Program and Angler Education Program



ASMFC Vision Statement:

*Healthy, self-sustaining populations for all Atlantic coast fish species
or successful restoration well in progress by the year 2015.*

November 2007

Acknowledgements

This addendum was prepared by the Commission's Atlantic Striped Bass Plan Development Team composed of: Peter Fricke, National Marine Fisheries Service; Doug Grout, New Hampshire Fish and Game Department; Wilson Laney, U.S. Fish and Wildlife Service; Gary Shepherd, National Marine Fisheries Service; Vic Vecchio, former staff of New York State Department of Environmental Conservation; Nancy Wallace, former staff of Atlantic States Marine Fisheries Commission; and Nichola Meserve (Chair), Atlantic States Marine Fisheries Commission. Development of the document benefited greatly from the input of the Atlantic Striped Bass Technical Committee and Atlantic Striped Bass Advisory Panel. The Atlantic Striped Bass Management Board approved Addendum I on October 31, 2007.

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1.0 Introduction

Atlantic striped bass (*Morone saxatilis*) management authority from 0-3 miles offshore lies with the coastal states and is coordinated through the Atlantic States Marine Fisheries Commission (Commission). The management unit includes all coastal migratory stocks between Maine and North Carolina, excluding the Albemarle-Roanoke stock. Management authority in the Exclusive Economic Zone (EEZ) from 3-200 miles from shore lies with NOAA Fisheries. Atlantic striped bass have been managed by the states under the Commission's fishery management plan (FMP), amendments, and addenda since October 1981. Atlantic striped bass is currently managed under Amendment 6 to the FMP, which was approved in February 2003. The goals of Amendment 6 are to perpetuate migratory stocks of striped bass, allow fisheries consistent with maintaining a self-sustaining spawning stock with a broad age structure, and provide for the restoration and maintenance of striped bass essential habitat.

The purpose of this addendum is to implement a bycatch monitoring and research program as required by Amendment 6 (Section 2.1). The monitoring program is designed to increase the accuracy of data on striped bass discards from both the commercial and recreational fisheries. This addendum also recommends an angler education program to help decrease discard mortality in the recreational fishery (Section 2.2). If deemed necessary, a subsequent addendum will propose a management program to reduce bycatch through penalties and incentives.

2.0 Management Program

2.1 Bycatch Data Collection Program

2.1.1 Statement of the Problem

Striped bass discards from the commercial and recreational fisheries have increased in importance as the populations have rebuilt through the 1990s. However, data on the magnitude of discards and the mortality associated with these discards is limited. Amendment 6 to the FMP requires the Atlantic Striped Bass Management Board (Board) to develop a data collection program to increase the accuracy of discard data. More accurate discard mortality estimates will improve understanding of stock status and provide for more effective management.

2.1.2 Background

Bycatch, Discards, Discard Mortality, and Dead Discards

For the purpose of this addendum, the following definitions apply. *Bycatch* are fish caught incidental to the primary target and may be retained or released. Under this definition, bycatch can be non-targeted species, or fish of the target species that are not legal or desired. *Discards* are bycatch released to the sea, whether dead or alive. Fish may be discarded for regulatory, conservation, or economic reasons. Discards in this addendum are specific to striped bass (i.e., discards are striped bass caught and released while targeting striped bass and striped bass discarded while targeting another species). Some proportion of striped bass discards die as a result of being caught and released through *discard mortality*. Many factors can influence the rate of discard mortality including gear type and use, fishermen behavior, environmental conditions, and fish characteristics. Fish released dead and fish released alive that die from discard mortality are referred to as *dead discards* in this addendum.

Status of the Stock

The most recent stock assessment completed by the Atlantic Striped Bass Technical Committee (TC), Stock Assessment Subcommittee (SAS), and Tagging Subcommittee includes data through the 2004 fishing year (ASMFC 2005). The assessment report determined that striped bass were not overfished and overfishing did not occur in 2004 (Figure 1).

Spawning stock biomass (SSB) estimates were derived from catch-at-age based virtual population analysis (VPA). Female SSB for 2004 was estimated at 55 million pounds, which is above the Amendment 6 threshold SSB of 30.9 million pounds and the target SSB of 38.6 million pounds. Estimated SSB has been above the target and threshold since 1996, but has declined by 9% since 2002 when it peaked at 60.6 million pounds.

Fishing mortality rate (F) estimates are available from VPA as well as tagging data analyses. The estimates show a general trend upwards since the moratoria in the mid-1980s. Based on VPA results, the average F for age 8-11 fish has increased annually since 2000, equaling 0.40 in 2004, which is above the Amendment 6 F target of 0.30, but below the overfishing threshold of 0.41. It was the consensus of the Technical Committee members that this was likely an overestimate due to a pattern of overestimating F in the last year of the model. Two methods of using the tagging data resulted in coastwide average F estimates for fish greater than 18 inches of 0.11-0.29, and for fish greater than 28 inches of 0.15-0.29.

Status of the Fisheries

Commercial landings in 2006 are estimated to be 1.08 million fish or 6.9 million pounds, an increase of 7.3% in numbers and a decrease of 12.0% in weight compared to 2005.¹ The greatest portion of the commercial harvest occurred in the Chesapeake Bay Region (Maryland, PRFC, and Virginia). The harvest in these jurisdictions accounted for 79.1% by number and 61.2% by weight of the commercial harvest in 2006. Commercial dead discards have fluctuated without trend (Figure 2). The 2005 stock assessment provides the most recent estimate of 518,847 commercial dead discards in 2004.

Recreational harvest in 2006 is estimated to be 2.7 million fish or 29.5 million pounds (Figure 1). Anglers in Maryland, Virginia, New Jersey, Massachusetts, and New York harvest the most number of fish (respectively), with each state's total recreational harvest being over 300,000 fish. Recreational releases have increased nearly every year since 1982, reaching 25.9 million fish in 2006. An estimated 2.1 million released fish died from hooking mortality in 2006.

The percent contribution of each fishery component to the total fish killed in 2004 is shown in Figure 3. Of the total removals (number of fish) from the fishery in 2004, commercial harvest represents 17%, commercial dead discards represents 10.0%, recreational harvest represents 47%, and recreational dead discards represents 26% (Figure 3).

Current Discard and Discard Mortality Estimation Methodologies

The most recent stock assessment describes the methodologies for estimating striped bass discards and dead discards from recreational and commercial fisheries (ASMFC 2005). The Striped Bass SAS includes the estimated dead discards when modeling stock size and fishing

¹ Estimates of commercial harvest in number of fish for 2005 and 2006 and in pounds for 2006 are preliminary.

mortality, thus this discard mortality is included in the determination of the status of the stock. The estimation methodologies differ for the recreational and commercial fisheries.

Recreational Fishery

Recreational statistics are collected as part of NOAA Fisheries' Marine Recreational Fishery Statistics Survey (MRFSS). Details of the assessment methodology can be found on the MRFSS web site (http://www.st.nmfs.gov/st1/recreational/the_mrfss.html). In brief, the MRFSS uses a traditional two complementary survey approach to estimate catch, harvest, and discards in the recreational fisheries. A telephone survey collects fishing effort data and a shore-based angler intercept survey collects individual catch data including species identification, total number of each species, and measurements of individual fishes, as well as some angler-specific information about the fishing trip and the angler's fishing behavior.

For striped bass, dead discards are estimated by multiplying the MRFSS released fish estimate (B2 fish) by an 8% discard mortality rate. The Striped Bass TC uses alternative methods to estimate harvest from the winter recreational fishery in North Carolina and Virginia because the MRFSS has not or does not survey during this time period; discards from these fisheries are not included in coastwide recreational discard estimates yet. Proportions of dead discards at each age are also calculated for stock assessment purposes.

Commercial Fishery

The Striped Bass SAS uses tagging data to generate discard estimates for fisheries in three locations: Chesapeake Bay, Delaware Bay, and the Atlantic coast. For each location, the ratio of tags reported from discarded fish in the commercial fishery to tags reported from discarded fish in the recreational fishery is multiplied by total recreational discards to generate an unadjusted estimate of the number of fish discarded by the commercial fishery. This estimate is adjusted by a correction factor for a bias between the tag reporting rates in commercial and recreational fisheries. The adjusted total discards estimate is allocated to fishing gears based on the relative number of tags recovered by each gear. Discards by fishing gear are then multiplied by gear-specific release mortalities to generate dead discards (Table 1).

Discard estimates are generated separately for the Hudson River Estuary, where a shad gillnet fishery intercepts striped bass. From 1980 to 2001, direct measurements of discards from this fishery were available from onboard observer monitoring; however, with the decline of the shad fishery, observer coverage decreased and for 2002-2006, bycatch was estimated from mandatory logbooks. The Hudson River Estuary dead discards estimate is added to the gillnet dead discards estimate from the tagging data and all the gears' dead discards are summed to estimate total number of fish killed in a given year. Proportions of dead discards at each age are also calculated for stock assessment purposes.

Other State Discard Mortality Estimates

In addition to the discard estimates produced in stock assessments, some states report available discard and discard mortality estimates from directed and non-directed fisheries to the Commission in annual compliance reports. The availability of such estimates differs significantly between states based on the fisheries' significance, state resources, and other factors. Additionally, the estimation methods differ between states, and often within a state's record of estimates due to such reasons as shifts in funding or the level of effort in a fishery. None of the state discard estimates from the compliance reports provide a complete accounting of the

commercial discard mortality from all sources within a state or jurisdiction. See Table 2 for a summary of state-specific discard estimation methods and dead discard estimates for 2006 as reported to the Commission in the 2007 compliance reports. All the states use MRFSS generated recreational releases (numbers of B2 fish) multiplied by a release mortality rate to report recreational dead discards.

Discard Estimates in Federal Waters

NOAA Fisheries utilizes fishery observers to collect data from U.S. commercial fishing and processing vessels. The National Observer Program coordinates the deployment of approximately 600 observers annually to collect biological and economic data. In FY 2005, federal commercial fisheries observer programs received funding of approximately \$44,691,000 for observer coverage and program infrastructure (~\$13,200,000 was industry-funded and ~\$31,491,000 federally-funded; NMFS 2006). The Northeast Fisheries Observer Program and the Southeast Regional Observer Program have potential to result in observations of striped bass bycatch depending on the time of year (due to the migratory nature of striped bass).

Analysis of data resulting from the federal observer programs has been limited in regards to discerning striped bass bycatch levels. The Northeast Fisheries Science Center published a document that used available observer coverage data in conjunction with vessel logbook data to estimate striped bass discards in the northeast multispecies groundfish fishery, specifically in the Great South Channel, during the 2002 fishing year (May 2002-April 2003; Shepherd 2004). Assuming a 100% discard mortality rate, Shepherd estimated 289,098 lbs. of striped bass dead discards (287,019 lbs from otter trawls in May-December; 2,789 lbs. from sink gillnets in May-December; and no discards during January-April for either gear). Shepherd cautioned that results could be overestimated because statistical area was the lowest resolution for geographical stratification, yet they could be underestimated because of limited-to-no observer coverage in some areas. The conclusion was that striped bass discards in the multispecies groundfish fishery appear to be localized, seasonal events. The TC reviewed Shepherd's work and agreed that the analysis was technically sound and the resulting discard estimates reasonable. The TC also agreed that the overall impact of this level of discards would not have a significant effect on the fishing mortality rate or the biomass of striped bass.

Addendum History

During the development of Amendment 6, the Striped Bass Management Board (Board) raised concerns about the effect of discard mortality on the overall fish population. At that time, the Board agreed to develop a data collection program to collect the information necessary to evaluate the accuracy of the current discard estimates. To improve discard and discard mortality estimates the following data needs were identified in Amendment 6: proportional use of different gear type and fishing practices by recreational anglers; discard numbers from various commercial gear types; and the mortality rate associated with each recreational gear type/fishing practice and commercial gear type. Amendment 6 indicated that the program should be developed during the amendment's first two years of implementation (2004-05).

Given that timeline, the TC met in February 2005 to review what discard data was being collected, what data elements the Atlantic Coastal Cooperative Statistics Program (ACCSP) was expected to collect once fully implemented, and what data elements would be collected in an ideal bycatch monitoring program. In March and April 2005, staff developed a draft addendum for public comment based on the TC's review and the guidance in Amendment 6. The Board

reviewed the document in May 2005, but determined that additional analysis was needed for incorporation before it was ready for public comment. Specifically, the Board tasked the TC with generating cost estimates to implement the proposed monitoring program.

To address this task, the TC completed a survey of the existing state programs and cost estimates for monitoring striped bass discards and presented this to the Board in August 2005. The Board delayed approval of the draft addendum for public comment, expressing concern that mandatory implementation of the monitoring program for the commercial fishery would be quite burdensome to states given an estimated cost of \$500-\$900 per observed trip. (Implementation of the recreational fishery's program components was not expected to result in such significant costs.) Based on anticipated resource needs, the Board asked that the draft addendum include a clearer justification for a mandatory program given the healthy status of the resource and that methods for estimating discards already exist. The Board also tasked the TC with estimating commercial discard mortality from existing sea sampling data. If this federally-funded, sea sampling data could be analyzed to produce discard estimates, the cost to states could be significantly lower.

The Board next reviewed Draft Addendum I for Public Comment in February 2006. At this point, the TC presented estimates of striped bass dead discards in the 2004 commercial fisheries north of Cape Hatteras based on NMFS sea sampling, and dead discard estimates from the existing tag-based method. The TC's analysis of the sea sampling data produced dead discard estimates for offshore otter trawl and anchor gillnets. The results were comparable to the existing dead discard estimate for trawls, but significantly less for gillnets. The data did not allow reliable estimation for other gears offshore (due to limited striped bass bycatch) nor for any gears in inshore areas (due to limited observer coverage). The analysis provided some validation for the current estimation method and indicated that the cost to implement adequate inshore observer coverage, if mandated, would fall to the states. The Board delayed action on the draft addendum and formed a small working group to take up its next revision.

The main change to the draft addendum resulting from the working group's review was to clearly identify which elements of the ideal bycatch monitoring program would be mandatory and which would be recommendations. In effect, the only component that remained mandatory was annual reporting of bycatch and/or bycatch data monitoring as part of the states' annual compliance reports. This draft of the addendum was sent back to the TC for review in June 2006. The TC made several modifications to the document, including updating the status of the fisheries with more recent harvest and discard estimates, placing the highest priority on studies to estimate discard mortality rates in trawl fisheries, and indicating that a review of existing release mortality studies should be conducted before designing and implementing any new studies.

In August 2006, the Board reviewed and approved the draft addendum for public comment. During August and September, public hearings were held in seven states for a total of 22 attendees and a public comment period garnered nine written comments. The Striped Bass Advisory Panel was also asked to provide comment on Draft Addendum I, although feedback was limited to six of the 20-plus members.

In October 2006, the Board reviewed the public comment and Advisory Panel comment on Draft Addendum I. While there was still some debate as to whether the program and its various components should be voluntary or mandatory, Board review included new discussion on the

inclusion of an angler education program to help reduce bycatch, which was also a recommendation in several public comments. The result of this discussion is manifested in Section 2.2 of this addendum. The Board voted to postpone final consideration of Draft Addendum I until the annual Commission meeting in October 2007.

At a meeting on October 31, 2007, the Board approved Addendum I as modified within this document. The resulting bycatch data collection program establishes a suite of mandatory and voluntary data collection standards, discard mortality studies, and technical committee analyses for commercial, recreational, and for-hire fisheries.

2.1.3 Program Goals and Mandatory and Recommended Elements

PROGRAM GOALS

The overarching goal of the program is to develop more accurate estimates of striped bass discards and discard mortality. Additional sector-specific goals are listed below.

Commercial Fisheries

- Implement at-sea observer coverage on commercial vessels that are targeting striped bass, as well as vessels that may encounter striped bass, to collect information on the number of fish being discarded from various commercial gears. Ideally, the sampling effort will be optimally allocated, both seasonally and spatially, among directed and non-directed fishing that has a strong likelihood of generating striped bass bycatch.
- Determine the discard mortality associated with all of the commercial gear types currently encountering striped bass.
- Document the level of bycatch in identified problem fisheries in annual state compliance reports.

Recreational Fisheries

- Determine proportional use of different gear types and fishing practices (e.g. fly fishing, live bait fishing, circle hooks, treble hooks, etc.).
- Determine the discard mortality associated with each gear type and fishing practice.
- Document the level of bycatch in identified problem fisheries in annual state compliance reports.

For-Hire Fisheries

- Determine proportional use of different gear types and fishing practices (e.g. fly fishing, live bait fishing, circle hooks, treble hooks, etc.).
- Determine the discard mortality associated with each gear type and fishing practice.
- Document the level of bycatch in identified problem fisheries in annual state compliance reports.

MANDATORY DATA COLLECTION

- Collect commercial fishery data elements consistent with ACCSP standards.
- Coordinate with NOAA Fisheries to ensure coverage in federal waters.
- Continue collection of quantitative data on the bycatch of finfish species as reported by interviewed fishermen through existing recreational and for-hire intercept surveys (ACCSP standard).

RECOMMENDED DATA COLLECTION

- Implement commercial at-sea observer coverage on 2-5% of the total trips in state waters. Applicable to all states with commercial fisheries (directed and non-directed) that encounter striped bass.
- Develop “add-on” questions for interview surveys to collect information on gear/terminal tackle used (circle hooks, J-Hooks, treble hooks, fly fishing, live bait, etc.) in recreational and for-hire fisheries.
- Develop a survey to estimate size composition of discarded fish. The Board will need to work with the TC to determine an effective way to collect these data. Approaches for consideration include, but are not limited to, volunteer angler surveys, additional questions for intercept survey, and expansion of data collected in for-hire fisheries.

MANDATORY DISCARD MORTALITY STUDIES

- Review existing commercial discard studies to determine what information has already been collected.
- Review existing recreational studies for various species and gears to develop estimates of striped bass discard mortality.

RECOMMENDED DISCARD MORTALITY STUDIES

- Conduct studies to estimate the discard mortality associated with the following commercial gear types: trawl (highest priority), gill net, fixed nets (pound net/fyke net/floating fish trap), hook and line, haul seine. These studies do not need to be conducted in all states, but should be conducted to reflect the fishing activities (gear type, temperature, salinity, etc.) that encounter striped bass.
- Conduct additional studies on recreational post-release mortality associated with a range of temperature, salinity, and gear types.

MANDATORY TECHNICAL COMMITTEE ANALYSES

- Analyze any newly collected commercial at-sea observer data to determine if any discarding “hot spots” can be reliably identified.
- Develop estimates for the proportion of discards based on water temperature and salinity, if possible. Apply existing post-release mortality rates to the proportions to determine the effect on estimated discard mortality. For example, if 20% of the catch occurs in warm brackish water, that portion of the catch is likely to have a higher mortality rate than discards in cold ocean water.

RECOMMENDED TECHNICAL COMMITTEE ANALYSES

- Analyze the number and type of all fishing trips from each state, by season and area if possible, and determine ideal allocation of recommended observer coverage.

MANDATORY DATA REPORTING

- Once any mandatory or recommended elements of this program are implemented, states are required to report any bycatch and/or data monitoring as part of the annual compliance report to the Commission.

Following two years of data collection under the Program, the Striped Bass Management Board will determine if there are any fisheries that result in striped bass bycatch levels that have a significant effect on the overall population or a sub-set of the population. If any fisheries are

determined to have a significant effect, a bycatch management program will be developed in a subsequent addendum through the adaptive management process. The bycatch management program will be designed to implement penalties for excessive bycatch problems and/or incentives to states/jurisdictions that develop and implement measures to minimize the effect of discards.

2.2 Angler Education Program

2.2.1 Statement of the Problem

Recreational catch rates have increased as the striped bass population has rebuilt. Recreational regulations, in addition to increasing use of catch and release fishing by conservation-minded anglers, have resulted in a growing number of recreational discards. Studies show that the fate of discarded fish is a product of many variables, including individual fish characteristics and behavior; environmental conditions; the gear, tackle, and bait used; where the fish is hooked; and angler behavior and skill level. Ignoring fishing practices shown to reduce post-release mortality is considered contributing to unnecessary waste of the striped bass resource. The resulting public outreach program will aim to minimize discard mortality by informing recreational anglers of best-use practices.

2.2.2 Background

Recreational Releases

With the relaxing of strict regulations on striped bass harvest in the mid to late 1980s, the recreational fishery for striped bass began to grow, with harvest reaching one million fish by 1995, and two million fish by 2001. In 2006, the recreational harvest peaked at more than 2.7 million fish. The trend in striped bass releases is similar but at a much larger scale. In 1996, the number of recreationally released fish reached over 10 million for the first time, and in 2006, the number passed the 20 million fish mark for the first time, nearly reaching 26 million fish (Figure 4). Applying the 8% post-release mortality rate (currently used in assessments) results in an estimated dead discard amount of over 2.0 million fish from the recreational fishery in 2006. Given the growth in recreational fishing for striped bass, the number of dead discards has the potential to surpass the number of striped bass harvested.

Addendum History

In October 2006, the Board determined that the draft addendum should include an angler education program as a management option. Such a program was considered a possible means to reduce dead discards in the recreational fisheries concurrent with the implementation of the bycatch data collection program.

2.2.3 Recommendation to States on Angler Education

Through the ASMFC, if possible, states are recommended to develop and implement an angler education program. The main tool of the education program will be a website accessible from each state fisheries agency website. When funding is available, states should develop posters and/or brochures for posting and distributing at boat launches, shore-based fishing areas, and for placement on charter and rental boats. State agencies should also coordinate outreach to anglers through influential fishing organizations.

3.0 Compliance

Effective immediately, states are required to implement the mandatory elements of this management program. States are encouraged to implement the recommended elements of this management program when funding permits. The Technical Committee will be tasked with the required technical analyses as appropriate.

4.0 Recommendation for Action in Federal Waters

The management of striped bass in the EEZ is the responsibility of the Secretary of Commerce through NOAA Fisheries. The Atlantic States Marine Fisheries Commission believes that it is important to gain a better understanding of the degree of striped bass discarding and discard mortality in state waters and in the EEZ. The Commission recommends that NOAA Fisheries ensure observer coverage at a level and distribution adequate to estimate the magnitude of striped bass discarding in the EEZ, as well as develop and implement additional questions for the marine recreational fishing survey to collect information on fishing practices and gear/terminal tackle used by all types of shore-based and boat-based anglers.

5.0 References

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6.0 Figures

Figure 1. VPA-based average fishing mortality (F) for age 8-11 fish and spawning stock biomass (SSB), 1982-2004. The VPA-based F for 2004 (0.40) is not shown because the Technical Committee concluded it was not reliable due to the observed retrospective pattern. Target and threshold levels for F (plain lines) and SSB (dotted lines) are also shown (Source: ASMFC 2005)

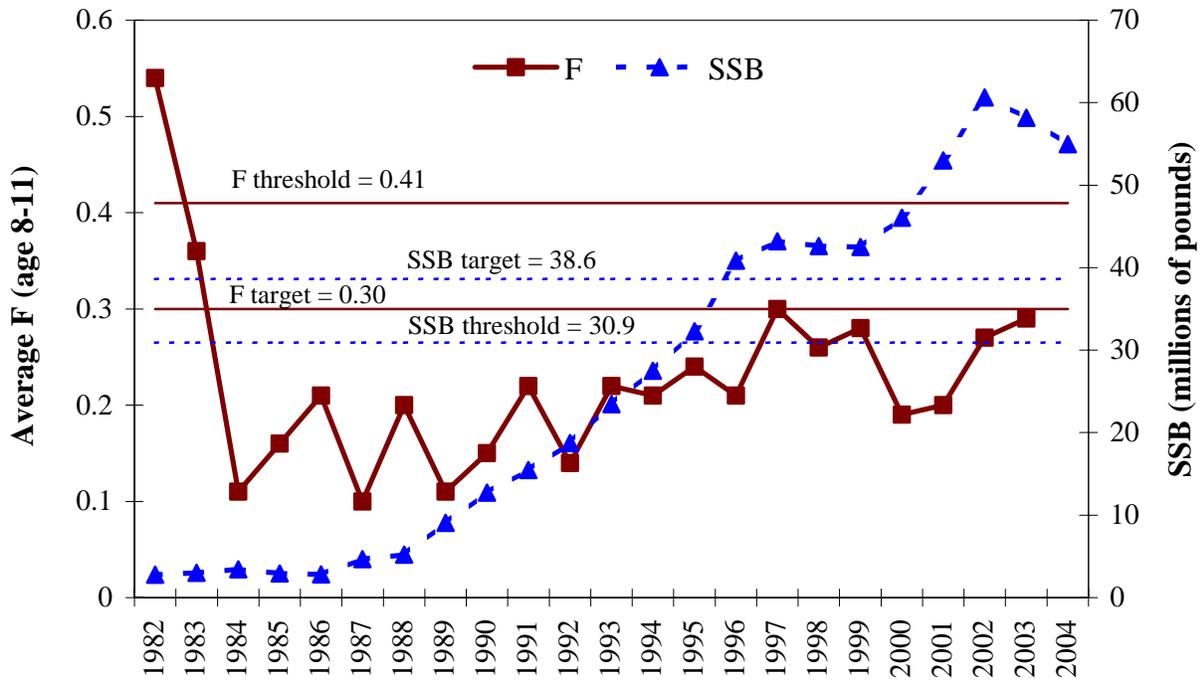


Figure 2. Dead discards and harvest (numbers of fish) in the recreational fishery and commercial fishery from Maine through North Carolina. Note that commercial estimates in 2005 and 2006 are preliminary. (Sources: ASMFC 2005; NMFS Fisheries Statistics Division 2007, State Compliance Reports 2005 and 2006).

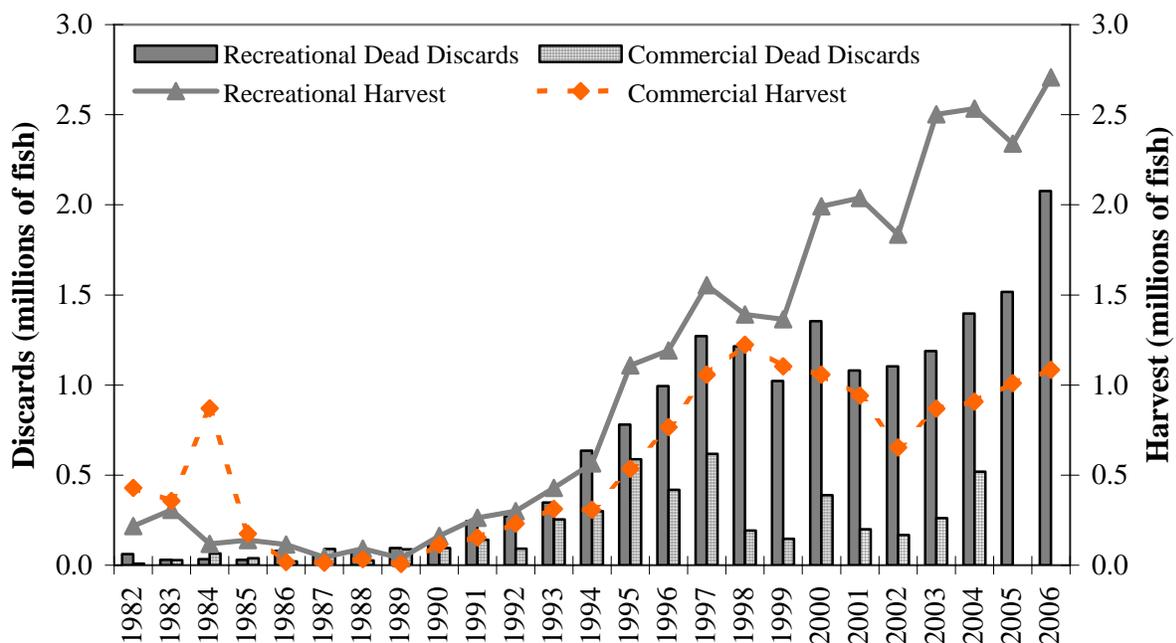


Figure 3. Percent contribution of fishery components to the total 2004 striped bass kill (by number of fish) as estimated in the 2005 stock assessment (Source: ASMFC 2005)

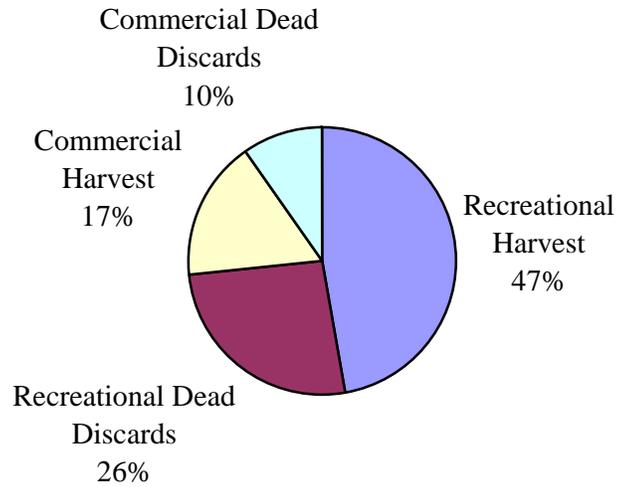
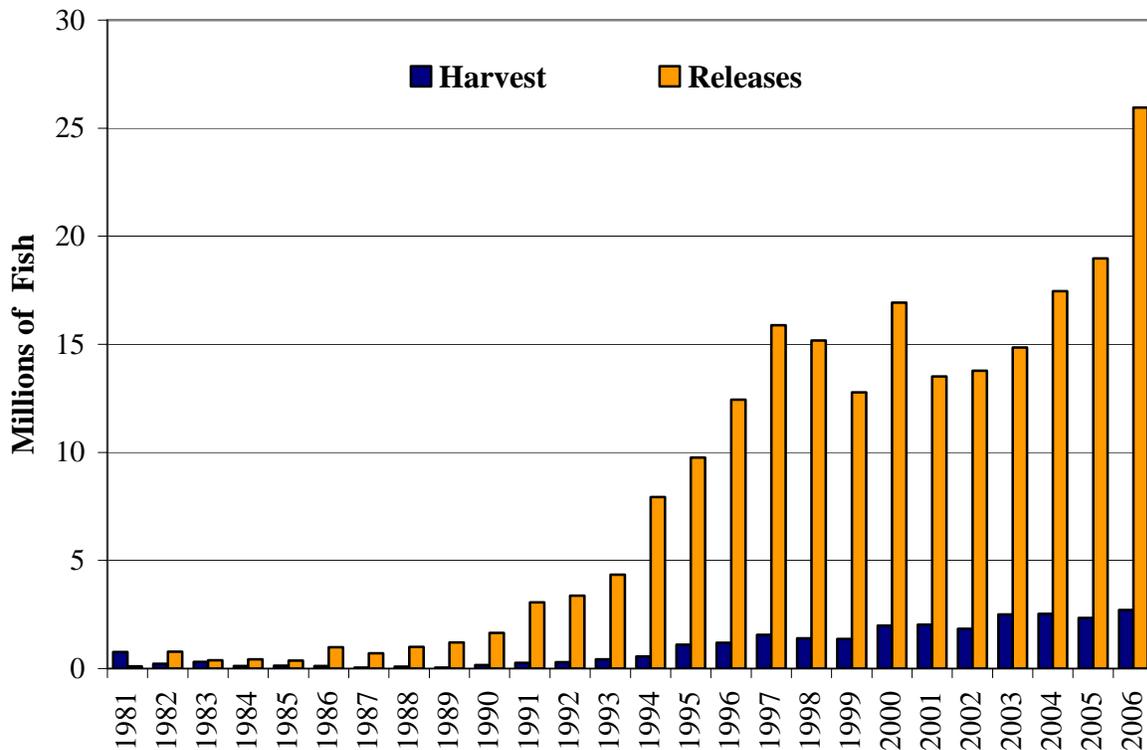


Figure 4. Recreational harvest and releases (number of fish) of striped bass from Maine through North Carolina, 1981-2006 (Source: NMFS Fisheries Statistics Division 2007)



7.0 Tables

Table 1. Gear-specific release mortality rates, with source, used in the Technical Committee's estimation of dead discards from the commercial fishery. The hook and line release mortality rate is also used to estimate dead discards in the recreational fishery.

	Anchor Gill Net	Drift Gill Net	Hook & Line	Other	Pound Net	Seine	Trawl
Release Mortality	0.43	0.08	0.08	0.20	0.05	0.15	0.35
Source	Average of Seagraves & Miller 1989 and an unpublished MD DNR study	Seagraves & Miller 1989	Diodati & Richards 1996	TC Consensus Opinion	TC Consensus Opinion	Unpublished NY DEP study	Crecco 1990

Table 2. State-specific discard estimation methods and 2006 dead discard estimates in commercial fisheries (directed and non-directed) as reported by the states/jurisdictions to the Commission in annual striped bass compliance reports. (No discard mortality reported by NH, RI, CT, MD, and VA.)

State	Commercial Fishery Discard Estimation Methods Reported by States to the ASMFC	Estimated Discard Mortality in 2006	
		number	pounds
Maine	Bait Gill Net Fishery: use annually reported logbook data to estimate nondirected-fishery discards; assume 100% release mortality.	1,053	5,528
Massachusetts	Hook and Line Fishery: use weekly reported logbook data to estimate discards during the open season; multiply by 8% release mortality.	5,969	52,224
New York	Coastal Gill Net Fishery: use weekly reported logbook data to estimate discards during the open season; multiply by 47% release mortality.	1,380	4,416
	Coastal Pound Net Fishery: use weekly reported logbook data to estimate discards during the open season; multiply by 5% release mortality.	619	1,238
	Coastal Hook and Line Fishery: use weekly reported logbook data to estimate discards during the open season; multiply by 13% release mortality.	14,685	73,425
	Coastal Trawl Fishery: use weekly reported logbook data to estimate discards during the open season; multiply by 35% release mortality.	899	2,877
	Hudson River Shad Gill Net Fishery: used weekly observer coverage from 1980-2001, and use weekly reported logbook data from 2002 onward to estimate nondirected-fishery discards; multiply by 47% release mortality.	411	2,423
New Jersey	Shad Gill Net Fishery: use logbook data to estimate nondirected-fishery discards; multiply by 3.1% drift gear mortality rate and 41.2% fixed gear mortality rate	2,791	22,328
Delaware	Gill Net Fishery: used observer coverage during 1987-89 & 2001-03, and use logbook data in other years to estimate discards during the open season; multiply by 47% drift gear mortality rate and 7% fixed gear mortality rate.	612	3,959
Delaware	Hook and Line Fishery: use logbook data to estimate directed-fishery discards; multiply by 8% release mortality.	28	237
PRFC	Potomac River Fisheries: use logbook data to estimate discards during the open season; multiply by 8% release mortality for hook and line and miscellaneous gears.	621	3,723
North Carolina	Albemarle Sound Management Area Gill Net Fisheries: use trip ticket program and at-sea observer coverage to estimate bycatch rates and at-net mortality rates to estimate dead discards during the open season.	22,130	54,529