Atlantic States Marine Fisheries Commission

PUBLIC INFORMATION DOCUMENT

for Amendment 3 to the Interstate Fishery Management Plan For

NORTHERN SHRIMP

ASMFC Vision Statement:
Sustainably Managing Atlantic Coastal Fisheries

February 2015

The Atlantic States Marine Fisheries Commission seeks your comments on the Initiation of Amendment 3 to the Northern Shrimp Fishery Management Plan

The public is encouraged to submit comments regarding this document during the public comment period. Comments will be accepted until **5:00 PM (EST) on April 15, 2015.** Regardless of when they were sent, comments received after that time will not be included in the official record. The Northern Shrimp Section will consider public comment on this document when developing the first draft of the Amendment 3.

You may submit public comment in one or more of the following ways:

1. Attend public hearings held in your state or jurisdiction, if applicable.
2. Refer comments to your state's members on the Northern Shrimp Section or Northern Shrimp Advisory Panel, if applicable.
3. Mail, fax, or email written comments to the following address:

Mike Waine
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If you have any questions please call Mike Waine at (703) 842-0740.

Atlantic States Marine Fisheries Commission
Draft Public Information Document for Northern Shrimp Draft Amendment 3

Introduction

The Atlantic States Marine Fisheries Commission (Commission) is developing an amendment to revise the Interstate Fishery Management Plan for Northern Shrimp (FMP). The Commission, through the coastal states of Maine, New Hampshire, and Massachusetts, is responsible for managing northern shrimp.

This is your opportunity to inform the Commission about changes observed in the fisheries; actions you feel should or should not be taken in terms of management, regulation, enforcement, and research; and any other concerns you have about the resources or the fisheries, as well as the reasons for your concerns.

Management Issues

Amendment 2 to the FMP was approved in October 2011. Since implementation, the northern shrimp fishery and population have experienced significant changes. There have also been substantial changes in other fisheries in the northeast resulting in increased effort in the shrimp fishery. For example, reductions in the groundfish fishery have caused fishermen to switch their effort to the northern shrimp fishery to make up for the loss of opportunity in the groundfish fishery.

Recently, the northern shrimp resource has experienced three successive years of recruitment failure. In addition, abundance and stock biomass indices in recent years are the lowest on record. Changing environmental conditions paired with fluctuating effort in the fishery have resulted in uncertainties in the future status of the northern shrimp resource. Limited entry has been used in other fisheries to control fishing effort which stabilizes fishing pressure on the resource. An amendment to the plan is necessary to establish a limited entry program in the northern shrimp fishery.

Purpose of the Public Information Document (PID)

The purpose of this document is to inform the public of the Commission's intent to gather information concerning the northern shrimp fishery and to provide an opportunity for the public to identify major issues and alternatives related to the management of this species. Input received at the start of the amendment development process can influence the final outcome of the amendment. This document is intended to draw out observations and suggestions from northern shrimp harvesters and industry, the public, and other interested parties, as well as any supporting documentation and additional data sources.

To facilitate public input, this document provides a broad overview of the issues already identified for consideration in the amendment; background information on the northern shrimp

population, fisheries, and management; and a series of questions for the public to consider on the management of the species. In general, the Commission is seeking input on the following question: **"How would you like the northern shrimp fishery to be managed in the future?"**

Commission's Process and Timeline

The publication of this document and announcement of the Commission's intent to amend the existing FMP for northern shrimp is the first step of the formal amendment process. The following motion was made at the Northern Shrimp Section meeting in November 2014 to continue the amendment process:

Move to approve the Public Information Document (PID) for Amendment 3 to the Northern Shrimp FMP for public comment, pending the changes discussed today [adding more background information for the public to consider].

Following the initial phase of information gathering and public comment, the Commission will evaluate potential management alternatives and the impacts of those alternatives. The Commission will then develop Draft Amendment 3, incorporating the identified management alternatives through the PID process, for public review. After the public comment process is completed on Draft Amendment 3, the Commission will specify the management measures to be included in a final version of Amendment 3, as well as a timeline for implementation.

As a note, Draft Amendment 3 may include additional issues identified through the public comment period that were not initially included in the PID process.

The proposed timeline for completion of Amendment 3 is as follows:

June 2014	Northern Shrimp Section (Section) tasks the Plan Development Team (PDT) to develop Public Information Document
Fall 2014	Section receives the Public Information Document (PID) and considers approval for public comment
Spring 2015	**Public Comment on the PID**
Summer 2015	Management Board reviews PID for public comment, considers initiation of Draft Amendment. PDT will develop amendment with input from Technical Committee and Advisory Panel.
Fall 2015	Management Board reviews Draft Amendment for public comment
Fall 2015	Public comment on Draft Amendment
Winter 2016	Section reviews and approves Amendment

Description of the Resource

Summary of Management

The Gulf of Maine fishery for northern shrimp is managed through an interstate agreement between Maine, New Hampshire and Massachusetts. The management framework evolved during 1972-1979 under the auspices of the State/Federal Fisheries Management Program. In 1980, this program was restructured as the Interstate Fisheries Management Program (ISFMP) of the Commission. The FMP for Northern Shrimp was approved under the ISFMP in October 1986.

The Commission approved Amendment 1 to the FMP in May 2004. Amendment 1, which replaced the original FMP, established biological reference points for the first time in the shrimp fishery and expanded the tools available to manage the fishery. Amendment 2, which completely replaced Amendment 1 and was approved in October 2011, further expanded the tools available to manage northern shrimp, including options to slow catch rates throughout the season. It also established a threshold level for the fishing mortality reference points; included a more timely and comprehensive reporting system; and allowed for the initiation of a limited entry program to be pursued through the adaptive management addendum process. The goal of Amendment 2 is "to manage the northern shrimp fishery in a manner that is biologically, economically, and socially sound, while protecting the resource, its users, and opportunities for participation."

Addendum I to Amendment 2, approved in November 2012, refined the annual specification process, and allocated the total allowable catch (TAC) to the trawl (87%) and trap (13%) fisheries based on historical landings since 2001.

The Northern Shrimp Technical Committee (NSTC) provides annual stock assessments and related information to the ASMFC Northern Shrimp Section (Section). Annually, the Section sets specifications on management measures after considering the NSTC stock assessment, input from the Northern Shrimp Advisory Panel, and comment from others knowledgeable about the shrimp fishing industry. Management tools used under Amendment 2 were primarily TACs and seasonal closures.

Summary of Stock Status

Stock assessments for northern shrimp are updated on an annual basis. The 2013 Stock Assessment Update utilized the model which was accepted by peer reviewers in 2007. The 2014 Benchmark Stock Assessment explored new analytic methods, including a new model and modifications to the accepted assessment model. The Benchmark Assessment went through peer review in January 2014 and the new approaches were not approved for management use.

Due to uncertainties raised by the Benchmark Review, the 2014 assessment did not include modeling results. Instead, the NSTC evaluated a suite of indicators that reflected fishery

performance, stock status, and environmental conditions. Abundance and biomass indices for 2012-2014 were the lowest on record in the thirty-one year survey time series (Figure 1). Recruitment indices for the 2010-2012 year classes were also well below average and included the two smallest year classes on record. As a result, the 2014 index of fishable biomass was the lowest on record. The recruitment index increased slightly in the 2014 survey, but was the ninth lowest in the time series. Recruits from the 2013 year class are not expected to reach exploitable size until 2017. Despite the marginal increase in recruitment, the NSTC concluded that the northern shrimp stock has collapsed with little prospect of recovery in the near future.

Recruitment of northern shrimp is related to both spawning biomass and ocean temperatures, with higher spawning biomass and colder temperatures producing stronger recruitment. Ocean temperatures in the western Gulf of Maine have increased in recent years and reached unprecedented highs in the past several years (Figure 2). While temperatures in 2014 were cooler, in the longer term they are predicted to continue rising as a result of climate change. This suggests an increasingly inhospitable environment for northern shrimp and the need for strong conservation efforts to help sustain the stock.

Summary of the Fishery

Drastic fluctuations in landings have characterized the Gulf of Maine northern shrimp fishery throughout its history. Annual landings of Gulf of Maine northern shrimp declined from an average of 11,400 metric tons (mt) during 1969-1972 to about 400 mt in 1977, resulting in a closure of the fishery in 1978 (Table 1a, Figure 3). The fishery reopened in 1979 and landings increased steadily to over 5,000 mt by 1987. Landings ranged from 2,300 to 6,400 mt during 1988-1995, and then rose dramatically to 9,500 mt in 1996, exceeding the previous high in 1973. Landings subsequently declined from 1997 to 2002, only to increase again between 2003 and 2011, from 1,300 to 6,400 mt, with a slight drop in 2009.

In recent years (2010-2012), the fishery has been closed early when landings approached the TAC. In 2011, a year in which the fishery closed early because the TAC was exceeded, the average price per pound was $0.75 and the estimated landed value of the catch was $10.6 million (Table 1b). Since then, the price per pound of shrimp has increased, but low landings have kept the value of the fishery well below $10 million (Table 1b).

The Section considered several factors in setting the specifications for the 2015 shrimp fishery, and ultimately implemented a moratorium to protect the limited number of spawning females. The Section's deliberation considered the biomass in 2014 (500 mt) that was the lowest value in recent history, estimated at 5.2% of the biomass of the reference period (1985-1994), and well below the FMP biomass threshold of 9,000 mt and the biomass limit of 6,000 mt. Additionally, there was recent recruitment failure of three consecutive year classes (2010-2012).

Typically, Maine accounts for about 90% of the landings of northern shrimp. In 2013, the most recent year with landings, Maine landed 83% (278.7 mt) of the season total, New Hampshire followed with 11% (36.9 mt) and Massachusetts landed 6% (18.9 mt) of the season total (preliminary data, Table 1a). The proportional distribution of landings among the states has been similar between 2003 and 2013, though has shifted gradually since the 1980's when Massachusetts averaged about 34% of the catch (Table 1a).

Most northern shrimp fishing in the Gulf of Maine is conducted using otter trawls designed for shrimp, although traps are also utilized off the central Maine coast. Trapping effort has increased in recent years, accounting for 22% of Maine's landings in 2010, but may have been lower relative to trawling in 2011 (17%) and 2012 (9%) because of the early closure of the fishing seasons which limited the trapper's ability to harvest (Table 2). Preliminary dealer reports indicate that trappers accounted for about 7% of Maine's landings in 2013, which was a season impacted by the low abundance of northern shrimp.

Size composition data from both the fishery and summer trawl surveys indicate that higher landings have followed the recruitment of strong (dominant) year classes. Low biomass and landings during 1998 – 2004 can be attributed in part to the below-average recruitment of the associated year classes. In 2014, the female population was comprised of the 2009 and 2010 year classes; the 2010 year class was the first of three successive year classes of recruitment failure. The last two year classes failed to recruit into the fishery, therefore it is anticipated that landings will be low even if the fishery reopens.

Issues for Public Comment

Public comment is sought on a series of issues being considered for inclusion in Draft Amendment 3. The issues are intended to focus the public comment and provide the Section with the necessary input to develop the Amendment. The public is encouraged to submit comment on the issues listed below as well as other issues that may need to be addressed in the management document.

ISSUE 1: LIMITED ENTRY INTO THE FISHERY

Background

The northern shrimp fishery is currently open access and has experienced significant fluctuations in participation over the last 30 years (Table 3). Interest and effort in the fishery generally increases as the season length or price increases. As one of the last open access fisheries in the region, the northern shrimp fishery has provided opportunities for harvesters to target an alternative species when other fishing was unavailable or not economically viable.

However, as the shrimp biomass has decreased, concern has been raised over the influx of boats into the fishery when shrimp stocks and markets warrant. Harvesters and managers have noted the reduced fishing opportunities in other fisheries such as the New England groundfish fishery and are concerned about the impact of shifting effort entering the shrimp fishery. More effort in the fishery would result in increased pressure on the shrimp population. This concern has led to the suggestion that access to the shrimp fishery should be restricted.

Limited access has been used in a number of fisheries along the Atlantic coast to control effort while maintaining access by harvesters who have demonstrated a history and a vested interest in the fishery. Limited entry may also moderate the boom and bust cycle for both harvesters and processors in this relatively small fishery by ensuring more stable landings for northern shrimp. The current status of the northern shrimp stock (lowest indices in the time series) has increased the interest in exploring options to limit new entrants into the fishery. Managers are seeking strategies to stabilize the fishery and improve harvesters and processors' ability to make informed business decisions each year.

Addendum I also scoped the potential for limited entry programs and a summary of public comment is presented below the management questions.

Management Questions

- Should limited entry be used in the northern shrimp fishery?
- How should effort be capped (number of vessels, number of licenses)?
- How should landings history be assigned (by vessel, by individual, by state license holder [Maine only])?
- What years should be used to determine the landings history?
- Should the previously set control date of June 7, 2011 remain or be re-evaluated?

- Should new participants be allowed to enter the fishery? If yes, how and when would new participants enter the fishery?

Addendum I to Amendment 2 included preliminary options concerning entrance into a limited entry program to the Section. Options that received the most positive public comment from Addendum I are included below, however, the Section welcomes comments on other options.

Potential options for entrance into the program include:

- Assign landings history to a vessel, by default the current vessel owner gets landings history, unless specified.
- Assign landings history to an individual.

In addition, Addendum I explored which years are appropriate to determine landings history. Options that are the most feasible given data availability and reliability are included below, however, the Section welcomes comments on other options:

Potential options for assigning landings history include:

- Assign landings history based on average annual landings between 2001 and 2009. Logbook reporting requirements were initiated in 2000 for Maine, allowing for one year of quality assurance/quality control procedures to ensure full reporting. This time period includes the last season before emergency closures were implemented.
- Assign landings history based on average annual landings between 2008 and 2012. These years reflect the more recent condition of the stock.

ISSUE 2: STATE-BY-STATE ALLOCATION

Background

Over the past five fishing seasons (2009-2013), Maine has accounted for approximately 90% of the northern shrimp landings. Maine is the only state with a trap fishery for northern shrimp. Under a limited entry program, Maine would be the only state in which a significant reduction in participation would be necessary to achieve an effective limited entry program. An alternative to limited entry (see Issue 1 above) would be to determine state-by-state allocations of the TAC. Maine, New Hampshire, and Massachusetts could implement measures to meet the needs of the state's fishery, as long as the state allocation was not exceeded. In other Commission-managed species, state allocations are based on average landings over a certain period of time. Usually, this period of time represents a stable period in the fishery to ensure equitable division of landings. It should be noted that state-by-state allocation of the fishery may limit vessels seeking to enter the fishery and reduce growth of the fishery in Massachusetts and New Hampshire. The managers are

investigating the most fair and equitable way to manage the fishery while ensuring flexibility for the future.

Addendum I also scoped the potential for state-by-state allocations and a summary of public comment is presented below the management questions.

Management Questions

- Should the northern shrimp TAC be allocated by state?
- Should landings history be used to determine allocations? Which years should be used to determine landings history?
- How should historical landings be accounted for when a boat permitted in one state lands shrimp in a different state?
- Should a permitted harvester from one state be able to land in another state? If yes, what state's quota would the landings be deducted from (permitted or landed state)?
- Would quota transfers between states be allowed?
- Are there other methods to set state allocations that the Section should consider?

The Plan Development Team (PDT) has previously investigated which years are appropriate for determining state-by-state allocation. Options that are the most feasible given data availability and reliability are included below, however, the Section welcomes comments on other options

Potential time frames for assigning landings history include:

- Timeline 1 - 2001 – 2009 - This time period represents landings after new logbook reporting requirements for non-federal permits were instituted in Maine in 2000, allowing for one year of quality assurance/quality control procedures to ensure full reporting. The time period includes the last season before emergency closures were implemented because the TAC was reached.
- Timeline 2 - 2001 – 2013 - This time period represents the full range of data of new logbook reporting requirements in Maine for non-federal permits, which were implemented in 2000, allowing for one year for quality assurance/quality control procedures to ensure full reporting and accountability. This includes management measures in 2010-2012 that may have influenced landings history.
- Timeline 3 - 2003 – 2008 - This time period represents data three years after new logbook reporting requirements for non-federal permits were implemented in Maine in 2000, but before emergency closures were implemented in the 2010-2012 seasons

because the TAC was reached. It is similar to but shorter than Timeline 1.

ISSUE 3: HOW SHOULD THE SPECIFICATIONS PROCESS OCCUR UNDER AMENDMENT 3?

Background

Northern shrimp specifications are based on a TAC for the entire fishery. Typically, an annual stock assessment estimates values for the fishing mortality target (F_{target}) and fishing mortality threshold ($F_{threshold}$). The TAC is set based on those estimates and 87% is allocated to the trawl fishery and 13% to the trap fishery. The Section may then specify various effort controls such as fishing seasons, trip limits, days out of the fishery, trap limits, season closure dates and a research set aside. These measures are based upon the most recent stock status report and are revisited annually. Measures which may be changed within seasons include trip limits, days out, and transferability of the TAC between gear types.

Due to the uncertainties in the benchmark stock assessment (ASMFC 2014), current estimates of fishing mortality are not usable for establishing a TAC. The Section would like to explore flexibility in the specifications process so a TAC can be set when (1) fishing mortality estimates are not usable (2) as the stock recovers and/or (3) as environmental conditions change. For example, the Section may use stock status indicators (e.g., catch rates, recruitment) and/or empirical harvest levels (e.g., historical harvest levels that match similar stock status conditions) to set the TAC. In addition, the Section would like to consider including multi-year specifications in the fishery to provide stability to the market and processors.

Management Questions

- How should the TAC be set under Amendment 3 (stock assessments, other)?
- How should overages/underages in the TAC be handled?
- Should the gear allocation of 87%/13% for trawl/trap be revisited?
- Should target reference points (fishing mortality or biomass) be determined for northern shrimp? How should they be determined?
- Should the northern shrimp fishery have a defined season, or should the season be set on an annual or multi-annual basis?
- Should there be trip limits in the northern shrimp fishery?
- Should there be an option for research set asides? If so, what maximum percentage of the TAC should be allocated for research set asides?
- Should multi-year specifications be considered in the northern shrimp fishery?

ISSUE 4: SHOULD THE GOALS AND OBJECTIVE OF THE FISHERY MANAGEMENT PLAN FOR NOTHERN SHRIMP BE REVISED?

Background

The goal and objectives for this management program should be reviewed to ensure they are consistent with the needs of the northern shrimp fishery. The current goal and objectives are outlined in Amendment 2:

GOAL

"To manage the northern shrimp fishery in a manner that is biologically, economically and socially sound, while protecting the resource, its users and opportunities for participation."

OBJECTIVES (as outlined in Amendment 2 to the FMP)

- Protect and maintain the northern shrimp stock at levels that will support a viable fishery
- Optimize utilization of the resource within the constraints imposed by distribution of the resource, available fishing areas, and harvesting, processing and marketing capacity
- Maintain the flexibility and timeliness of public involvement in the northern shrimp management program
- Maintain existing social and cultural features of the fishery to the extent possible
- Minimize the adverse impacts the shrimp fishery may have on other natural resources
- Minimize the adverse impacts of regulations, including increased cost to the shrimp industry and the associated coastal communities
- Promote research and improve the collection of information to better understand northern shrimp biology, ecology, and population dynamics,
- Achieve compatible and equitable management measures through coordinated monitoring and law enforcement among jurisdictions throughout the fishery management unit

<u>Management Questions</u>

- Are the goals and objectives from Amendment 2 still appropriate for the northern shrimp fishery?
- What changes to the goals and objectives need to be made to reflect the needs of the fishery?

ISSUE 5: OTHER ISSUES

Background

As stated earlier in this document, the goal of the PID is to solicit comments on a broad range of issues for consideration as the next amendment to the northern shrimp FMP is developed. The public comment should generally focus on

"How would you like the northern shrimp fishery to be managed in the future?" The Section is interested in hearing from the public on all issues associated with the fishery. Comments do not need to be limited to issues included in this document.

A number of other issues have been discussed by stakeholders, scientists, and managers regarding the future of the fishery. These topics include:

- Implementation of area management
- Individual fishing/transferable quotas (ITQ/IFQ)
- Fleet or sector quotas
- Days-at-sea restrictions
- Vessel limits (size, horsepower, tonnage)
- Catch limits by gear type and vessel category
- Additional gear restrictions (mesh size, sweep length, roller size)
- Monthly and seasonally divided catch
- Bycatch of finfish species
- Maximum count-per-pound limits
- Size-selective gear and research
- Assessment methodology
- Management reference points
- Adapting to climate change

Management Questions

- What other changes should be made to the northern shrimp fishery that is not covered by the topics included in this document?

References

Atlantic States Marine Fisheries Commission, 2014. Stock Status Report for Northern Shrimp. http://www.asmfc.org/uploads/file/545cf3b5NShrimpStockStatusReport_2014.pdf

Tables and Figures

Table 1a. U.S. Commercial landings (mt) of northern shrimp in the Gulf of Maine

Year	Maine		Massachusetts		New Hampshire		Total	
	Annual	Season	Annual	Season	Annual	Season	Annual	Season
1958	2.2		0.0		0.0		2.2	
1959	5.5		2.3		0.0		7.8	
1960	40.4		0.5		0.0		40.9	
1961	30.5		0.3		0.0		30.8	
1962	159.5		16.2		0.0		175.7	
1963	244.3		10.4		0.0		254.7	
1964	419.4		3.1		0.0		422.5	
1965	941.3		8.0		0.0		949.3	
1966	1,737.8		10.5		18.1		1,766.4	
1967	3,141.2		10.0		20.0		3,171.2	
1968	6,515.2		51.9		43.1		6,610.2	
1969	10,993.1		1,773.1		58.1		12,824.3	
1970	7,712.8		2,902.3		54.4		10,669.5	
1971	8,354.8		2,724.0		50.8		11,129.6	
1972	7,515.6		3,504.6		74.8		11,095.0	
1973	5,476.6		3,868.2		59.9		9,404.7	
1974	4,430.7		3,477.3		36.7		7,944.7	
1975	3,177.2		2,080.0		29.4		5,286.6	
1976	617.3		397.8		7.3		1,022.4	
1977	142.1		236.9		2.2		381.2	
1978	0.0		3.3		0.0		3.3	
1979	32.8		405.9		0.0		438.7	
1980	69.6		256.9		6.3		332.8	
1981	530.0		539.4		4.5		1,073.9	
1982	883.0		658.5		32.8		1,574.3	
1983	1,029.2		508.2		36.5		1,573.9	
1984	2,564.7		565.4		96.8		3,226.9	
1985	2,957.0	2,946.4	1,030.5	968.8	207.4	216.7	4,194.9	4,131.9
1986	3,407.2	3,268.2	1,085.7	1,136.3	191.1	230.5	4,684.0	4,635.0
1987	3,534.2	3,680.2	1,338.7	1,427.9	152.5	157.9	5,025.4	5,266.0
1988	2,272.5	2,258.4	632.7	619.6	173.1	157.6	3,078.3	3,035.6
1989	2,544.8	2,384.0	751.6	699.9	314.3	231.5	3,610.7	3,315.4

Table 1a continued – U.S. commercial landings of northern shrimp (*2013 data are preliminary)

Year	Maine		Massachusetts		New Hampshire		Total	
	Annual	**Season**	**Annual**	**Season**	**Annual**	**Season**	**Annual**	**Season**
1990	2,962.1	3,236.3	993.4	974.9	447.3	451.3	4,402.8	4,662.5
1991	2,431.5	2,488.6	737.7	814.6	208.3	282.1	3,377.5	3,585.3
1992	2,990.4	3,070.6	291.7	289.3	100.1	100.1	3,382.2	3,460.0
1993	1,563.1	1,492.5	300.3	292.8	441.2	357.6	2,304.6	2,142.9
1994	2,815.4	2,239.7	381.9	247.5	521.0	428.0	3,718.3	2,915.2
1995		5,013.7		670.1		772.8		6,456.6
1996		8,107.1		660.6		771.7		9,539.4
1997		6,086.9		366.4		666.2		7,119.5
1998		3,481.3		240.3		445.2		4,166.8
1999		1,573.2		75.7		217.0		1,865.9
2000		2,516.2		124.1		214.7		2,855.0
2001		1,075.2		49.4		206.4		1,331.0
2002		391.6		8.1		53.0		452.7
2003		1,203.7		27.7		113.0		1,344.4
2004		1,926.9		21.3		183.2		2,131.4
2005		2,270.2		49.6		290.3		2,610.1
2006		2,201.6		30.0		91.1		2,322.7
2007		4,469.3		27.5		382.9		4,879.7
2008		4,515.8		29.9		416.8		4,962.4
2009		2,315.7	MA & NH combined			185.6		2,501.2
2010		5,604.3		35.1		501.4		6,140.8
2011		5,569.7		196.4		631.5		6,397.5
2012		2,219.9		77.8		187.8		2,485.4
*2013		278.7		18.9		36.9		334.5
2014	Moratorium in fishery							

Table 1b. Price and value of U.S. Commercial landings (mt) of northern shrimp in the Gulf of Maine. (*2013 data are preliminary.) Values are not adjusted for inflation.

Year	Price $/Lb	Value $
1958	0.32	1,532
1959	0.29	5,002
1960	0.23	20,714
1961	0.2	13,754
1962	0.15	57,382
1963	0.12	66,840
1964	0.12	112,528
1965	0.12	245,469
1966	0.14	549,466
1967	0.12	871,924
1968	0.11	1,611,425
1969	0.12	3,478,910
1970	0.2	4,697,418
1971	0.19	4,653,202
1972	0.19	4,586,484
1973	0.27	5,657,347
1974	0.32	5,577,465
1975	0.26	3,062,721
1976	0.34	764,094
1977	0.55	458,198
1978	0.24	1,758
1979	0.33	320,361
1980	0.65	478,883
1981	0.64	1,516,521
1982	0.6	2,079,109
1983	0.67	2,312,073
1984	0.49	3,474,351
1985	0.44	3,984,563
1986	0.63	6,451,207
1987	1.1	12,740,583
1988	1.1	7,391,778
1989	0.98	7,177,660
1990	0.72	7,351,421
1991	0.91	7,208,839
1992	0.99	7,547,942
1993	1.07	5,038,053
1994	0.75	4,829,107
1995	0.9	12,828,031
1996	0.73	15,341,506
1997	0.79	12,355,873
1998	0.96	8,811,939
1999	0.91	3,762,044
2000	0.79	4,968,656
2001	0.86	2,534,095
2002	1.08	1,077,534
2003	0.87	2,590,917
2004	0.44	2,089,636
2005	0.57	3,261,648
2006	0.37	1,885,978
2007	0.38	4,087,121
2008	0.49	5,407,374
2009	0.4	2,216,411
2010	0.52	6,994,107
2011	0.75	10,625,534
2012	0.95	5,230,032
*2013	1.81	1,332,150
2014	NA	moratorium

Table 2. Distribution of landings (metric tons) in the Maine northern shrimp fishery by season, gear type, and month.

	Dec	Jan	Feb	Mar	Apr	May	Other	Season Total	% of total
2000 Season, 51 days, Jan 17 - Mar 15, Sundays off									
Trawl		731.1	1,354.8	163.6				2,249.47	89%
Trap		28.9	179.6	58.3				266.7	11%
Total	0.0	759.9	1,534.4	221.9	0.0	0.0	0.0	2,516.2	
2001 Season, 83 days, Jan 9 - Apr 30, Mar 18 - Apr 16 off, experimental offshore fishery in May									
Trawl		533.0	360.1	30.9	29.8	0.3		954.0	89%
Trap		42.9	72.6	5.7				121.2	11%
Total	0.0	575.8	432.8	36.6	29.8	0.3	0.0	1,075.2	
2002 Season, 25 days, Feb 15 - Mar 11									
Trawl			263.6	77.2				340.8	87%
Trap			43.2	7.6				50.8	13%
Total	0.0	0.0	306.8	84.8	0.0	0.0	0.0	391.6	
2003 Season, 38 days, Jan 15 - Feb 27, Fridays off									
Trawl		467.2	518.8	0.4			0.6	987.0	82%
Trap		67.5	149.2					216.7	18%
Total	0.0	534.7	668.0	0.4	0.0	0.0	0.6	1,203.7	
2004 Season, 40 days, Jan 19 - Mar 12, Saturdays and Sundays off									
Trawl	1.8	514.0	905.5	430.0	4.7	2.7	0.04	1858.7	96%
Trap		12.2	39.5	16.5				68.1	4%
Total	1.8	526.2	945.1	446.4	4.7	2.7	0.04	1926.9	
2005 Season, 70 days, Dec 19 - 30, Fri-Sat off, Jan 3 - Mar 25, Sat-Sun off									
Trawl	75.0	369.4	770.6	663.6			0.01	1878.5	83%
Trap		conf	132.6	259.0				391.6	17%
Total	75.0	369.4	903.2	922.6	0.0	0.0	0.01	2270.2	
2006 Season, 140 days, Dec 12 - Apr 30									
Trawl	144.1	675.0	733.8	256.9	117.1			1927.0	88%
Trap	conf	16.7	163.1	93.9	0.9			274.6	12%
Total	144.1	691.7	896.9	350.8	118.0	0.0	0.0	2201.6	
2007 Season, 151 days, Dec 1- Apr 30									
Trawl	758.2	1,443.3	1,275.6	362.1	143.6	0.4	0.0	3,983.2	89%
Trap	3.7	37.2	314.7	119.8	10.6			486.1	11%
Total	761.9	1,480.5	1,590.4	481.9	154.2	0.4	0.0	4,469.3	

	Dec	Jan	Feb	Mar	Apr	May	Other	Season Total	% of total
2008 Season, 152 days, Dec 1- Apr 30									
Trawl	408.5	989.6	1,680.8	603.4	42.6		0.1	3,724.9	82%
Trap	conf	64.1	339.6	380.4	6.7			790.8	18%
Total	408.5	1,053.7	2,020.4	983.8	49.3	0.0	0.1	4,515.8	
2009 Season, 180 days, Dec 1- May 29									
Trawl	134.3	579.7	780.9	405.4	33.6	1.8	0.2	1,935.9	84%
Trap	0.4	16.2	207.3	154.7	1.3			379.8	16%
Total	134.6	595.9	988.2	560.1	34.9	1.8	0.2	2,315.7	
2010 Season, 156 days, Dec 1- May 5									
Trawl	263.4	1,488.3	2,091.1	326.3	194.3	33.0	0.4	4,396.7	78%
Trap	conf	194.8	823.4	189.3	conf			1,207.6	22%
Total	263.4	1,683.1	2,914.5	515.6	194.3	33.0	0.4	5,604.3	
2011 Season, 90 days, Dec 1- Feb 28									
Trawl	720.8	2,194.5	1,728.5	0.5				4,644.4	83%
Trap	1.9	377.7	545.8					925.3	17%
Total	722.7	2,572.2	2,274.3	0.5	0.0	0.0	0.0	5,569.7	
2012 Season, Trawling Mon,Wed,Fri, Jan 2- Feb 17 (21 days); Trapping Feb 1-17 (17 days)									
Trawl	0.5	1,130.6	895.2	0.5				2,026.8	91%
Trap			193.1					193.1	9%
Total	0.5	1,130.6	1,088.2	0.5	0.0	0.0	0.0	2,219.9	
***2013** Season, Trawl 2-7 days/wk, Jan 23-Apr 12 (54 days); Trap 6-7 days/wk, Feb 5-Apr 12 (62 days)									
Trawl		63.0	155.6	37.4	2.4			258.3	93%
Trap			15.2	4.9	0.2			20.4	7%
Total	0.0	63.0	170.8	42.4	2.6	0.0	0.0	278.7	
2014 Season was closed.									

conf = Confidential data were combined with an adjacent month.
* Preliminary data

Table 3. Estimated numbers of active vessels in the Gulf of Maine northern shrimp fishery by fishing season and state.

Season	Maine			Massachusetts	New Hampshire	Total
	Trawl	Trap	Total			
1980			15-20	15-20		30-40
1981			~75	~20-25		~100
1982			>75	~20-25		>100
1983			~164	~25	~5-8	~197
1984			239	43	6	288
1985			~231	~40	~17	~300
1986						~300
1987			289	39	17	345
1988			~290	~70	~30	~390
1989			~230	~50	~30	~310
1990			~220			~250
1991			~200	~30	~20	~250
1992			~259	~50	16	~325
1993			192	52	29	273
1994			178	40	29	247
1995						
1996			275	43	29	347
1997			238	32	41	311
1998			195	33	32	260
1999			181	27	30	238
2000			249	15	23	287
2001	174	60	234	19	27	275
2002	117	52	168	7	23	198
2003	142	49	191	12	22	222
2004	114	56	170	7	15	192
2005	102	64	166	9	22	197
2006	68	62	129	4	11	144
2007	97	84	179	3	15	196
2008	121	94	215	4	15	234
2009	80	78	158	12 (MA and NH combined)		170
2010	124	112	236	6	14	256
2011	172	143	311	12	19	342
2012	164	132	295	15	17	327
*2013	109	72	181	13	14	207
2014	0	0	0	0	0	0

note that some boats reported both trapping and trawling

* preliminary

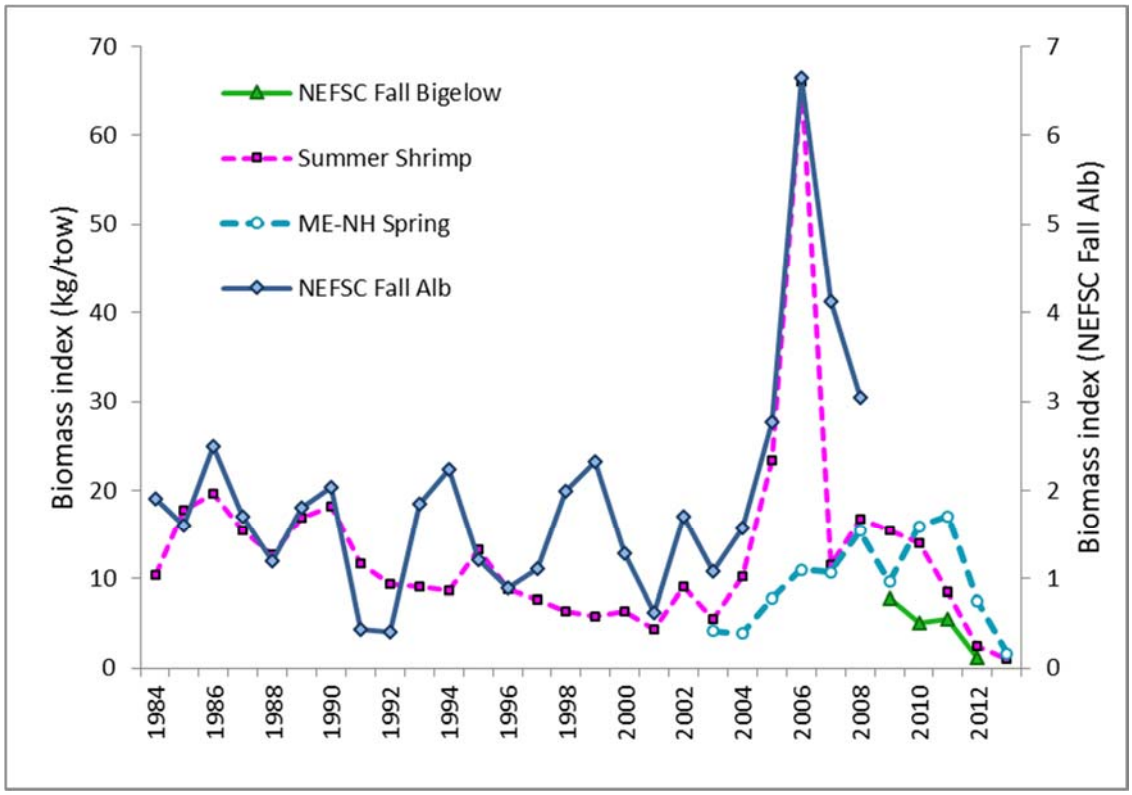

Figure 1. Biomass indices (kg/tow) from various northern shrimp surveys in the Gulf of Maine.

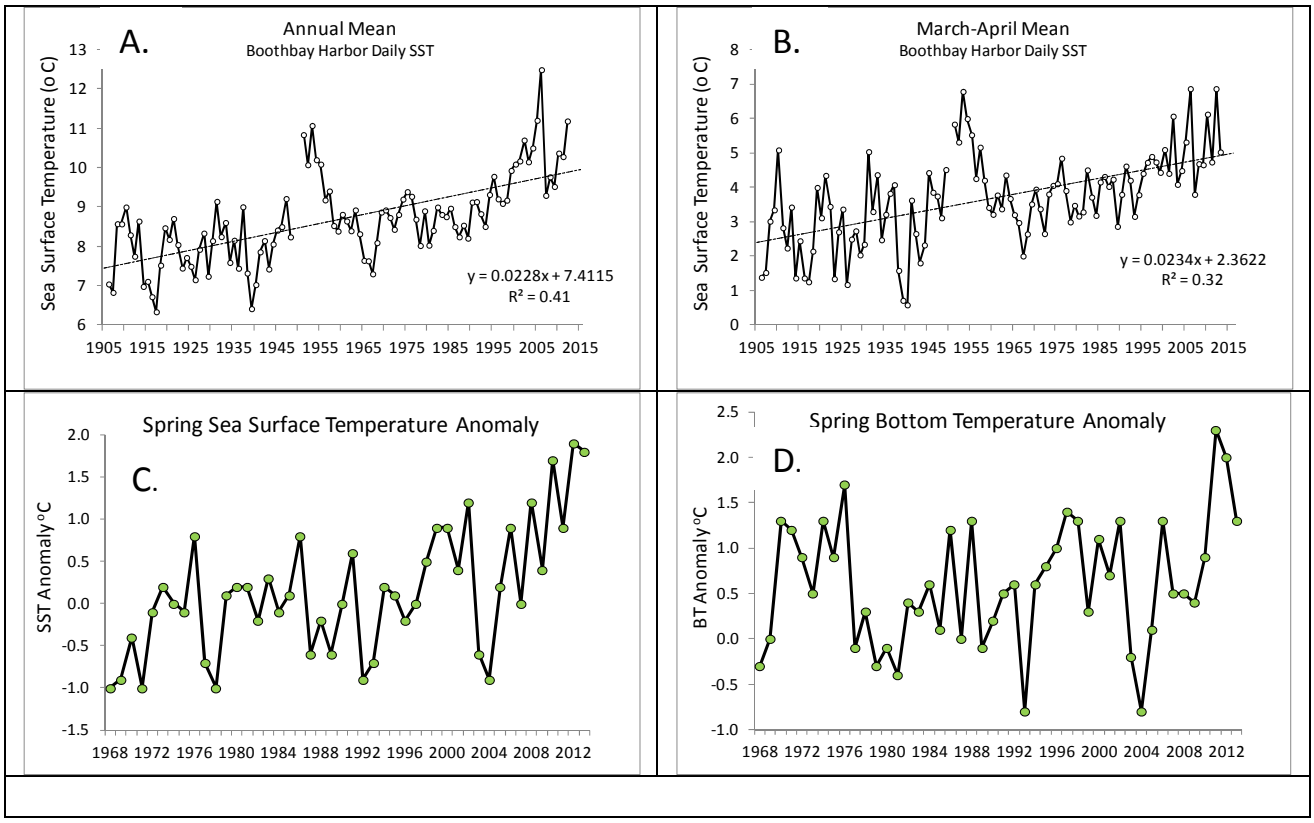

Figure 2. (A) Average annual sea surface temperature (SST) at Boothbay Harbor, Maine, during 1906-2013 and (B) average SST during March-April, 1906-2013. (C) Spring sea surface temperature anomaly in shrimp offshore habitat areas from NEFSC trawl surveys, 1968-2013. (D) Spring bottom temperature anomaly in shrimp offshore habitat areas from NEFSC trawl surveys, 1968-2013.

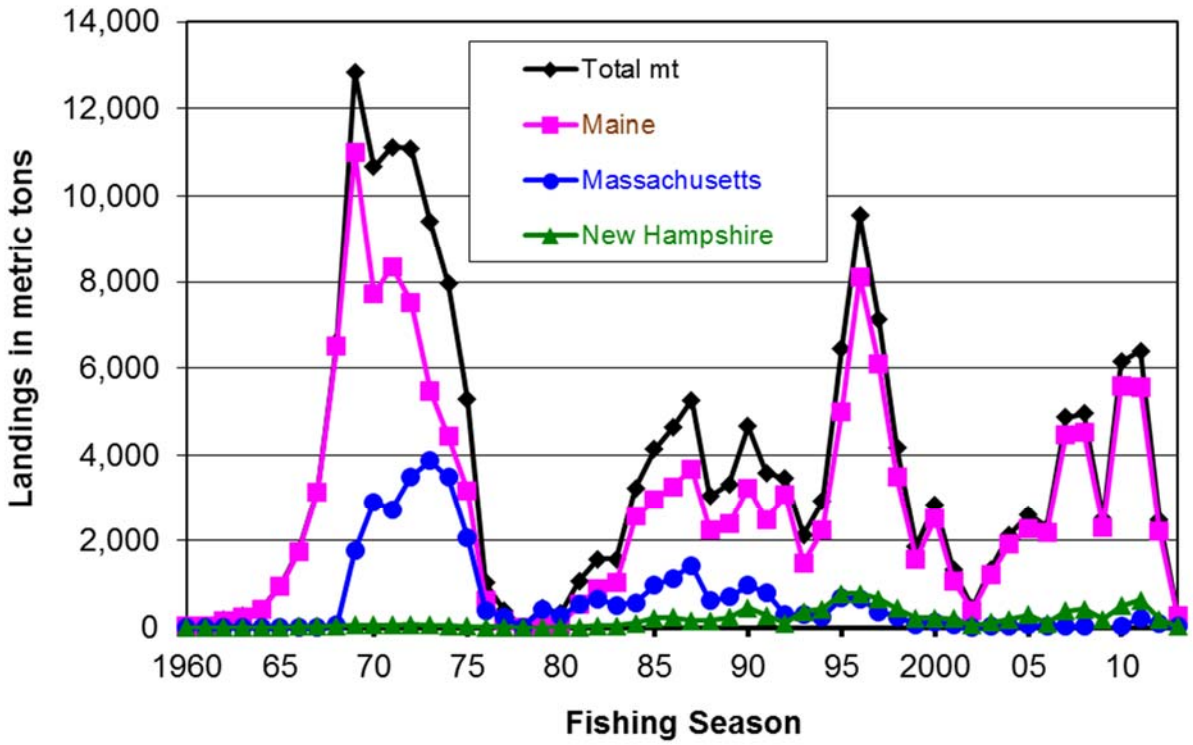

Figure 3. Gulf of Maine northern shrimp landings by season and state. MA landings are combined with NH landings in 2009 to preserve confidentiality.