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# Jonah Crab Fishery

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A Briefing for the  
Atlantic States  
Marine Fisheries  
Commission

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April 14, 2014

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# Jonah Crab Fishery

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## Executive Summary

Jonah crab has long been considered a bycatch of the lobster industry. In recent years, however, increased targeted fishing pressure on Jonah crab, likely due to fast growing market demand, has seriously compromised the long-term health of the fishery. In the absence of a comprehensive management plan and stock assessment process, harvest of Jonah crab is at risk of compromising the sustainability of the resource, ultimately resulting in inaccessible raw product and lost markets. This is particularly impactful to fishermen who rely on Jonah crab for their livelihoods and to the processors and dealers who have invested in processing technology and building markets for Jonah crab.

Jonah crab has no stock assessment or fishery management plan of its own, due in part to limited data on its population, growth rates, distribution, and sexual maturity. In addition, the limited dealer reports available often don't differentiate by species, confusing Jonah crab (*Cancer borealis*) with rock crab (*Cancer irroratus*).

As Jonah crab increases in value to the region, protecting the resource becomes progressively important. According to the National Ocean Economics Program data, 11,473,264 pounds of Jonah crab was landed in the U.S. in 2012 with a total ex-vessel value of \$8,154,806. In fact, the harvest has increased steadily over the past decade. Massachusetts, followed by Rhode Island,

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has landed the greatest amount of Jonah crab in the region for the past three years. These numbers are based on reporting data from federal waters, where the vast majority of Jonah crab is presently harvested.

In 2012, Delhaize America, a major grocery retailer with approximately 1,700 stores from Maine to Florida, recognized that Jonah crab does not meet its criteria for sustainable harvest. It faced a decision to either discontinue the item or to engage the industry and others in a formal Fishery Improvement Project (FIP) to address the fishery's sustainability concerns. Over the past year, Jonah crab processors, fishermen, state and federal management representatives, and scientists have worked with Delhaize America to better understand the sustainability concerns of the fishery and to develop a set of recommendations for its management. Facilitated by the Gulf of Maine Research Institute (GMRI), the FIP has conducted a pre-assessment benchmark against Marine Stewardship Council criteria (Appendix A: MSC Pre-Assessment) and developed a work plan (Appendix B: Jonah Crab FIP Work Plan) that outlines a series of deliverables that will address threats to the fishery's sustainability.

The FIP Work Group requests that the ASMFC Policy Board make management of Jonah crab a priority over the coming year in order to address the following problems:

- The crab resource is unregulated in federal waters, with most of the landings coming from Area 3.
- Landings and effort are increasing rapidly and in an unregulated manner.
- There are no minimum size protections for Jonah crab, nor are there regulations to protect spawning biomass, including restrictions on the harvest of females.
- If left unregulated, the expanding crab fishery threatens the effectiveness of the lobster industry's conservation measures to reduce traps in the water and avoid interactions with right whales.
- Supermarkets and other major buyers are positioning to discontinue selling processed and whole Jonah crab unless it is managed sustainably.
- With the loss of market access, the ex-vessel price of Jonah crab is likely to decline.
- With continued unregulated harvest of Jonah crab, the long-term availability of this resource for harvest is compromised.

Specifically, the Work Group's recommendations to the ASMFC include the following:

- Incorporate Jonah crab into the Lobster Management Plan;
- Tie the harvest of Jonah crab to the lobster license and trap tagging requirements as is currently done in Massachusetts, New Hampshire, and Maine. For states that do not have a lobster license, require a license and trap tags for the harvest of Jonah crab.
- Require a 5" minimum carapace width (CW), with an enforcement tolerance.
- Prohibit the harvest of female Jonah crabs.
- Require full reporting of Cancer crabs by species to better understand the fishery and to establish baseline data.

This document provides additional background and justification for the Work Group's recommendations.

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## Market Demand for Sustainability

Over the past decade, retailers around the world have taken a hard look at how their purchasing impacts the sustainability of the globe's fishery resources. The vast majority of retailers – including Wal-Mart, Giant Eagle, Delhaize America, and Wegmans – have made commitments to sourcing sustainable seafood. While each retailer might have a slightly different definition of sustainability, all recognize that they have a role to play in motivating responsible harvest, ultimately contributing to long-term sustainability of the resource.

Delhaize America has committed to sourcing only seafood that is well-managed and not at risk of over exploitation. As the company reviewed Jonah crab, it discovered that the fishery is not well managed and there is very little scientific data to determine whether the fishery is being overexploited.

Rather than abandon the product, Delhaize America engaged with GMRI and other partners to implement a FIP. Globally, FIPs have been initiated as industry-led voluntary efforts to identify and address sustainability concerns in fisheries (for additional information on FIPs, visit <http://www.sustainablefish.org/fisheries-improvement>).

The Conservation Alliance for Seafood Solutions ([www.solutionsforseafood.org](http://www.solutionsforseafood.org)) includes 18 NGOs from North America that engage with the seafood buying marketplace to encourage and inform sustainable sourcing. This Alliance has agreed that encouraging fishery improvements is beneficial to sustainability and has developed formal guidelines (Appendix C: Guidelines for Supporting Fishery Improvement Projects) for FIPs to be recommended to their buyer partners (Appendix D: Summary of NGO and Retailer and Food Service Partnerships).

The Jonah crab FIP follows these guidelines closely, and all information – including the participation agreement, work plan, Work Group, and budget – is made available on a public web site at <https://sites.google.com/site/jonahcrabfip>. The Work Group members are:

- Chair: Ray Swenton, Bristol Seafood
- David Borden, Atlantic Offshore Lobstermen's Association
- Josanna Busby, Delhaize America
- Lanny Dellinger, Rhode Island Lobstermen's Association
- Bill Gerencer, M.F. Foley Company
- Adam LaGreca, Rome Packing
- Derek Perry, Massachusetts Division of Marine Fisheries
- David Spencer, F/V Nathaniel Lee
- Steve Train, Atlantic States Marine Fisheries Commission
- Rick Wahle, University of Maine
- Jon Williams, The Atlantic Red Crab Company

This Work Group has committed to collaboratively address the sustainability concerns in the Jonah crab fishery. The FIP recognizes that, in the absence of appropriate management measures for the Jonah crab fishery, the market demand for this product – and hence the price per pound

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and overall value – is at risk of decreasing precipitously, as major retailers implement their sustainable seafood commitments.

## Threats to Biological Sustainability

Although Jonah crab has long been considered a bycatch of the lobster fishery, increasing market for this product – in both live and processed forms – has resulted in increasing targeted effort on Jonah crab. Over the past twenty years, landings of Jonah crab in New England have more than quadrupled (Figure 1.) with the majority landed in Massachusetts, followed by Rhode Island (Figures 2 and 3). The majority of these landings are coming from the Southern New England management area, followed by Georges Bank (Figures 4 and 5).

In the absence of a stock assessment, it isn't possible to determine whether increased landings are market driven or a reflection of an increasing biomass. However, reduced fisheries dependent and independent catch per unit effort (CPUE) data (Figures 6 and 7) may indicate that the biomass may be starting to decrease.

Further, offshore fishing for crab in the absence of a lobster permit or trap tags, which is presently permissible, threatens the lobster industry's effort control plan and conservation measures to reduce whale and other mammal interactions.

Finally, there are no protections in place for undersized or female Jonah crab to preserve a fecund population of crabs that will ensure a sustainable population in perpetuity.

In the absence of effective and robust control measures for the harvest of Jonah crab, the fishery will be harvested unsustainably. The consequences will be dire for fishermen who rely on Jonah crab for their livelihoods, and for the seafood processors that have invested in processing capacity and building markets for Jonah crab products.

# Jonah Crab Fishery

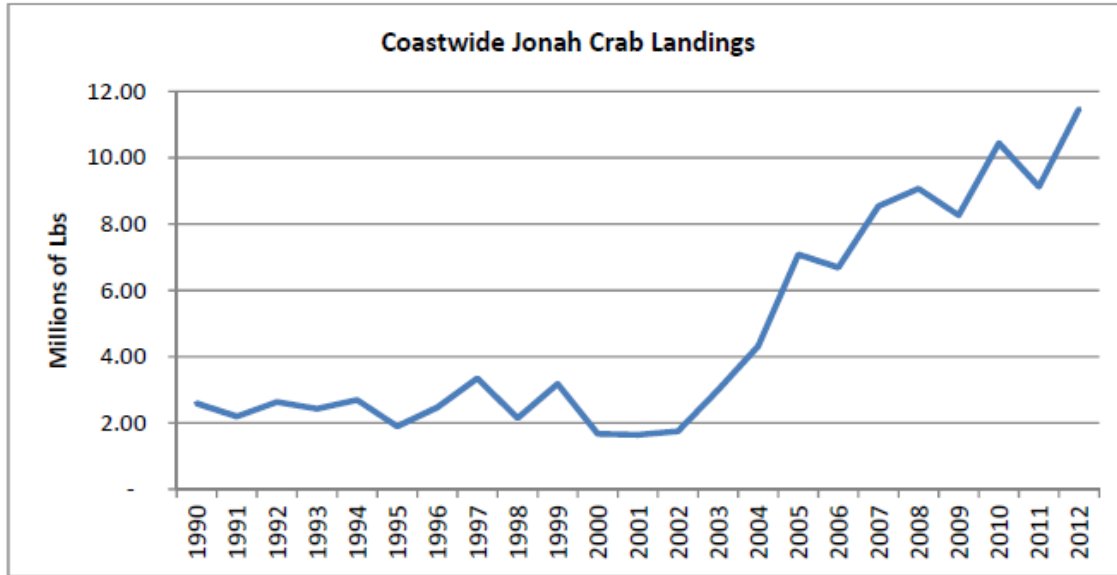


Figure 1: Coast-wide (all states) landings of Jonah crabs 1990-2012, as reported by the Atlantic Coastal Cooperative Statistics Program (ACCSP). Heidi Henninger, Atlantic Offshore Lobsterman's Association (AOLA).

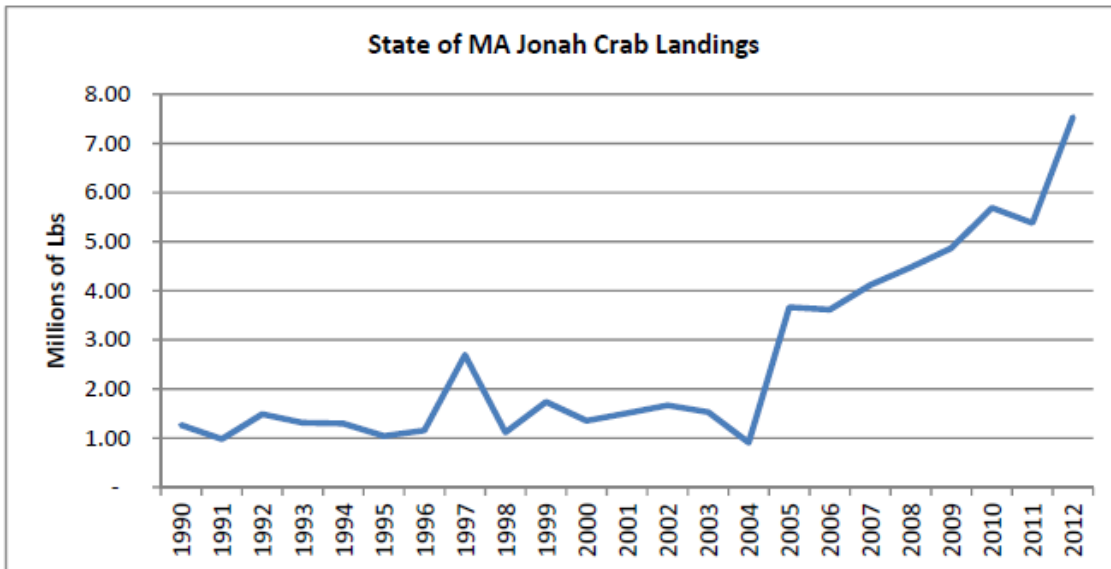


Figure 2: State of Massachusetts landings of Jonah crabs 1990-2012, as reported by ACCSP. Heidi Henninger, AOLA.

# Jonah Crab Fishery

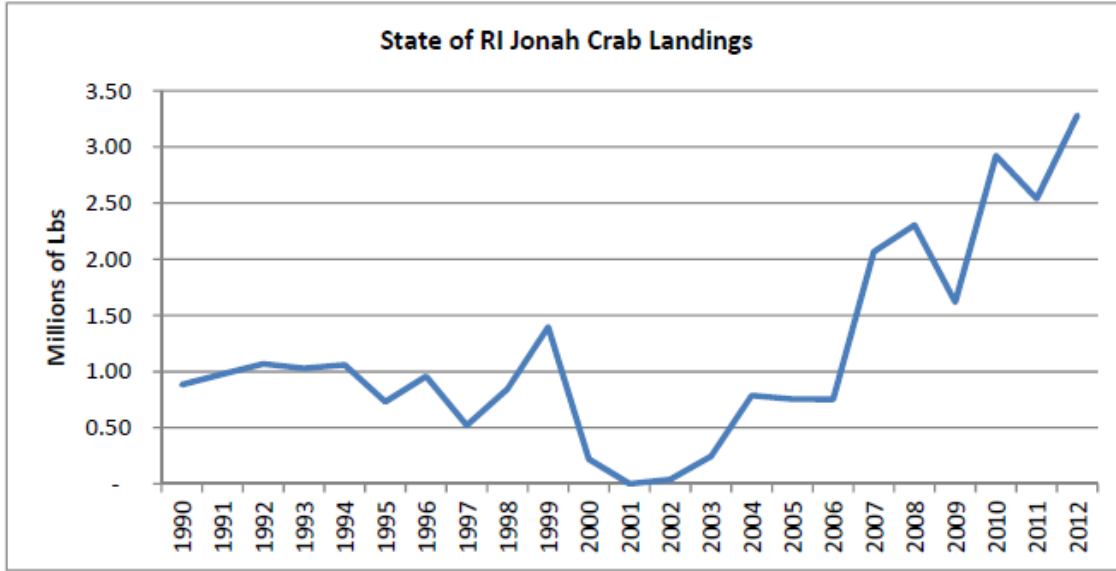


Figure 3: State of Rhode Island landings of Jonah crab 1990-2012, as reported by the ACCSP. Heidi Henninger, AOLA.

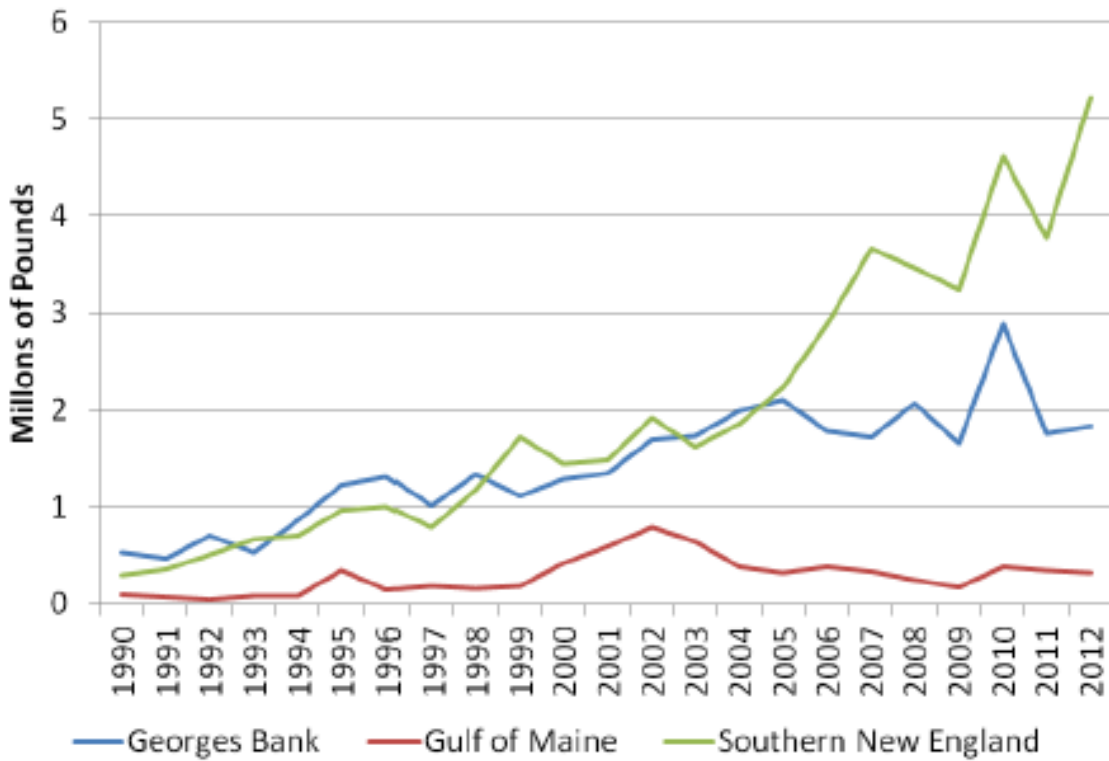


Figure 4: Massachusetts Cancer crab landings (Jonah and rock crabs) by region, 1990-2012.

# Jonah Crab Fishery

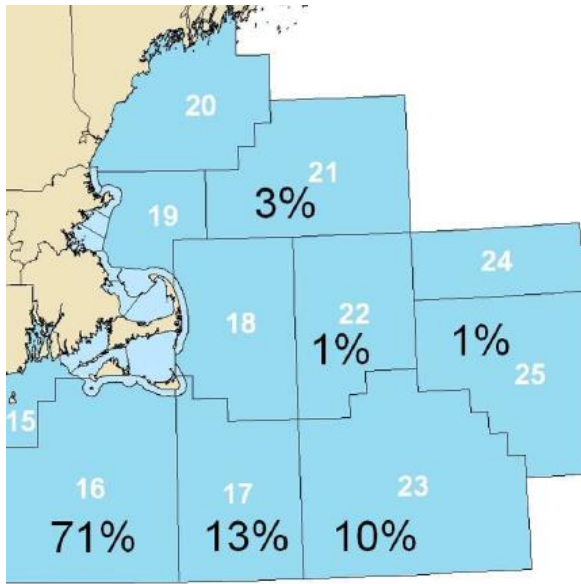


Figure 5: Percentage of Jonah crab landed in Massachusetts by MA Statistical Reporting Areas (SRA) (white numbers), 1990-2012. All areas without a given percentage are <1% of landings. The lighter blue shaded areas are SRA 1 through 14 and collectively are responsible for 1% of all MA Jonah crab landings.

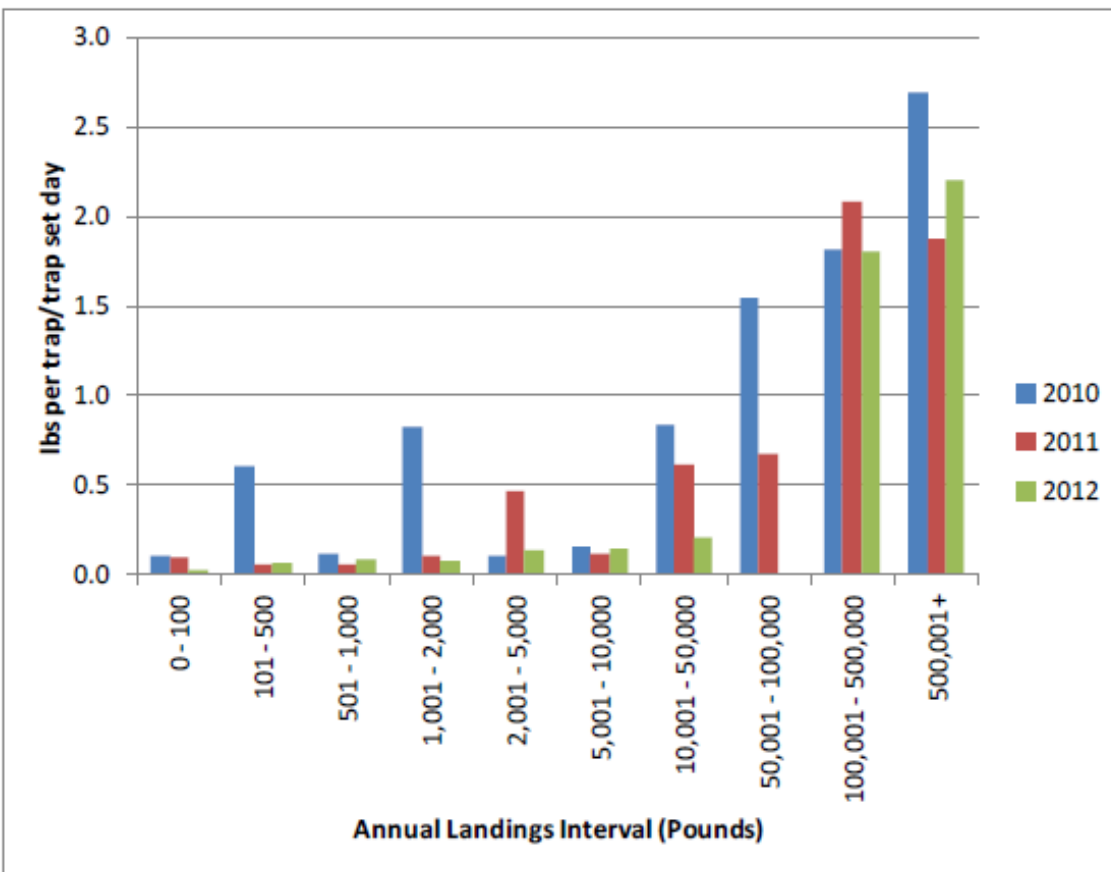


Figure 6: Catch per unit of effort (CPUE) data by landings interval (from DMF trip level reporting and NMFS VTR data).



# Jonah Crab Fishery

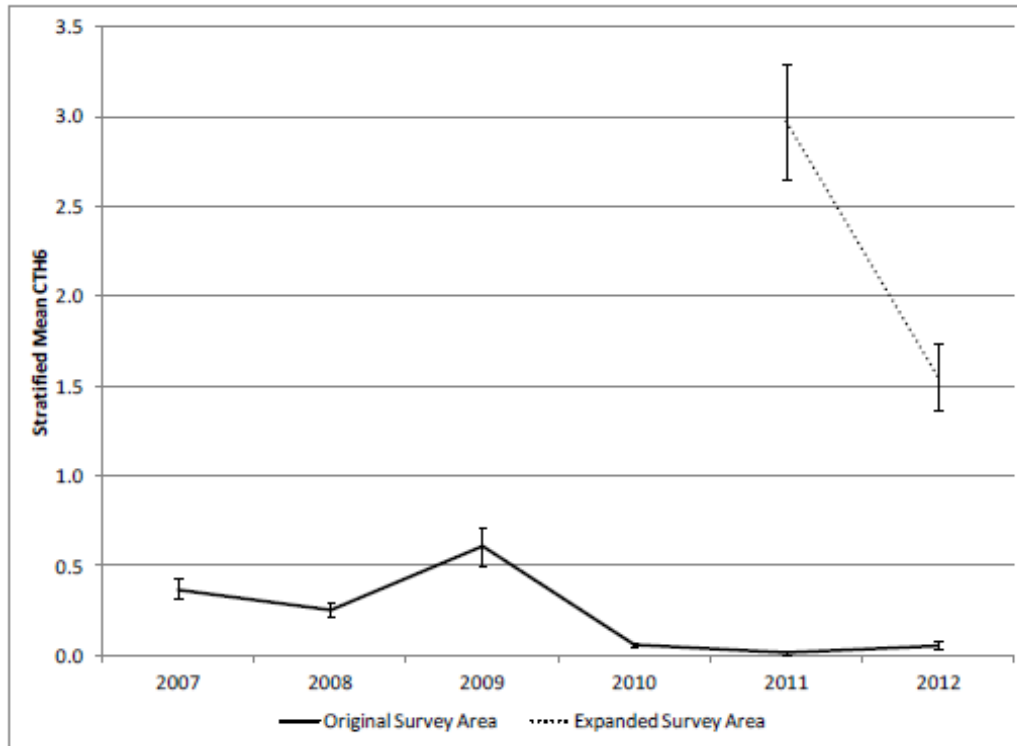


Figure 7: Jonah crab catch per trap haul from MA DMF Ventless Trap Survey. The original survey area was done in state waters; the expanded survey was conducted in both state and federal waters. Error bars around the data points are standard error.

## Jonah Crab Management

Jonah crab is managed differently from state to state, and management is completely absent in federal waters. The table below is a summary of state-by-state management measures for Jonah crab.

In Massachusetts and Rhode Island – the states with the highest Jonah crab landings – there is no minimum landing size. There is also no commercial limit to the amount of Jonah crab that can be harvested, and traps are limited only when harvested with lobsters. In federal waters, when fishermen do not harvest lobsters, there are no licensing requirements and no trap limits for Jonah crab. There exist no protections for female Jonah crab.

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Summary of Federal and State Crab Regulations	Limit on Trap Qty	Gear Restrictions	Limit on Trap Size	Commercial License required Y/N	Minimum landing Size	Maximum Landing Size	Sex Restrictions	Closed seasons	Closed Areas
<b>New Jersey</b>	N	biodegradable panel	Y	Y	3" - 4.5" varies by hardness (per blue crab regs)	N	No egg bearers	Y	Y
<b>New York</b>	N	escape panel	Y	N	3" - 4.5" varies by hardness (per blue crab regs)	N	No egg-bearers	N	Y
<b>Massachusetts</b>	Y - Lobster limit	Y - Lobster traps	Y-lobster traps	Y	N	N	No egg bearers	Yes; closed Jan 1 - Apr 30 in state waters	N
<b>Maine</b>	Y - Lobster limit	Y - Lobster traps	Y-lobster traps	Y	N	N	None indicated	Dec 30 - Apr 1 in rivers	Y
<b>Rhode Island</b>	N	N	N	Y	N	N	No egg-bearers	N	N
<b>New Hampshire</b>	Y - lobster limit 1200	Y - Lobster traps	Y-lobster traps	Y	N	N	None indicated	N	N
<b>Connecticut</b>	?	Y - lobster trap	Y-lobster traps	Y	3.5" - 5" varies by hardness (per blue crab and lobster regs)	N	No egg bearers	May 1 - Nov 30; commercial closed Dec 1 - Apr 30	N
<b>Maryland</b>	N	Turtle BRD (juvenile), escape vent	Y	N	3.5" - 5" varies by hardness (per blue crab and lobster regs)	N	Comm no females at certain times, Rec no females	Y, opens Apr 1 - Dec 15	Y
<b>Virginia</b>									

# Jonah Crab Fishery

Summary of Federal and State Crab Regulations (con't)	Commercial Catch Reporting	Harvest Limits Commercial	Harvest Limits Recreational	Recreational License required Y/N	Recreational Limit on Trap Qty	Notes	Source(s)
<b>New Jersey</b>	Y	N	One bushel per day	Y	Y	Blue Crab Regs	<a href="http://www.state.nj.us/dep/fgw/niregs.htm">http://www.state.nj.us/dep/fgw/niregs.htm</a>
<b>New York</b>	Y	50/day	50/day	N	N	Blue Crab Regs	<a href="http://www.dec.ny.gov/outdoor/7894.html">http://www.dec.ny.gov/outdoor/7894.html</a> ; <a href="http://www.dec.ny.gov/outdoor/fishing.html">http://www.dec.ny.gov/outdoor/fishing.html</a>
<b>Massachusetts</b>	Y	N	25/day	N for hand harvest; Y if trap or SCUBA	10 traps	Rec: Blue Crab Regs, applied to other species; Commercial: lobster regs	<a href="http://www.mass.gov/eea/agencies/dfg/dmf/laws-and-regulations/recreational-regulations/">http://www.mass.gov/eea/agencies/dfg/dmf/laws-and-regulations/recreational-regulations/</a> ; <a href="http://www.mass.gov/eea/agencies/dfg/dmf/laws-and-regulations/commercial-regulations/">http://www.mass.gov/eea/agencies/dfg/dmf/laws-and-regulations/commercial-regulations/</a>
<b>Maine</b>	Y	200 lbs./day or 500 lbs./trip	N	N/Y	5 traps; no license for hand harvest	Lobster Regs	<a href="http://www.maine.gov/ifw/fishing/regulations_seasons/index.htm">http://www.maine.gov/ifw/fishing/regulations_seasons/index.htm</a> ; <a href="http://www.maine.gov/dmr/lawsandregs/re">http://www.maine.gov/dmr/lawsandregs/re</a>
<b>Rhode Island</b>	Y	N	N	Y	N		Scott Olszewski <a href="http://www.wildlife.state.nh.us/Fishing/fishing.htm">http://www.wildlife.state.nh.us/Fishing/fishing.htm</a> ; <a href="http://www.wildlife.state.nh.us/pubs/digests/SW_2011.pdf">http://www.wildlife.state.nh.us/pubs/digests/SW_2011.pdf</a>
<b>New Hampshire</b>	Y	N	N	Y if more than 12 crabs taken	?		
<b>Connecticut</b>	Y	N	N	Y	10 traps hauled per day	Blue Crab regs; Lobster Regs incl other crab	<a href="http://www.ct.gov/dep/cwp/view.asp?a=2696&amp;q=322740&amp;depNAV_GID=1647; Matt Gates">http://www.ct.gov/dep/cwp/view.asp?a=2696&amp;q=322740&amp;depNAV_GID=1647; Matt Gates</a>
<b>Maryland</b>	Y	25 bushels per vessel/day	Y, varies 1 bushel hard crabs, 2 doz soft	N/Y	N, limited harvest qty	Blue Crab Regs	<a href="http://www.dnr.state.md.us/fisheries/regulations">http://www.dnr.state.md.us/fisheries/regulations</a>
<b>Virginia</b>	Y						<a href="http://www.dgif.virginia.gov/fishing/">http://www.dgif.virginia.gov/fishing/</a>

## Current Data Collection Programs

Data collection for Jonah crab varies from state to state and survey to survey. Appendix B of the attached MSC pre-assessment (Appendix A) includes a comprehensive overview of data collected on Jonah crab. A great deal of data, albeit inconsistent, exists for Jonah crab. Unfortunately, because this fishery has been considered a low priority, very little of it has been analyzed.

The only survey that exists for Jonah crab applies to only inshore Rhode Island waters. The University of Rhode Island and Rhode Island Department of Environmental Management conduct an annual survey of the abundance of Cancer crab species. The 2012 Rhode Island state assessment indicated that the fishing mortality rate in the state fishery exceeded  $F_{MSY}$ , but the biomass had not fallen below  $B_{MSY}$  and was not considered overfished (RIDEM 2012<sup>1</sup>). After a

<sup>1</sup> Rhode Island Department of Environmental Management, 2012. 2013 Management Plan for the Crustacean Fishery Sector.

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stable fishing mortality rate from 1971 to 2004, the Rhode Island Jonah and rock crab fishery has experienced a sharp increase in fishing effort and decrease in crab abundance.

Massachusetts, Maine, and New Hampshire conduct inshore trawl surveys, but these surveys only provide minimal data on crab species and are primarily used to assess finfish species and none of these surveys are conducted in the federal waters south of New England where approximately 75% of the commercial fishery is executed. The federal trawl survey also offers a time series of Cancer crab abundance and distribution data, distinguished by species, although the data have not yet been analyzed.

Fishery dependent data is comprised of landings data. Unfortunately, it is likely that Jonah crab are confused for other types of crabs in reporting, thus compromising the reliability of that data.

## Biology

For the fishery overall, biological reference points are unknown, as are geographical differences in size, fecundity, and recruitment.

Also, the size at sexual maturity and to what extent it might vary from one area to the next is poorly documented. In a study conducted in Canada, the size at 50% morphometric maturity for males was determined to be 127.6mm (5.02”) CW (Moriyasu et al, 2002<sup>2</sup>). Existing minimum size restrictions in the Bay of Fundy and the Scotian Shelf for Jonah crab are 121mm and 130mm (4.76” and 5.12”) respectively. Little is known about female maturity in Canada, but the size at 50% maturity is believed to be around 92 mm (3.62”) CW and females can reach a maximum size of 150 mm (5.91”) CW (Pezzack et al. 2011<sup>3</sup>). Male maturity off of Virginia is estimated to be 90-100 mm (3.54-3.94”) and approximately 85 mm (3.35”) for females (Carpenter 1978<sup>4</sup>, Wenner et al. 1992<sup>5</sup>).

What little maturity data exists on Jonah crabs comes from the fringes of their commercially exploitable range. No data exists in the offshore area south of New England where approximately 75% of the commercial fishery currently operates. Male Jonah crabs reach

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<sup>2</sup> Moriyasu M, Benhalima K, Duggan, D, Lawton P, Robichaud D (2002) Reproductive biology of male Jonah crab, *Cancer borealis* Stimpson, 1859 (Decapoda: Cancridae) on the Scotian Shelf, Northwestern Atlantic. *Crustaceana* 75: 891-913.

<sup>3</sup> Pezzack, D. S., C.M. Frail, A. Reeves, M. J. Trembley. 2011. Assessment of the LFA 41 Offshore Jonah crab (*Cancer borealis*) (NAFO 4X and 5Zc). DFO Can. Sci. Advis. Sec. Res. Doc. 2010/113:vii-52.

<sup>4</sup> Carpenter, R. K. 1978. Aspects of the growth, reproduction, and abundance of the Jonah crab, (*Cancer borealis*) Stimpson, in Norfolk Canyon and the adjacent slope. MA Thesis, University of Virginia, Charlottesville.

<sup>5</sup> Wenner, E. L., C.A. Barans, G. F. Ulrich. 1992. Population structure and habitat of Jonah crab, *Cancer borealis* Stimpson 1859, on the continental slope off the Southeastern United States. *Journal of Shellfish Research* 11(1):95-103.

<sup>6</sup> Shields J. D. 1993. The reproductive ecology and fecundity of *Cancer* crabs. In: Wenner A, Kuris A (eds) *Crustacean issues vol. 7—crustacean egg production*. A. Balkema, Rotterdam.

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maturity at a larger size in Canada (5") than they do in Virginia (4"). Northern hemisphere congeneric crab species also reach maturity at larger sizes in more northerly sections of their range (Shields 1993<sup>6</sup>), making it likely that the size of male maturity is between 4 and 5" where most of the commercial fishery is conducted.

Jonah crab is an assessed species in Canada for the small bycatch fishery in the eastern Gulf of Maine and Southeast Nova Scotia. There may be additional biological data that can be procured from their assessment, but likely not much.

### Value of the Jonah Crab Fishery

The impact of size and other restrictions on the market for Jonah crab is an important consideration. In Massachusetts, Jonah crab was the 5<sup>th</sup> most valuable species landed in 2013 (Table 1). According to 2012 data from the National Ocean Economics Program, the ex-vessel value of Jonah crab in New England was \$8,086,559 (average \$0.71/pound), which was up from \$5,530,388 (average \$0.61/lb) just the year before. The steady increase in the fishery's value is depicted in Figures 8 and 9 below.

Species	Pounds (Whole)**	Value
Scallop, Sea	244,404,049	\$333,047,038
Lobster, American	14,956,166	\$60,216,990
Oyster, Eastern	10,539,126	\$10,291,065
Goosefish	9,589,132	\$8,937,279
<b>Crab, Jonah</b>	<b>10,070,775</b>	<b>\$8,930,604</b>
Flounder, Winter	5,388,992	\$8,775,488
Herring, Atlantic, Sea	76,375,477	\$8,727,482
Cod, Atlantic	4,142,359	\$8,303,059
Pollock, Atlantic	7,934,667	\$7,655,851
Haddock	3,975,609	\$5,556,242

Table 1: Ten most valuable Massachusetts fisheries from Standard Atlantic Fisheries Information System (SAFIS) for 2013.

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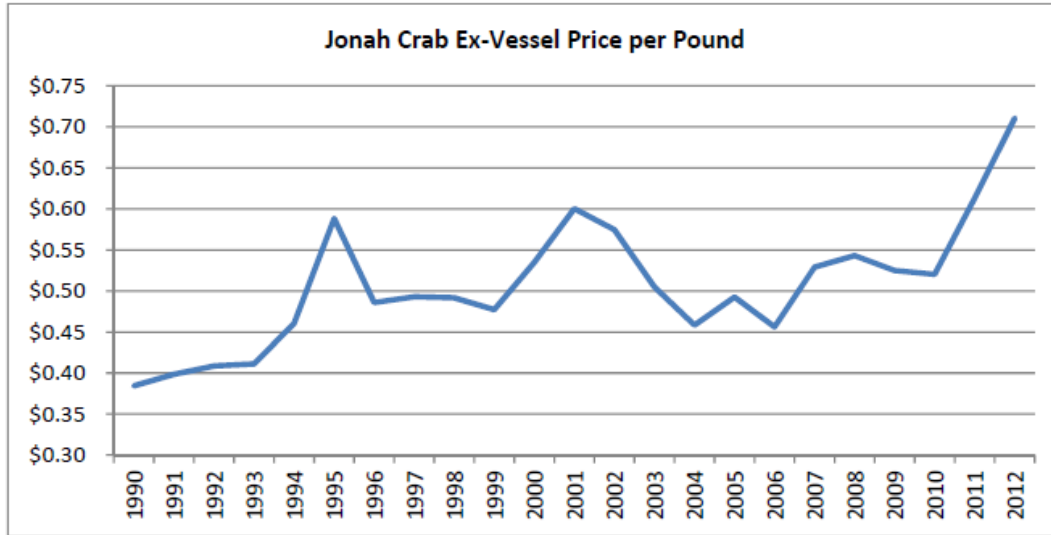


Figure 8: Coastwide (all states) ex-vessel price per pound of Jonah crab 1990-2012, as reported by the ACCSP. Heidi Henninger, AOLA.

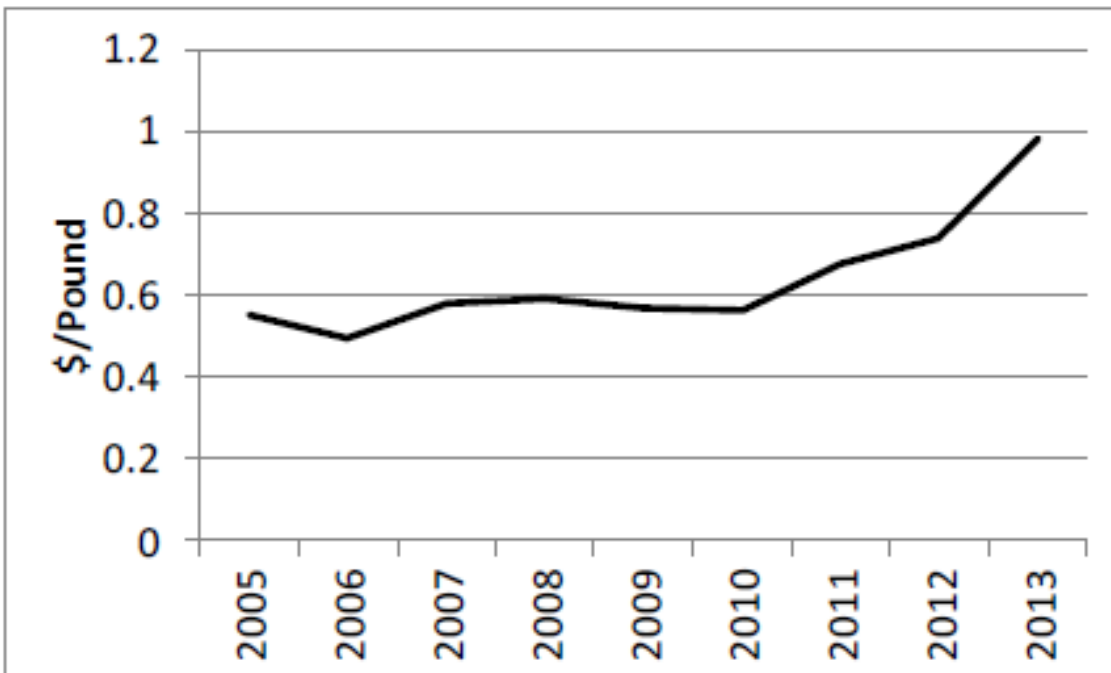


Figure 9: Price per pound for Jonah crab landed in MA from SAFIS.

## FIP Work Group Recommendations

The Jonah Crab FIP Work Group met seven times (five in person and two by phone) to discuss the threats to the Jonah crab fishery and to develop recommendations that would protect this valuable resource from overexploitation. These discussions were informed by contracted data

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collection done by the University of Maine and GMRI, which culminated in a pre-assessment against MSC criteria (Appendix A).

Following are the Work Group's management and data collection recommendations, which are also outlined briefly in the attached Work Plan (Appendix B).

## Data Collection Recommendations

- Develop a standard list of data points that are recommended for all surveys, including:
  - Documentation of egg-bearing individuals.
  - Documentation of size of individuals captured (i.e., carapace width).
  - Abundance (i.e., how many were caught).
  - Weight of catch.
  - Sex of individuals caught.
  - Specifications on gear being used.

*Justification: While data for Jonah crab are presently sporadic, there are numerous opportunities through existing and ongoing state and federal surveys to collect a robust data set that can inform Jonah crab fishery management. Having a shared protocol will enable this data to be integrated and analyzed throughout the fishery's region.*

- Develop a sub sampling protocol for fishery-dependent data collection done by observers, including sizes and sexes of the individuals landed versus discarded.

*Justification: To better understand the Jonah crab stock structure, particularly from one area to the next, information about what is discarded at sea is essential, in addition to what is landed.*

- Analyze survey data to determine size at maturity for females by comparing egg-bearing females with size data; and
- Conduct research to determine size-specific fecundity (clutch size) and evaluate the geography of size at maturity; and
- Conduct research to determine whether there is a significant difference between the size at physiological maturity and functional maturity in males. The question is whether males must be considerably larger than females to mate with females. The concern is whether harvesting large males will deplete the pool of large males competent to mate.

*Justification: The literature on size at sexual maturity for Jonah crab is lacking. While some research has been done to indicate female Jonah crab are sexually mature at 3.5" CW and males at 5.02", very little is known about whether there are variations in size at sexual maturity from one harvest area to the next, including no information from where the majority of the commercial catch is currently caught.*

## Management Recommendations

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- Incorporate the management of Jonah crab into the lobster management plan through the ASMFC; and
- Tie the harvest of Jonah crab with the lobster license and trap tagging requirements. Require a lobster license in order to harvest Jonah crab. In the absence of a lobster license, require a license for the harvest of Jonah crab.

*Justification: The Jonah crab and lobster fisheries in offshore waters are inextricably tied, as licensed lobstermen presently harvest 98.3% of the Jonah crab landed from federal waters for the region (personal communication, Burton Shank, NOAA Fisheries Science Center, November, 2013). Requiring a lobster license and trap tags for Jonah crab harvest would retain that connection while respecting and building on conservation measures already in place in the lobster fishery, such as trap density reductions.*

*Massachusetts, Maine, and New Hampshire already tie Jonah crab harvest to lobster licenses. The lobster fishery is managed under effort controls that address whale entanglement issues. By tying the harvest of Jonah crab to the existing lobster management plan, managers would avoid increasing trap numbers, additional costs to states for plan development and enforcement, and determining resource allocation for the Jonah crab fishery.*

*Further, at this point in time, there is not enough information to determine a separate FMP for Jonah crab. For example, there would be very little data that would inform a TAC.*

- Require all Cancer crab landed to be reported by species. Educate harvesters and dealers to achieve consistent species identification.

*Justification: Existing data on Jonah crab landings is suspect because of inconsistent reporting by species. Fishermen and dealers use many common names for Cancer crabs interchangeably. Any future stock assessment using fishery-dependent data will require accurate and complete landings data.*

- Require a 5" minimum CW for Jonah crab.

*Justification: In the absence of a minimum size restriction for Jonah crab and the preservation of brood stock, the population is at risk of long-term unsustainability. The scientific advisors on the Jonah crab FIP Work Group (Burton Shank, NOAA; Rick Wahle, University of Maine; and Derek Perry, Massachusetts DMF) agree that, based on the best available science regarding size at sexual maturity, a 5-inch minimum CW would maintain reproductive capacity in the fishery. From a market perspective, processors have indicated that they do not want to purchase crabs that are smaller than 5.25" CW, while dealers of live crab have indicated that a minimum harvest size of 5" would reflect a marketable size (per personal communication with three Jonah crab processors and one live dealer). While interviews with Jonah crab buyers indicate little interest in crabs smaller than 5" CW, markets are emerging that warmly welcome smaller crab, including for use as bait. While the FIP Work Group does not recommend rules restricting Jonah crab from being used as bait, it*



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*does maintain that all restrictions (e.g., minimum size) be applied for harvest of all Jonah crab, regardless of its ultimate use.*

- Prohibit the harvest of female Jonah crabs.

*Justification: The protection of females in the Jonah crab fishery is a critical factor in ensuring long-term sustainability of the fishery. This recommendation is consistent with existing rules in the lobster fishery. A 5" CW size restriction would protect most female crabs from harvest, as very few females exceed this size. However, the Work Group wants to be explicit that protection of female crabs is of utmost importance. In particular, the Work Group recommends a zero tolerance for egg-bearing Jonah crab.*

- Consider a tolerance level for the enforcement of rules.

*The majority of the Work Group members recommend designating a tolerance level for the enforcement of the minimum size restriction, because it will likely not be possible to measure each individual given the numbers landed per trip. Previous attempts to measure Jonah crab with calipers and measuring boards have demonstrated that Jonah crabs are very difficult to measure even if there were small volumes (i.e., three people using a measuring board have recorded three different measurements for the same crab).*

*There is precedent in other fisheries for tolerance levels (See Appendix E, Crab Species With Tolerances, for a summary). The tolerance level should be set to allow for mistakes, while also avoiding a leniency that allows for significant harvest of undersized product, as has also been observed in other fisheries (i.e., fishermen have been observed to fish right up to the tolerance level, basically resulting in a decreased size restriction). For the enforcement of a 5" size restriction on male crab, the Work Group recommends a tolerance between 1% and 10%. For female crab, the Work Group recommends a tolerance not to exceed 1%. The Work Group recommends a zero tolerance on the harvest of egg-bearing females.*

*The Work Group also requests that the ASMFC includes options for sampling protocols developed by enforcement in the informational documents that go out for public comment. These protocols should include a sufficient sample size that is statistically representative of the catch being audited.*

## **! Emergency Measure Recommendation**

The Jonah Crab FIP Work Group is increasingly concerned that a robust market for smaller female Jonah crab already exists and is growing. The group requests that the ASMFC consider implementing an interim measure prohibiting the possession of female Jonah crab (with a 0.5-1% enforcement tolerance). The process of establishing a management plan for Jonah crab is likely to take a couple of years, at which point the long-term reproductive capacity might already be seriously compromised.

## **List of Appendices**

**Appendix A: MSC Pre-Assessment**

**Appendix B: Jonah Crab FIP Work Plan**

**Appendix C: Guidelines for Supporting Fishery Improvement Projects**

**Appendix D: Summary of NGO and Retailer and Food Service Partnerships**

**Appendix E: Crab Species With Tolerances**

# Jonah Crab Fishery

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## **Appendix A: MSC Pre-Assessment**

**SEE SEPARATE ATTACHMENT: *Jonah Crab Pre-Assessment November 1 2013***

# Jonah Crab Fishery

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## Appendix B: Jonah Crab FIP Work Plan

### Jonah Crab Fishery Improvement Project 2014 Workplan

*Updated: March 28, 2014*

#### *Participants*

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Chair: Ray Swenton, Bristol Seafood  
David Borden, Atlantic Offshore Lobstermen's Association  
Josanna Busby, Delhaize America  
Lanny Dellinger, Rhode Island Lobstermen's Association  
Bill Gerencer, M.F. Foley Company  
Adam LaGreca, Rome Packing  
Derek Perry, Massachusetts Division of Marine Fisheries  
David Spencer, F/V Nathaniel Lee  
Steve Train, Atlantic States Marine Fisheries Commission  
Rick Wahle, University of Maine  
Jon Williams, The Atlantic Red Crab Company

#### *Status of the Fishery*

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- The status of the Jonah crab fishery is unknown as there is no stock assessment for Jonah crab.
- The management and governance for the Jonah crab fishery varies from state to state. Licensing is often, but not always, linked to the lobster fishery with input controls in place. In the federal management zones, harvest of Jonah crab is unregulated.
- Jonah crab is harvested using traps. Some landings are a result of bycatch in the lobster fishery. The majority of the volume landed is a result of directed harvest by lobster licensed fishermen with slightly modified traps to target crab.
- Available data on Jonah crab vary throughout the region and are not analyzed to develop an overall stock assessment.
- There are live markets and value-add markets for Jonah crab.

#### *Sustainability Needs*

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##### **Fishery-Independent Data Needs**

- More information about patterns of abundance by life stage (life history, including eggs and fecundity, spatial patterns over time, size at maturity data, maturity schedules, growth, and molt frequency).

# Jonah Crab Fishery

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- Understanding of whether the Jonah crab resource comprises multiple or single stocks, including a characterization of the inshore/offshore fisheries (need definitions).
- Seasonality, inter-annual variations, and environmental influences on Jonah crab distribution, size, and abundance.
- Analysis of trophic interactions, including Jonah crab food and predators to inform eventual ecosystem-based management.

## **Fishery-Dependent Data Needs**

- Clearly distinguishing Jonah crab from other crab species in reporting data.
- Information on performance of various gear types (e.g., vent sizes and shapes).
- Understanding the distribution of fishing effort, catch, landings, and types of gear used over time and space (including targeted versus bycatch) and what influences fishing effort (including price, availability, etc.).

## **Stock Assessment Need**

A stock assessment is a critical need to inform a management plan, including appropriate effort and size restrictions. The Jonah crab FIP Work Group recommends a regular analysis of the best available data in the form of a stock assessment, inclusive of the data needs identified above.

## **Fishery Management Plan Need**

A fishery management plan is necessary to ensure the long-term sustainability, and hence supply, of Jonah crab. Following are strategies and recommendations developed by the Work Group.

### *Strategies and Recommendations to Address Needs*

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## **Fishery Dependent and Independent Data**

- Develop a standard list of data points that are recommended for all surveys, including:
  - Documentation of egg-bearing individuals.
  - Documentation of size of individuals captured (i.e., carapace width).
  - Abundance (i.e., how many were caught).
  - Weight of catch.
  - Sex of individuals caught.
  - Specifications on gear being used.
- Develop a sub sampling protocol for fishery-dependent data collection done by observers, including sizes and sexes of the individuals landed versus discarded.

# Jonah Crab Fishery

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- Analyze survey data to determine maturity for females by comparing egg-bearing females with size data.
- Conduct a distinct research effort to compare number of eggs to size of individual in females to establish baseline. Attempt to capture geographically distributed samples to understand differences in geography and continue to monitor episodically (every two years at outset).
- Determine maturity schedules for males through distinct research experiments that analyze male physiological and functional maturity (e.g., through laboratory dissection).
- Require all Cancer crab landed to be reported by species. Educate harvesters and dealers to achieve consistent species identification.
- Solicit industry participants as data collectors.
- Optimize gear selectivity for sustainability and marketability.

## **Management**

- Incorporate the management of Jonah crabs into the lobster management plan through the ASMFC.
- Establish some baseline information to understand the fishery, including the proportion that is inshore versus offshore, how many harvesters have a lobster license, what gear is used (dominant gear type, different vent sizes), and the effort in the fishery (number of harvesters who are active, seasonal patterns, number of traps).
  - Pull data from each state/NOAA to describe landings, permits, active permits, effort, soak time, harvest locations, etc. Also identify information gaps.
- Tie the harvest of Jonah crab with the lobster license and trap tagging requirements. Require a lobster license in order to harvest Jonah crab. In the absence of a lobster license, require a license for the harvest of Jonah crab.
- Require a minimum size for Jonah crab based on the biological and market realities of the fishery.
- Prohibit the harvest of female Jonah crabs.

# Jonah Crab Fishery

**Table of Activity**

<b>Topic/Activity</b>	<b>Deliverables</b>	<b>Deadline</b>	<b>Status</b>
Project Start Up	Work Group and Participation Agreement made public.	January, 2014	Completed
	Web site with FIP information established.	January, 2014	Completed
	MSC Pre-assessment drafted and made public.	January, 2014	Completed
	Work Plan made public.	April, 2014	Not Completed
	Distribute work plan to management entities for review and feedback.	April, 2014	Not Completed
Implement a Management Plan	Letter to the ASMFC from the FIP Work Group with recommendations, including integration of Jonah crab into lobster management.	April, 2014	Not Completed
	Presentation at the May ASMFC meeting, including integration of Jonah crab into lobster management.	May, 2014	Not Completed
	Require a lobster license and trap tags to harvest Jonah crab. Manage according to the conservation measures in place for the lobster fishery, including trap reduction programs.	May, 2015	Pending ASMFC Review/Action
	Implement a 5" minimum size limit for Jonah crab harvest along with a maximum tolerance level for errors.	May, 2015	Pending ASMFC Review/Action

## Jonah Crab Fishery

	Require a male-only Jonah crab harvest.	May, 2015	Pending ASMFC Review/Action
Fill Data and Information Gaps	Develop protocols for data collection.	March, 2014	Not Completed
	Pilot implementation of data collection protocols.	August, 2014	Not Completed
	Require full reporting of Jonah crab landings.	May, 2015	Pending ASMFC Review/Action
	Assimilate and analyze available Jonah crab data.	September, 2014	Not Completed
	Solicit industry participants to capture needed data.	April, 2014	Not Completed
	Conduct research to compare number of eggs to size of individual in females to establish baseline. Attempt to capture geographically distributed samples.	June, 2015	Not Completed
	Determine maturity schedules for males through distinct research experiments that analyze male physiological and functional maturity (e.g., through laboratory dissection).	June, 2015	Not Completed
	Develop a Stock Assessment	May, 2017	Not Completed
Outreach and Communications	Host an industry stakeholder meeting to gather input.	November, 2013	Completed
	Update the Jonah crab FIP web site.	Ongoing	Completed
	Distribute an announcement to popular press and endemic media announcing the FIP.	February, 2014	Not Completed



# Jonah Crab Fishery

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## **Appendix C: Guidelines for Supporting Fishery Improvement Projects**

# Jonah Crab Fishery

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SIERRA CLUB BC • SUSTAINABLE FISHERIES PARTNERSHIP • VANCOUVER AQUARIUM • WORLD WILDLIFE FUND—US

## Guidelines for Supporting Fishery Improvement Projects

**Ratified by:** Blue Ocean Institute, David Suzuki Foundation, Ecology Action Centre, Environmental Defense Fund, FishChoice, FishWise, Living Oceans Society, Monterey Bay Aquarium, Natural Resources Defense Council, New England Aquarium, Ocean Conservancy, Shedd Aquarium, Sierra Club British Columbia, Sustainable Fisheries Partnership, Vancouver Aquarium Ocean Wise, World Wildlife Fund – U.S.

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Working together, conservation groups and the seafood industry can be a powerful force for improving the sustainability of seafood and the health of ocean ecosystems.

Members of the Conservation Alliance for Seafood Solutions support the efforts fisheries are making to improve the sustainability of their seafood products. There are many different ways to address management and environmental problems in fisheries, including policy change, targeted strategies such as bycatch reduction, and comprehensive fishery improvement projects. We believe all of these methods are valuable and play an important role in helping fisheries become more sustainable over time.

Recently, the seafood industry has expressed increasing interest in fishery improvement projects and members of the Conservation Alliance are often asked their position on this specific strategy. While members of the Conservation Alliance support efforts to help fisheries improve, it is important to ensure that fishery improvement projects that receive recognition in the marketplace are making measurable progress toward environmental sustainability. To be considered for recognition by members of the Conservation Alliance for moving toward sustainability, a fishery improvement project must take measureable steps within a defined timeframe to achieve a level of sustainability consistent with an unconditional pass of the Marine Stewardship Council standard.

The goal of this document is to define the kind of fishery improvement projects members of the Conservation Alliance will support and establish guidelines for communicating about these projects to buyer and consumer audiences.

This document includes:

- A brief explanation of the role seafood buyers can play in creating incentives for fisheries to address environmental problems;
- The Conservation Alliance's accepted definition of a fishery improvement project;
- The Conservation Alliance's accepted process for running a fishery improvement project that is eligible for recognition; and
- Guidelines for how the Alliance aims to recognize fishery improvement projects at different stages in the process.

This document is a first step toward defining how members of the Conservation Alliance will support fishery improvement projects. As work on this strategy evolves over time, we expect that our guidelines will evolve as well.

## The Role of Seafood Buyers in Improving Fisheries

In 2008, the Conservation Alliance released the [Common Vision for Environmentally Sustainable Seafood](#), a guide that outlines six steps businesses can take to develop and implement a sustainable seafood policy. One of these steps is for retailers, suppliers and processors to buy environmentally responsible seafood. To fulfill this step, buyers that purchase seafood from sources with serious environmental problems can pursue a variety of strategies to help those sources move toward sustainability. One such strategy is engaging suppliers, producers and other industry partners in a fishery improvement project.

If a company is unable to work with its seafood sources to improve their environmental performance, it can temporarily stop purchasing from these sources until improvements are made that meet the criteria required by the company's sustainable seafood purchasing policy. We recommend that companies that take this approach also convey the problem areas in the fishery that need to be addressed for sourcing to resume.

Fishery improvement projects need to be accountable for meeting specific milestones and deadlines for improvement. If a fishery does not make measurable improvements in its environmental performance over time, we recommend buyers and suppliers engaged in the improvement project stop buying seafood from that source.

The decision about whether to engage one's supply chain in an improvement project or stop buying until improvements are made rests with the buyer and will depend on the specific requirements of the company's sustainable seafood policy. Both approaches are legitimate when structured to create incentives for measurable, positive change in our oceans and seafood supply – which is the ultimate goal.

## Definition of a Fishery Improvement Project

A fishery improvement project is a multistakeholder effort to improve a fishery. These projects are unique because they utilize the power of the private sector to incentivize positive changes toward sustainability in the fishery. Participants may vary depending on the nature of the fishery and the improvement project, and may include stakeholders such as producers, nongovernmental organizations, fishery managers, government and members of the fishery's supply chain.

The ultimate goal of a fishery improvement project is to perform at a level consistent with an unconditional pass of the MSC standard. However, we recognize that for some fisheries performance at this level is a long-term goal and we do not control a fishery's decision to pursue certification.

A fishery improvement project must have the following characteristics:

- Draw upon market forces, which might include suppliers, retailers, food service, fishing industry, etc., to motivate fishery improvements.
- A workplan with measureable indicators and an associated budget.
- Explicit willingness from participants to make improvements (e.g., a signed memorandum of understanding, email correspondence stating a commitment, etc.).
- Willingness from participants to make the investments required to make improvements as outlined in the workplan and budget.
- A system for tracking progress.

# Jonah Crab Fishery

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To be considered for public recognition for moving toward sustainability, an improvement project must have the characteristics listed above and also:

- Have a scoping document completed by a third party experienced with applying the Marine Stewardship Council Fishery Assessment Methodology (see step one, below).
- Have a workplan specifically designed to address deficiencies in the fishery to achieve a level of sustainability consistent with an unconditional pass of the MSC standard (see step two, below).
- Employ a system for tracking and reporting progress against the indicators in the workplan (see step three, below).
- Include active participation by supply chain companies, at a minimum local processors and exporters.

## Process for Fishery Improvement Projects

To be considered for recognition for moving toward sustainability, fishery improvement projects must follow the process described below.

### STEP ONE – Scoping

During the scoping phase, the fishery's performance is reviewed against the MSC standard and any other potential areas of concern in the fishery that have been identified. The scoping phase includes:

- **A stakeholder mapping and engagement process.** Identify which parties make most sense to bring into the process. Consider who will play an essential role in making improvements in the fishery including government representatives, industry (fishers, processors, exporters, etc.), environmental NGOs and the scientific community.
- **An MSC pre-assessment.** Conduct an MSC pre-assessment to determine where the fishery falls short of the MSC standard. This assessment must be completed or audited by an entity accredited to apply the MSC's Fishery Assessment Methodology.
- **A scoping document/white paper.** Develop a synthesis of the assessment and potential strategies the fishery could implement to increase its sustainability.

### STEP TWO – Workplan Development

Based on the scoping document, a workplan is developed that lists the activities that will help the fishery meet the deficiencies identified in the MSC pre-assessment. Workplans include:

- **A list of activities.**
- **Responsible parties.** Organizations/people responsible for completing each activity.
- **Timeframes.** An estimate of the timeframe needed to complete each activity (e.g., < six months, six to 12 months, 12 months+).
- **Metrics and key performance indicators.** Milestones to enable the project participants to track progress, or lack thereof, over time and to communicate about the changes in the fishery.
- **An associated budget.** Costs and funding opportunities for each activity as appropriate. There are generally two sets of costs: (1) process costs (e.g., costs associated with developing the scoping document, holding stakeholder meetings, developing the workplan), and (2) implementation costs (e.g., costs for the fishery to actually make changes).

See Appendix A for a template workplan (*in progress*).

## STEP THREE – Implementation and Tracking Progress

The implementation phase includes:

- **Implementing the workplan.**
- **Tracking and reporting on progress.** Progress should be reported publicly every three to six months according to the objectives and timeline outlined in the workplan. Additional reporting may occur if significant milestones are met in the interim.

We recognize that the tracking of implementation is a work in progress. The key goals of tracking are to ensure fishery improvement projects adhere to the definition above and make progress against the milestones laid out in the workplan, and the work is as transparent as possible. This will include a move to make pre-assessment public moving forward. Organizations managing improvement projects must aim to track progress so that they can credibly and publicly report:

1. The actions taken by the project to encourage improvements;
2. The impact of these actions, in terms of changes in fisheries policy, management or fishing practices;
3. The results on the water.

## Recognizing Fishery Improvement Projects

Recognition of fishery improvement projects can help to engage additional seafood businesses in existing projects as well as spur demand from buyers and suppliers for new projects to improve other fisheries with environmental problems.

We will strive to communicate about improvement projects that meet the definition and process for potential recognition outlined in this document according to the conditions in the chart below. NGOs and their business partners may choose to engage with FIPs meeting the minimum requirements for FIPs (first set of bullets in "Definition" section of document) to encourage these fisheries to further develop FIPs that meet the full definition.

The ultimate decisions about engaging their supply chain, sourcing from or communicating about fishery improvement projects rests with companies and will depend on the requirements of their sustainable seafood policies. Consequently, we will present options and make recommendations to our buyer partners according to the guidelines below but cannot require or guarantee their specific actions.

To enable communication with buyers and consumers about fishery improvement projects, it is the responsibility of organizations coordinating the projects to provide timely information on their development, progress and conclusion. The workplan and, if possible, the scoping document or MSC pre-assessment must be available for Alliance members to review prior to communicating with buyer partners about options for sourcing from an improvement project.

When sourcing from a fishery in an improvement project, it is important to be able to trace the product back to the specific fishery in order to distinguish it from other products in the marketplace. We recommend that all fishery improvement projects include a path toward traceability in their workplans, particularly when the improvement project covers only a segment of a larger fishery.

# Jonah Crab Fishery

		Fishery Improvement Project Stage		
		Step One: Scoping	Step Two: Workplan	Step Three: Implementation
		FIP is in development and areas of concern are identified	FIP has completed its workplan and made it publicly available	FIP is making progress according to the indicators and timelines in its workplan, achieving milestones such as policy changes, improvements in fishing practices, or impact on the water
NGO Activity	Communicate as appropriate with relevant buyers that a FIP is in development and present options for them to engage their supply chain	√	√	√
	Present options for relevant buyers to make strategic procurement decisions*	√	√	√
	Provide options for buyers to communicate about the FIP to consumers if they are procuring the product		√	√
	Profile the FIP in NGO consumer-facing communications that provide an opportunity to tell the story of the FIP			√
	Integrate key milestones into relevant seafood ranking reports			√

\* As mentioned above, a company's decision about which products to buy will be based on the requirements of its sustainable seafood sourcing policy. These policies may allow companies to source from a fishery engaged in an improvement project or may require that a company discontinue sourcing until the fishery achieves a verified level of environmental performance. Because these policies differ by company, members of the Conservation Alliance will present "strategic procurement options" according to the specific stage of the improvement project:

- In **Step One**, companies may continue to source from a fishery where an improvement project is in development to incentivize progress or discontinue purchasing until improvements are made. We will not recommend that companies shift their purchasing to the fishery developing the improvement project at this stage.
- In **Steps Two and Three**, companies may continue to source from the fishery in the improvement project, shift their sourcing to the fishery in the improvement project, or discontinue purchasing until improvements are made.
- **At any stage**, we recommend that companies that discontinue sourcing convey the problem areas in the fishery that need to be addressed for sourcing to resume.

## Jonah Crab Fishery

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When a fishery improvement project ends, Alliance members will make individual decisions about whether to recommend that companies continue, start or refrain from sourcing from the fishery. These decisions will be based on the level of sustainability the fishery can be verified to achieve, each organization's criteria and the procurement policies of buyer partners. If the recommendation is to refrain from sourcing, we recommend that Alliance members or their buyer partners communicate the additional improvements that are needed in the fishery's environmental performance to change the recommendation.

## Jonah Crab Fishery

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### Appendix D: Summary of NGO and Retailer and Food Service Partnerships

<b>Retailer</b>	<b>NGO Partner</b>	<b>Retailer</b>	<b>NGO Partner</b>
<b>Walmart</b>	WWF, SFP	<b>Metro</b>	Greenpeace Canada
<b>Costco</b>	WWF	<b>BJ's Wholesale</b>	SFP
<b>Kroger</b>	WWF	<b>Giant Eagle</b>	SFP
<b>Supervalu</b>	WWF	<b>Whole Foods</b>	MBAq, MSC
<b>Safeway</b>	Fishwise	<b>Aldi</b>	SFP
<b>Loblaws</b>	WWF	<b>Wegman's</b>	SFP
<b>Publix</b>	SFP	<b>Raley's</b>	SFP
<b>Ahold</b>	New England Aquarium		
<b>Delhaize</b>	Gulf of Maine Research Inst.		
<b>Meijer</b>	SFP		
<b>Sobey's</b>	SFP		

<b>Company</b>	<b>NGO Partner</b>
<b>McDonald's</b>	SFP
<b>Compass Group</b>	Monterey Bay Aquarium
<b>Aramark</b>	Monterey Bay Aquarium
<b>Sodexo</b>	MSC
<b>Darden Restaurants</b>	New England Aquarium
<b>Disney</b>	SFP, Monterey Bay Aquarium
<b>Sysco</b>	WWF
<b>Santa Monica Seafood</b>	Monterey Bay Aquarium



# Jonah Crab Fishery

## Appendix E: Crab Species With Tolerances

**CRAB SPECIES WITH TOLERANCES**

Location	Species	Min. Size (male unless noted)	Max. Size	Tolerance (harvester requirement unless noted)	Rationale/Enforcement
CA	Dungeness	6¼"	none	1% by count allowance for undersized.	1% per load or lot can be between 5¾" and 6¼". No allowance for smaller crabs.
CA	Tanner Crab			5% by weight allowance for other invertebrate species.	
DE	Blue	5" hard 3" peeler 3½" soft	none	5% "by any commercial measure" allowance for undersized.	No minimum size for hard, non-egg bearing females.
NC	Blue	5" M & immature F hard	<i>Enacted as needed</i> 6¾" hard females 5¼" peeler females	10% by count allowance for undersized hard; 5% for oversized hard female and white-line peelers; and 3% for all other peelers.	Tolerances by count in "any container"
VA	Blue	3¼" / 3½"* peelers 5" M & immature F hard	none	10/bushel or 5% by count/container allowance for undersized. 10/bushel or 35/barrel allowance for dark sponge crab.	Any marine patrol officer may grade or cull any number of barrels, baskets or containers of crabs in any person's possession. Could not find tolerance regulations for hard crabs.
Gulf States	Blue	5" M & F hard	none	TX/FL - 5% by count allowance for undersized. LA - 1 stone crab/crate of blue crab.	Tolerance confirmed in TX and FL (2001 not present day) regulations. Didn't find reference to tolerance in AL, MS or LA regulations
Atl. States	Deep Sea Red	None	none	One tote allowance for females/trip.	Small allowance for incidental retention in directed fishery. From Original FMP "The allowance for the incidental retention of female crabs by the controlled access vessels allows these fishermen to continue current fishing practices and represents a very small fraction of the total crabs retained and landed on each fishing trip (i.e., one standard U.S. fish tote is estimated to equate to roughly 100 pounds, which would be approx.. 0.13% of the 75,000 pound trip limit)"

\*Varies by season, area, or gear type.

### Other crab species:

Alaskan crab fisheries (red king, blue king, golden king, tanner *bairdi*, snow/tanner *opilio*, and Dungeness) had a 1% tolerance when the fisheries were derby style. When fisheries converted to ITQ the tolerance was removed understanding that fishermen would have more time to sort crab and to avoid a 1% set aside. Canadian pacific crab fisheries (red king, golden king, red rock, and Dungeness) also removed tolerances when management measures changed.

Could find no evidence for historic or modern tolerances in the following crab fisheries: MD and RI blue crab, Washington state Dungeness, Oregon Dungeness; California tanner; Florida stone; Canada Atlantic tanner/snow; and Canadian exploratory fisheries for porcupine, Jonah, and rock. The Canadian snow crab fishery does monitor the proportion of soft shelled animals in the haul and closes management areas at a threshold (~20%).

# Jonah Crab Fishery

## EVIDENCE FOR TOLERANCE REGULATIONS IN OTHER FISHERIES IN STATES PARTICIPATING IN ASMFC

Location	Species	Min. Size	Tolerance (harvester requirement unless noted)	Rationale/Enforcement
ME	Sea Urchin	Min: 2 1/6" Max: 3"	5% by count of "bulk pile" allowance for under or oversized" for "all persons". 20% of any bulk pile for harvesters (divers) prior to culling in some areas. Unlimited tolerance before culling in other areas.	Determined by numerical count of not less than a randomly selected ½ bushel or the entire pile if less than ½ bushel. Catch is seized if more than 5% are outside of the allowable size range unless proof of purchase from another state is shown.
ME	Mussel	106/2 qrt	10% by count allowance.	Determined by numerical count of randomly selected two quarts.
NH	Sea Urchin	2"	5% by count of "bulk pile" allowance for undersized.	Determined by numerical count of not less than one peck nor more than 3 peck randomly selected.
RI	Quahogs, Soft-Shell Clams, Oysters	1", 2", 3"	10% by count ( <i>confusing language see Rationale/Enforcement</i> )	Additionally, any person who takes and/or possesses shellfish of less than the minimum size commingled and/or otherwise stored or contained with shellfish of not less than the minimum size, where the percentage of the less than minimum size shellfish is not less than ten percent (10%) of the total piece count of the commingled and/or otherwise stored or contained package, shipment, or container, shall be subject to seizure and/or forfeiture of the entire commingled and/or otherwise stored or contained package, shipment, or container in accordance with the provisions of §§ 20-1-8(e) and (f) and 20-1-8.1.
NJ	Mackerel/Herring		5% by weight allowance for river herring and shad.	
DE	Hard Clams	1 ½"	5% "by any commercial measure" allowance for undersized.	
DE	Oysters		5% per 2 bushel allowance for shells and other materials.	
MD	None			
VA	Oysters	3"	More than 4 qrts./bushel allowance for undersized or dead shell and after cull	
VA	Surf Clams	4 ¾"	240 clams/"full cage" allowance for undersized.	Provision can be suspended annual to maintain consistency with federal jurisdiction.
NC	Bait Finfish	4"	5% - measurement procedure not defined.	For finfish without other minimum sizes. Appears to be a dealer regulation.
NC	Oyster	Set annually	10% by volume allowance for undersized or dead shells after cull.	Violation determination by grading all or any portion of the catch.
NC	Scallop	3 ½"	10% by count allowance for undersized	Violation determination by grading all or any portion of the catch.
FL	Oysters	3"	5% by count allowance for undersized unattached/bag 15% by count allowance for undersized attached/bag	
FL	Hard Clam	1"	3% by count/bag allowance for undersized.	
FL	Mullet	11"	10% by total weight allowance for undersized.	

# Jonah Crab Fishery

## EVIDENCE FOR TOLERANCE REGULATIONS IN OTHER STATE MARINE FISHERIES

Location	Species	Min. Size	Tolerance (harvester requirement unless noted)	Rationale/Enforcement
AL	Red Drum	Min: 16" Max: 26"	1 oversized fish/day in rod and reel recreational fishery.	
AL	Oyster	3"	5% allowance for undersized "per load" or 10% per "sack"	Measurement unit (count vs. volume) for tolerance not described. Violation determination procedure not described.
MS	Red Drum	Min: 18" Max: 30"	1 oversized fish allowance in commercial and recreational fisheries.	
LA	Shrimp	100 count/lb white shrimp	10% by weight allowance for undersized white shrimp when 50% by weight of shrimp taken are seabobs or brown shrimp. Commercial and recreational tolerance.	
LA	Red & Black Drum	Min: 16" Max: 27"	1 oversized fish allowance/day in recreational fishery.	
TX	Oysters	3"	15% by number possession allowance for ¾" to 3" length oysters in commercial and recreational fisheries.	
TX	Black Drum	Min: 14" Max: 30"	1 oversized fish (over 52") allowance/day in recreational fishery	
TX	Red Drum	Min: 20" Max: 28"	1 oversized fish/year in recreational fishery.	Oversized fish must be affixed with proper tag.
TX	Shrimp		10% by weight or number allowance for other species of shrimp when fishing for seabobs. Commercial tolerance.	In some areas only.
Gulf States	Purse seine fisheries		Many of the Gulf States have 5-10% tolerance by weight allowances for non-target species in the purse seine fisheries.	
CA	Bonito	Min: 24" or 5 lbs	18% allowance for undersized when fishing with round haul net. 1,000 lb of undersized allowed when fishing with gill or trammel nets.	
CA	Angel Shark	Min: 42" F: 40" M	10% allowance/load for sharks measuring not more than ½" less than minimum size.	
CA	Sea Urchin	Possession prohibition 1 ½" to 3"	Allowance for 30 by number/person/load in this size range in some areas.	
WA	Walleye		Allowance for one over 22"/day.	
WA	bass	Max: 12" lg mouth Max: 14" sm mouth	Allowance for one large mouth bass over 17"/day and one small mouth bass over 14"/day.	