Mid-Atlantic Fishery Management Council

Ocean Quahog Information Document - May 2013

Management System

The Fishery Management Plan (FMP) for ocean quahog (*Arctica islandica)* became effective in 1977. The FMP established the management unit as all ocean quahog in the Atlantic EEZ. The FMP is managed by the Mid-Atlantic Fishery Management Council (Council), in conjunction with the National Marine Fisheries Service (NMFS) as the Federal implementation and enforcement entity. The primary management tool is the specification of an annual quota, which is allocated to the holders of allocation shares (Individual Transferable Quotas (ITQs)) at the beginning of each calendar year as specified in Amendment 8 to the FMP (1988). In addition to the Federal waters fishery, there is a small fishery prosecuted in the state waters of Maine. The FMP, including subsequent Amendments and Frameworks, is available on the Council website at: http://www.mafmc.org

Basic Biology

Information on ocean quahog biology can be found in the document titled, "Essential Fish Habitat Source Document: Ocean Quahog, *Arctica islandica*, Life History and Habitat Requirements" (Cargnelli et al. 1999b). An electronic version is available at the following website: http://www.nefsc.noaa.gov/nefsc/habitat/efh/. Additional information on this species is available at the following website: http://www.nefsc.noaa.gov/sos/. A summary of the basic biology is provided below.

The ocean quahog is a bivalve mollusk distributed in temperate and boreal waters on both sides of the North Atlantic Ocean. In the Northeast Atlantic, quahogs occur from Newfoundland to Cape Hatteras from depths of about 8 to 400 meters. Ocean quahogs further north occur closer to shore. The US stock resource is almost entirely within the Exclusive Economic Zone (EEZ, 3-200 miles from shore), outside of state waters, and at depths between 20 and 80 meters. However, in the northern range, ocean quahogs inhabit waters closer to shore, such that the State of Maine has a small commercial fishery which includes beds within the state's territorial sea ($\leq$ 3 miles). Ocean quahogs burrow in a variety of substrates and are often associated with fine sand.

Ocean quahogs are one of the longest-living, slowest growing marine bivalves in the world. Under normal circumstances, they live to more than 100 years old. Ocean quahogs have been aged in excess of 200 years. Growth tends to slow after age 20, which corresponds to the size currently harvested by the industry (approximately 3 inches). Size and age at sexual maturity are variable and poorly known. Studies in Icelandic waters indicate that 10, 50, and 90 percent of female ocean quahogs were sexually mature at 40, 64 and 88 mm (1.5, 2.5 and 3.5 inches) shell length or approximately 2, 19 and 61 years of age. Spawning occurs over a protracted interval from summer through autumn. Free-floating larvae may drift far from their spawning location because they develop slowly and are planktonic for more than 30 days before settling. Major recruitment events appear to be separated by periods of decades.

Based on their growth, longevity and recruitment patterns, ocean quahogs are relatively unproductive and able to support only low levels of fishing. The current resource consists of individuals that accumulated over many decades.

Ocean quahogs are suspension feeders on phytoplankton, and use siphons which are extended above the surface of the substrate to pump in water. Predators of ocean quahogs include certain species of crabs, sea stars, and other crustaceans, as well as fish species such as sculpins, ocean pout, cod, and haddock.

Status of the Stock

A forward projecting stock assessment model, based on the Deriso-Schnute delay-difference equation, was applied in a program called (KLAMZ) and was used in the most recent ocean quahog assessment update (Chute et al. 2013). This update utilized the same peer-reviewed and approved methods developed at Stock Assessment Workshop 48 (SAW 48). Detailed reports on "Stock Status," including annual assessment and reference point update reports, SAW reports, and Stock Assessment Review Committee (SARC) panelist reports are available online at the NEFSC website: http://www.nefsc.noaa.gov

Based on the June 2013 update, which utilized data through 2011, the stock is not overfished and overfishing is not occurring, relative to the biological reference points (Chute et al. 2013). Whole stock fishable biomass during 2011 was 2.96 million mt (Figure 1), which is above the revised B_{target} of 1.73 million mt and the revised $B_{threshold}$ of 1.39 million mt. The fishing mortality rate during 2011 for the stock in the exploited region was F= 0.007 y-1 (Figure 2), below the revised $F_{threshold}$ of 0.022 y-1. Fishing mortality for the exploited area of the stock was also below the previous $F_{threshold}$ of 0.08 y-1, and whole stock biomass was above the previous $B_{threshold}$ of 0.89 million mt.

Based on assessment data, the ocean quahog population is an unproductive stock with infrequent recruitment, and thus vulnerable to overfishing (Chute et al. 2013). After three decades of fishing at a low F, the stock as a whole is being fished down. In 2011, fishable stock biomass in the southernmost regions of SVA, DMV and NJ was less than half of 1978 pre-fishery levels (recommended target biomass for the stock as a whole is 50% of the pre-fishery biomass). Biomass in the more northern regions of LI and SNE increased after 1978 due to a recruitment event and growth, but then began to decrease in the early 1990s when recruitment declined and the fishery gradually began to move north into these regions. Recruitment events appear to be localized and separated by decades, although survey length frequencies show that a low level of recruitment occurs on a continuous basis. The potential contribution of this recruitment to stock biomass and productivity is unknown.

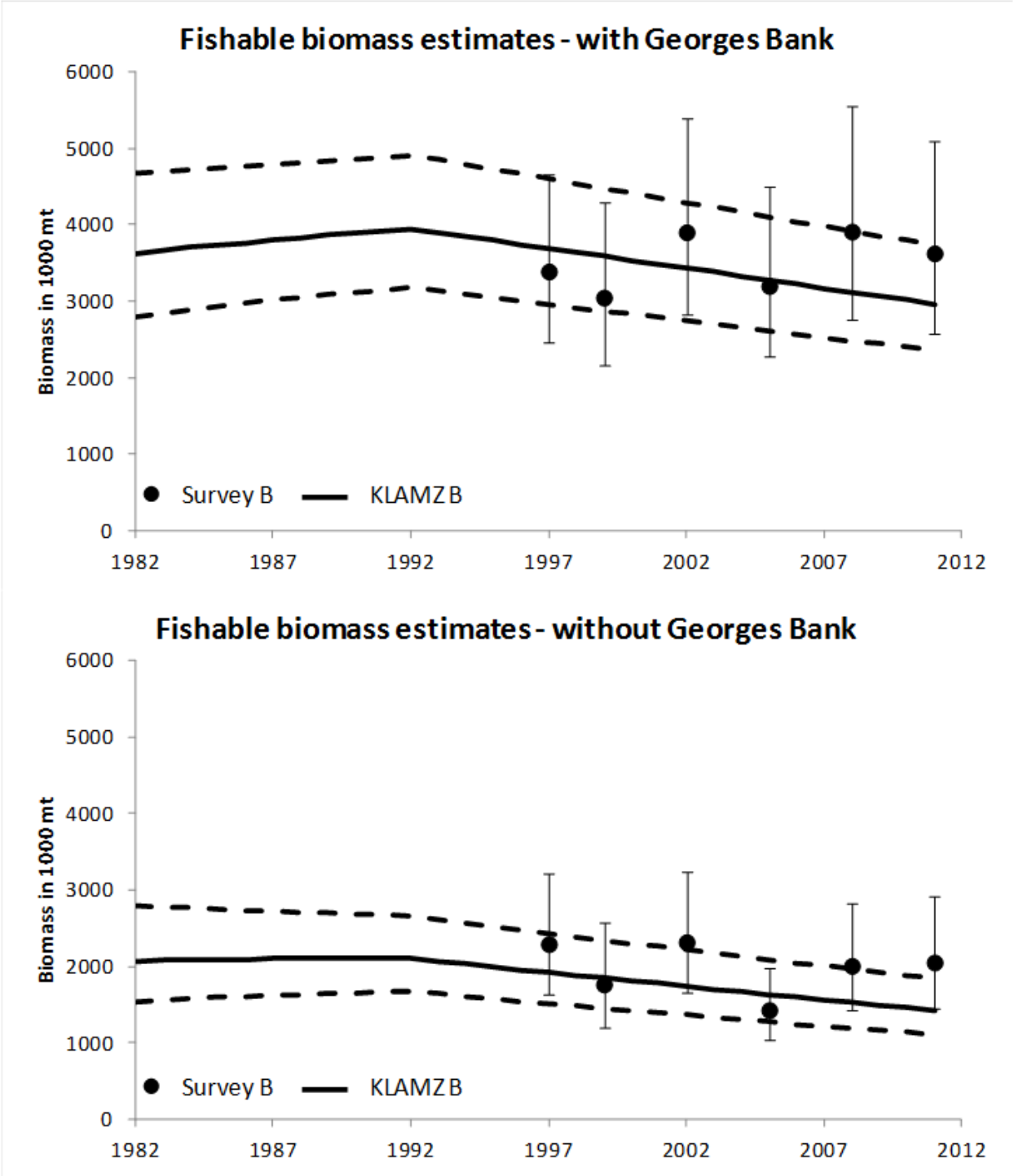

Figure 1. KLAMZ model estimates of fishable biomass for the entire stock (top) and the exploited regions (bottom), 1982-2011. Source: Stock Assessment Update (Chute at al. 2013)

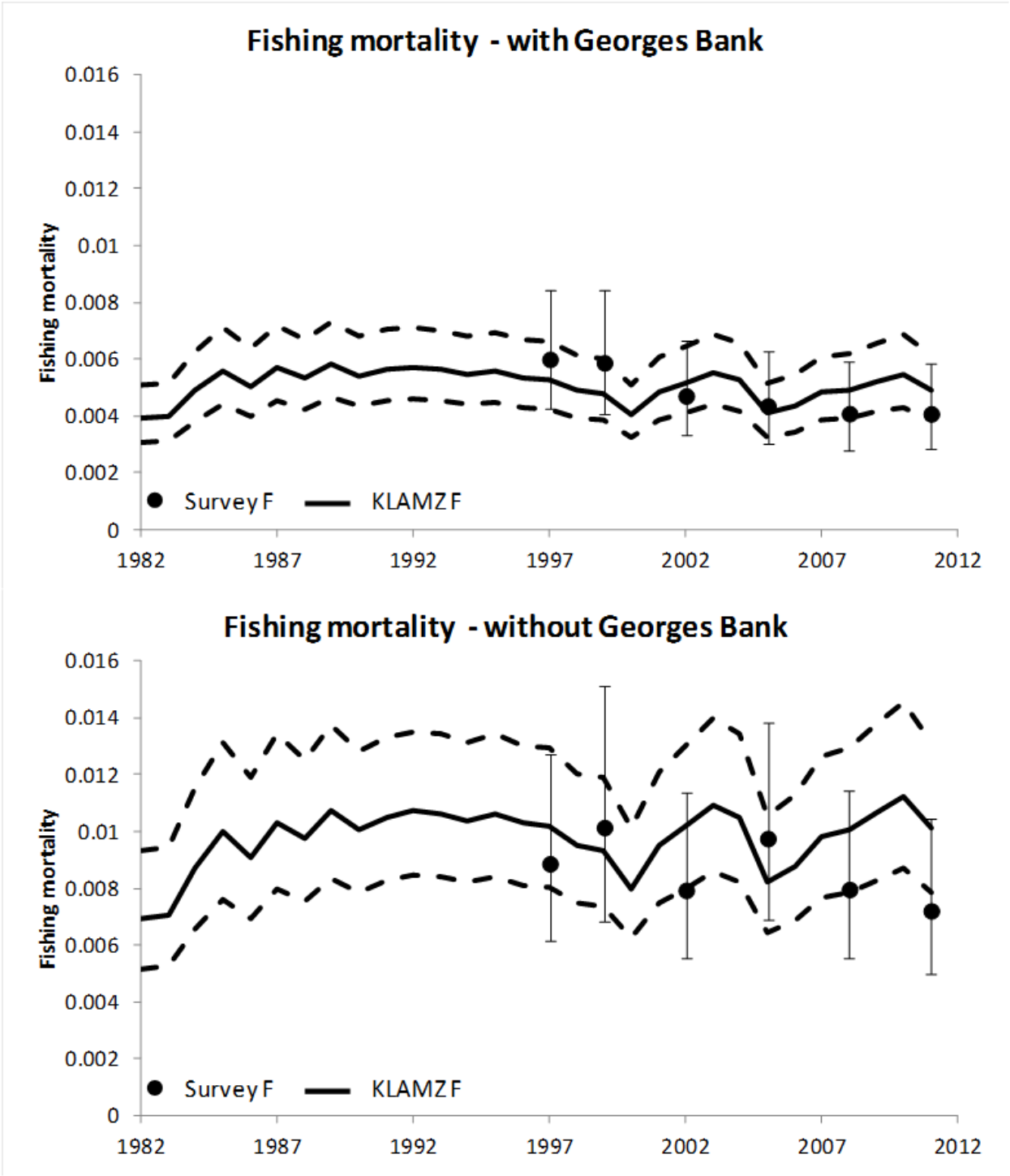

Figure 2. KLAMZ estimates of fishing mortality for the entire stock (top) and the exploited regions (bottom), 1982-2011. Source: Stock Assessment Update (Chute at al. 2013)

Description of the Fishery and Market

The commercial fishery for ocean quahog in Federal waters is prosecuted with large vessels and hydraulic dredges, and is very different from the small Maine fishery prosecuted with small vessels (35-45 ft) targeting quahogs for the local fresh, half shell market.

Ocean quahog landings and commercial quotas are given below in Table 1. The distribution of the fishery has changed over time, with the bulk of the fishery from 1980-1990 being prosecuted off the Delmarva, to more Northern areas (Figure 3).

Table 1. Federal Ocean Quahog Quotas and Landings: 1998 - 2013.

Year	Landings[a] ('000 bu)	Quota ('000 bu)	% Harvested
1998	3,897	4,000	97%
1999	3,770	4,500	84%
2000	3,161	4,500	70%
2001	3,691	4,500	82%
2002	3,871	4,500	86%
2003	4,069	4,500	90%
2004	3,825	5,000	77%
2005	2,940	5,333	55%
2006	3,066	5,333	57%
2007	3,366	5,333	63%
2008	3,426	5,333	64%
2009	3,443	5,333	65%
2010	3,554	5,333	67%
2011[b]	3,118	5,333	58%
2012[b]	3,446	5,333	65%
2013[b]	NA	5,333	NA

[a] 1 ocean quahog bushel is approximately 10 lb.
[b] For 2011-2013, the Scientific and Statistical Committee recommended an overfishing limit (OFL) for 2011-2013 = 34,800 mt, and an acceptable biological catch (ABC) of 26,100 mt. The Council recommended a quota based on a range for optimum yield in the FMP.
Source: NMFS Clam Vessel Logbook Reports

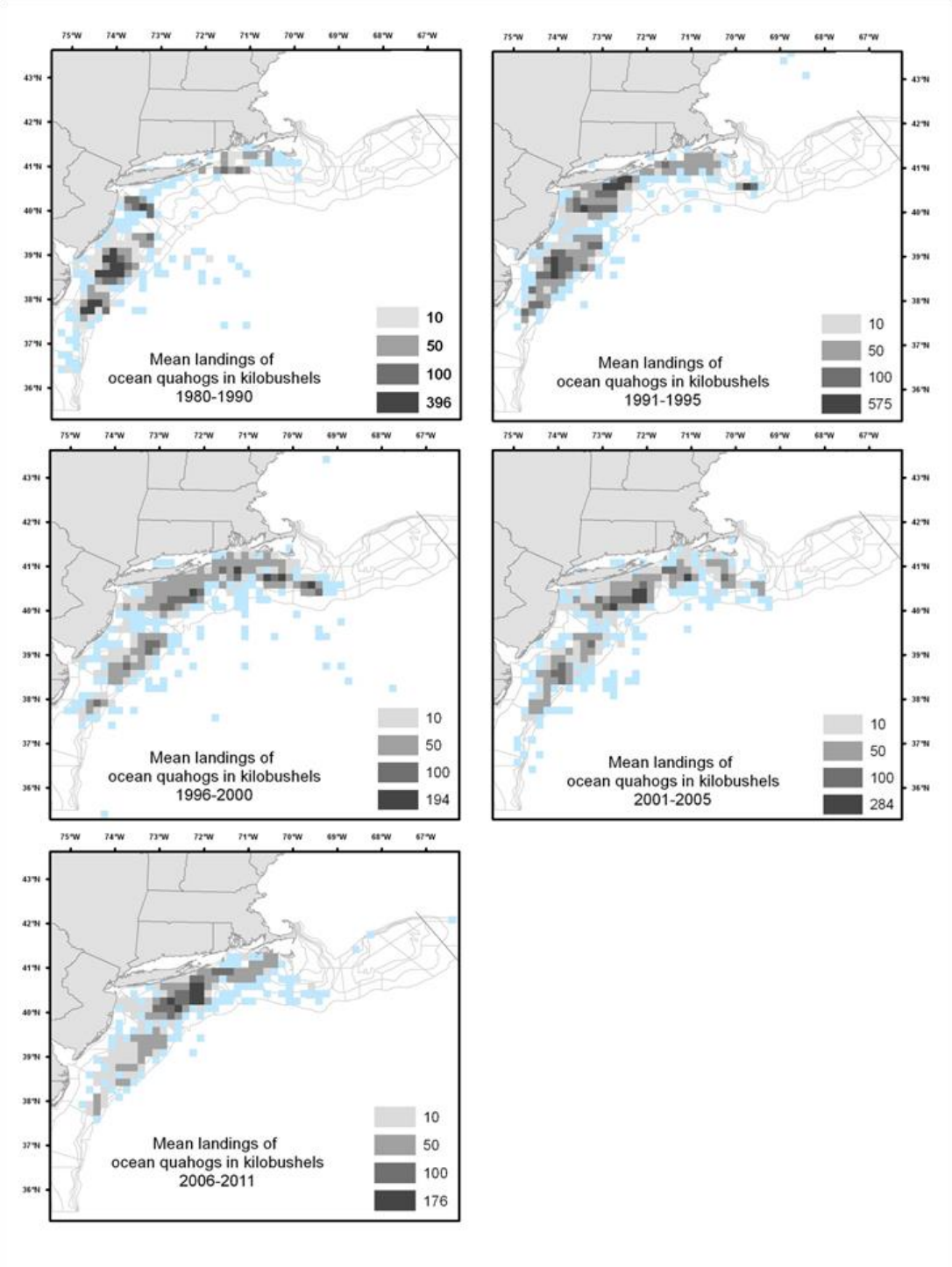

Figure 3. Ocean quahog landings by ten-minute square (TMSQ), the finest scale location for landings reported in logbooks, and time period. TMSQ in light blue had reported landings, but from fewer than three vessels (1 kilobushel = 1000 bu y-1). Source: Stock Assessment Update (Chute at al. 2013)

Port and Community Description

When Amendment 13 to the FMP was developed, the Council hired Dr. Bonnie McCay and her associates at Rutgers University to describe the ports and communities that are associated with the surfclam and ocean quahog fisheries. The researchers did an extensive job characterizing the three main fisheries (non-Maine ocean quahog, Maine ocean quahog, and surfclam). The description of the fishing gear, areas fished, etc. are fully described in Amendment 13.

Communities from Maine to Virginia are involved in the harvesting and processing of surfclams and ocean quahogs. Ports in New Jersey and Massachusetts handle the most volume and value, particularly Atlantic City, Point Pleasant, and Cape May/Wildwood in New Jersey, and New Bedford, Massachusetts. There are also significant landings in Ocean City, Maryland, Warren, Rhode Island, and the Jonesport and Beals Island areas of Maine. The Maine fishery is entirely for ocean quahogs, which are sold as shellstock for the half-shell market. The other fisheries are industrialized ones for surfclams and ocean quahogs, which are hand shucked or steam-shucked and processed into fried, canned, and frozen products.

Processing plants are therefore major components of the fishery, and the communities in which they are found must be described as well as the port towns. Some of them meet the definition of "fishing community" found in the Sustainable Fisheries Act of 1996: "[t]he term "fishing community" means a community which is substantially dependent on or substantially engaged in the harvest or processing of fishery resources to meet social and economic needs, and includes fishing vessel owners, operators, and crew and United States fish processors that are based in such community." The McCay team characterizations of the ports and communities are based on government census and labor statistics and on observations and interviews carried out during the late 1990s and in the fall of 2001.

Additional information on "Community Profiles for the Northeast US Fisheries" can be found at: http://www.nefsc.noaa.gov/read/socialsci/communityProfiles.html.

Federal Fleet Profile

The total number of vessels participating in the ocean quahog fisheries outside the state of Maine has experienced a downward trend as the fisheries moved beyond a market crisis in 2005 where major users of clam meats reduced their purchases from industry and stopped advertising products like clam chowder in the media. Industry members reported that imported meat from Canada and Vietnam contributed to an oversupply of clam meats in the marketplace. The costs to vessels harvesting clams have increased significantly, with the greatest component being the cost of diesel fuel. Trips harvesting quahogs have also increased in length as catch rates have declined steadily. The 30 or so vessels that reported landings during 2004 and 2005 was reduced and coast-wide harvests consolidated on to approximately 20 vessels in the subsequent years. The Maine ocean quahog fleet numbers started to decline with fuel prices soaring in mid-2008 and totaled 13 in 2012 (Table 2).

The average ex-vessel price of non-Maine ocean quahogs reported by processors decreased about 1% from $6.95 to $6.88 per bushel in 2012. The total ex-vessel value of the 2012 federal harvest

outside of Maine was approximately $22.9 million, a 10% increase from the prior year. A fleet-wide calculation of LPUE (landings per unit effort) for 2003 through 2012 showed that the average number of bushels harvested per hour of fishing ranged from 118 in 2003 to 145 in 2006. LPUE increased from 129 bushels per hour in 2011 to 133 in 2012. In the first four months of 2013, the average LPUE was 129 bushels per hour.

In 2012, the Maine ocean quahog fleet harvested a total of 70,655 Maine bushels, a 3% increase from the 68,865 bushels harvested in 2011. For the total 2012 harvest, 69,913 bushels were taken from the 100,000 bushel quota for Maine, and 137 bushels were leased from the industrial ITQ fishery. Average catch rates from 2003 to 2012 ranged from 5 bushels per hour in 2004 to 9 bushels in 2012. In 2011 average catch was 7 bushels per hour. In early 2013 the average increased to 12 bushels per hour.

Average prices for Maine ocean quahogs have declined substantially over the past 10 years. In 2003 there were very few trips that sold for less than $37.00 per Maine bushel, and the mean price was $40.66. Aggressive price cutting by one company has driven prices down such that many trips in 2008 and 2009 sold for $28.00, with the mean price for all trips equaling $33.31 per bushel in 2008. In 2012, the mean price was $24.79 per Maine bushel. The value of the 2012 harvest reported by the purchasing dealers totaled $1.75 million, a decrease of 23% from the prior year.

Table 2. Federal Fleet Profile, 2003 through 2012.

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Non-Maine Vessels Harvesting BOTH surfclams & ocean quahogs	11	14	12	9	9	8	8	12	12	13
Non-Maine Vessels Harvesting only ocean quahogs	16	15	12	9	8	10	7	9	7	6
Total Non-Maine Vessels	27	29	24	18	17	18	15	21	19	19
Maine Ocean Quahog Vessels	35	34	32	25	24	22	19	15	13	12

Source: NMFS Clam Vessel Logbooks

Processing Sector

Even though this document describes the ocean quahog fisheries, the information presented for the processing sector is for both ocean quahogs and surfclams as some of these facilities purchase/process both species. In 2012, there were 9 companies reporting purchases of surfclams and/or ocean quahogs from the industrial fisheries outside of Maine. They were distributed by state as indicated in Table 3. Employment data for these specific firms are not available. In 2012,

these companies bought approximately $22.9 million worth of ocean quahogs and $28.4 million worth of surfclams.

Table 3. Companies that reported buying ocean quahogs and surfclams by state (from NMFS dealer/processor surfclam/ocean quahog dealer/processor report database) in 2012.

Number of Companies	MA	NJ	DE	VA
	4	3	1	1

References

Cargnelli, L.,S. Griesbach, D. Packer, and E. Weissberger. 1999b. Essential Fish Habitat Source Document: Ocean Quahog, *Arctica islandica*, Life History and Habitat Characteristics. NOAA Tech. Memo. NMFS-NE-148.

Chute A., Hennen D., Russell R. and Jacobson L. 2013. Stock assessment update for ocean quahogs (*Arctica islandica*) through 2011. US Dept Commer, Northeast Fish Sci Cent Ref Doc., in review.