

**A SUPPLY CHAIN ANALYSIS OF
NORTH CAROLINA'S COMMERCIAL FISHING
INDUSTRY**

**A BRIEFING PAPER BY THE
NORTH CAROLINA RURAL ECONOMIC DEVELOPMENT CENTER**

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EXECUTIVE SUMMARY

The commercial fishing industry in North Carolina is at a critical juncture. The number of fishermen, fish houses and processors is at a historic low. The total dockside value of seafood, as measured by the Division of Marine Fisheries, is also at an all-time low when measured in constant dollars. More than 90 percent of the seafood consumed in the United States is imported from other countries. Like our farmers, North Carolina commercial fishermen and their families battle uncooperative weather, rising capital costs and volatile fuel prices, in addition to the challenges of finding a secure living in a market that demands high volumes and low market prices. The challenges are many, but there are also opportunities.

Fresh, sustainable seafood is gaining acceptance as part of the local/regional foods market. There is a small but growing sense of entrepreneurship and innovation in commercial fishing communities nationwide. Now is the time for North Carolina's commercial fishing industry to embrace these changes and partner with the support systems available to the agriculture community. In turn, state policy makers need to better appreciate and support the incredible strength of the commercial fishing industry. In 2011, commercial fishing contributed an estimated \$248 million to the state economy, according to research from the National Oceanic and Atmospheric Administration. By capitalizing on North Carolina's opportunities, this economic impact can be grown significantly.

This briefing report summarizes research that identified ways in which the commercial fishing industry in North Carolina can meet rising consumer demand efficiently and profitably. The methodology includes a supply chain analysis that relied on in-depth interviews with key stakeholders and participants in the commercial seafood supply chain. We supplemented our research with a market survey on the pricing and availability of local seafood across North Carolina. While acknowledging that regulations have imposed significant constraints on marine resources, management policy is outside our area of expertise and will receive limited discussion in this report.

The North Carolina Division of Marine Fisheries manages well the fisheries while in the water and counts the catch and its value at the dock. Once it leaves the dock, our knowledge of the product becomes far less informed. There are many processing and distribution questions that have yet to be answered. This report is only the beginning of what should be a long-term effort to find practical answers that ensure a more secure, profitable future for North Carolina's commercial fishing community.

This study addresses the challenges of managing the seasonality of local seafood versus the level of consumer demand throughout the year. In particular, we asked how suppliers can avoid supply

shortfalls by storing seafood when it is abundant and holding it for later sale at a more favorable price.

Our research considers a processing and storage solution that offers increased control over the product, while allowing suppliers to meet year-round demand and garner higher revenue. Such a strategic approach toward inventory management will lead to more money entering the distribution channel at the point of retailer-consumer exchange, which in turn leads to more profit flowing to distributors, processors, fish houses and fishermen. The industry would benefit from a stabilized supply, higher market prices, and by extension, increased profit. Our analysis of the current seafood supply chain suggests a fragmented distribution channel moving west from the coast. The implementation of two major recommendations in this report would allow the commercial fishing industry to close the gap between older distribution practices and more efficient, modern practices.

- 1) Develop at least one modern processing and cold-storage aggregation facility on the coast. A high-quality cold storage facility with the capacity to freeze large volumes of seasonal seafood would permit the distribution of local products to better fit consumer demand and increase industry profits. This facility could also house technology to flexibly process local seafood to meet the ready-to-cook and ready-to-eat convenience expectations of restaurants and grocery-chain buyers. This would better meet the needs of both coastal seafood restaurants and inland markets.
- 2) Develop a centralized distribution center farther inland. This distribution center would act as an aggregator of commodities sourced from all coastal regions and allow local seafood to flow across North Carolina through a more established and efficient distribution channel. Such a distribution center could be modeled on the profitable and long-established facilities in the northeastern part of the country.

The following secondary recommendations emerged from research and extensive interviews with participants in the commercial fishing industry:

Marketing Strategies

- 1) Provide greater support to the local catch groups that promote North Carolina seafood products to coastal restaurants: Brunswick Catch, Carteret Catch, N.C. Catch, Ocracoke Fresh and Outer Banks Catch.
- 2) Provide additional support to encourage commercial seafood innovators.

- 3) Expand seafood certification and traceability programs, both of which are growing in popularity among seafood providers and conscientious consumers

Consumer Education

- 1) Consumers need better information, which will help inform their seafood purchases. Good work is underway by local catch groups, the North Carolina Department of Agriculture and Consumer Services and North Carolina Sea Grant, but additional resources are needed to reinforce the availability, freshness, and safety of North Carolina's quality seafood products.

Finally, the research team proposed that the following ideas merit additional study:

- 1) A formal economic impact analysis should be conducted as part of the development strategies for a coastal cold-storage/processing facility and an inland aggregation/distribution facility.
- 2) The state should conduct a comprehensive assessment of the commercial fishing industry's contributions to the coastal and state economy.
- 3) An analysis should be designed to identify successful agricultural practices that create opportunities for new and young farmers, and evaluate their potential for the commercial fishing industry.
- 4) Research and action is needed to strengthen or find alternatives to the Department of Labor H-2B program.
- 5) Research is needed to help gain a better understanding of the potential economic impact of developing the state's marine aquaculture assets.
- 6) Research is needed on business methods and strategies to improve the profitability of commercial fishing operations. This research would be particularly beneficial when paired with a youth entrepreneurship program to encourage and educate the next generation of watermen.

When one component of the supply chain is adversely affected, eventually other members will suffer negative effects. Likewise, an action or resource that benefits one member ultimately benefits the entire supply chain. Considering the shift in consumer demand toward local food products, and the prevalence of imported seafood in the United States, these research findings hold important implications for commercial fishing and the seafood supply chain in North Carolina.

BACKGROUND

For generations, commercial fishing has been an integral part of North Carolina's coastal heritage and economy. Until the late 1990s, local fishermen earned sustainable incomes supplying wild-caught seafood along the East Coast with little commercial recognition to identify their commodities or trade. As globalization opened domestic markets to less expensive, imported seafood, price became a deciding sales factor. Due partly to declining market share and revenue, fishermen began abandoning their industry. The number of commercially licensed fishermen declined from 5,495 in 1995 to 3,244 in 2011, a 41 percent reduction (N.C. Division of Marine Fisheries Trip Ticket Program, 2012). Furthermore, the number of seafood processors in coastal North Carolina declined 36 percent between 2000 and 2011 despite a growing demand for local seafood within the state (Garrity-Blake and Nash, 2012).

Since 1972, the N.C. Division of Marine Fisheries (DMF) has compiled the total annual volume and estimated dockside value of the diverse commercial fishery stocks that have been landed by North Carolina fishermen. Historically Atlantic blue crabs, shrimp and flounder have been the species with the most economic value, with blue crabs being the most economically significant species by far. In 2011, these three species, plus clams and oysters, made up 68 percent of the total dockside value estimated by DMF¹. Again, as with agriculture generally, the amount brought to dock and the estimated value vary from year to year based on fluctuations in fishery stocks, inclement weather and the availability of product elsewhere. For example, the revenue of North Carolina crabbers are tied to the availability of blue crabs in the Chesapeake Bay in Virginia and Maryland.

A major change is the economic value of North Carolina's total catch over time. When dockside value over the last 40 years is expressed in constant 2011 dollars, we see dramatic spikes in values in the late 1970s and early 1980s, and another spike in the middle 1990s. In 1980, total dockside value peaked at a high of \$187 million in 2011 dollars. It declined but peaked again at \$161 million in 1995. Starting in the late 1990s, the dockside value of North Carolina commercial species began a steady decline to the \$80 to \$70 million range of more recent years (see *Figure 1*). This is a 56 percent decline since 1995.

¹ Data available at portal.ncdenr.org/web/mf/statistics/comstat.

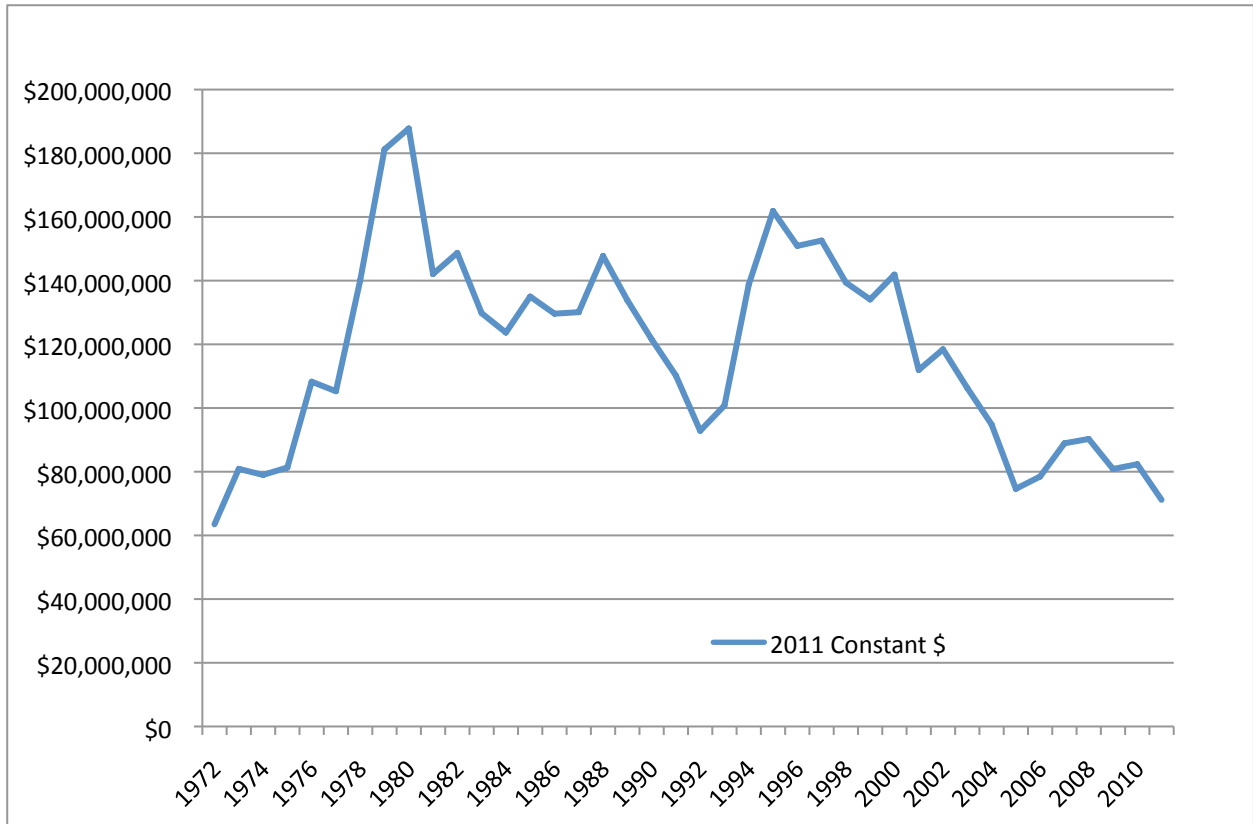


Figure 1: Total Dockside Value in 2011 Constant Dollars²

Dockside value — the single, annual economic estimate on commercial fishing collected by the state of North Carolina — gives only a partial measure of the industry’s economic impact. For example, in 2009 total dockside value was estimated at \$68.8 million (unadjusted). Subsequent DMF economic analyses, using the IMPLAN³ model, estimated an economic impact of \$255 million. But this, too, is a limited assessment of the full economic contribution of North Carolina’s commercial fishing industry, as John Hadley and Scott Crossan acknowledged that it did not include subsequent economic inputs after harvests left docks and went, for example, to local restaurants (Hadley and Crossan, 2010). This dramatic decline in economic return accounts for much of the decrease in participating licensed fisherman.

² Chart data were obtained from the North Carolina Commercial Fisheries Landings Statistics Tool, available at portal.ncdenr.org/web/mf/statistics/comstat. Total dockside value in 2011 constant dollars was calculated by the N.C. Rural Center.

³ The IMPLAN model allows researchers to show the effects of changes in the economy, such as shifts in jobs, household income and regional products. The model develops multipliers that are estimates of the magnitude and distribution of economic impacts. The results show the economic effect of changes, such as businesses moving into area or variations in government spending.

A more recent 2011 analysis from the National Oceanic and Atmospheric Administration (NOAA) estimates North Carolina's commercial seafood economic impact to be \$248 million and over 5,000 jobs across the industry supply chain, not counting imports.⁴

Challenges Confronting the North Carolina Seafood Industry

Imported Seafood

The prime factor stressing the state's seafood industry is globalization: The value of domestic products is declining due to an influx of less expensive imports. A drastic reduction in the number of crab-processing facilities illustrates the devastating impact of imports on one of North Carolina's most valuable fisheries. In 1982, the state had 45 certified crab-picking operations. As of 2011, the number was 12 (N.C. Shellfish Sanitation, 2013).

Regulatory Environment

Stricter state and federal fisheries regulations limit where, when, how and what fishermen can harvest. At the time the 2007 fish-house inventory (Garrity-Blake and Nash, 2007) was released, state regulators had reduced by 30 percent the harvests of southern flounder, North Carolina's most valuable fishery for finfish. And access to striped bass remained restricted, although the federal government considered the stocks to be healthy.

The "Graying of the Fleet" and Processor Labor Shortage

In 2007, globalization and tighter regulations caused a shortage of captains and crew to operate fishing vessels. Sociocultural and economic research by DMF showed a state at risk of losing a workforce dedicated to commercial fishing as older fishermen exited the industry with fewer younger individuals willing to replace them (Garrity-Blake and Nash, 2007). New federal restrictions regarding wage rates for H-2B visa holders make it difficult for crab processing businesses to employ them.

Waterfront Development

As a business model based solely on volume frayed under the impacts of globalization, regulations and labor shortages, the commercial fishing industry had to contend with a dramatic increase in the number of new residents settling along the state's coast during the last decade. The rising price of waterfront real estate incited investors and developers to purchase property for new homes and private marinas (Garrity-Blake and Nash, 2007). Rising property taxes added to the financial pressures on fishermen and processors already struggling with declining profits and incomes. Those who could not or would not endure any more financial hardship were predisposed to sell their harbors and waterfront fish houses to home builders.

⁴ National Oceanic and Atmospheric Administration. Fisheries Economics of the U.S. 2011.March, 2013.

Today, more than 90 percent of the seafood consumed in the United States comes from overseas, fostering an annual seafood trade deficit of more than \$10.4 billion — second only to oil in the natural resources category (NOAA Fishwatch, 2013). Yet the demand for local seafood is increasing because of concerns over product safety, nutrition and viable local-food economies.

Decreasing Seafood-Packing Capacity

A 2012 survey of seafood packers and processors by Barbara Garrity-Blake and Barry Nash calculated a 36 percent reduction since 2000, with the majority of closures occurring in the central coastal region.

Consumer Preferences for Local Seafood

Consumer research conducted along the coastal North Carolina regions show the public overwhelmingly prefers local seafood to imports when given a choice. A 2005 survey at the N.C. Seafood Festival in Morehead City showed 84 percent of respondents expected seafood at the coast to be locally harvested, and 92 percent said they favored local seafood over imports (Nash and Andreatta, 2011). A 2006 survey by Susan Andreatta, from the University of North Carolina at Greensboro (UNCG) who is an authority on direct-marketing arrangements for local agricultural products, showed 84 percent of respondents said the seafood they consumed proximal to the coast should be locally caught, and 83 percent were willing to pay a price premium at restaurants to ensure they were served local seafood (Andreatta 2006).

Andreatta and Barry Nash, North Carolina Sea Grant seafood technology and marketing specialist, conducted a study of business models for small-scale fishermen and seafood processors (Nash and Andreatta, 2011). They reported that a 2007 survey conducted by a UNC-Chapel Hill researcher revealed 95 percent of respondents said they would buy *branded* local seafood if it were available in North Carolina markets further inland. Another survey conducted in 2010 indicated 84 percent of respondents purchased local seafood not only for its freshness and quality, but to *support local fishermen*. This finding reveals an important incentive that motivates consumers to select local agricultural products: People who value local want a personal connection with the individual who is growing or harvesting their food.

Promoting North Carolina Seafood

North Carolina Seafood Marketing

In addition to its regulatory function, the N.C. Department of Agriculture & Consumer Services (NCDA&CS) also promotes the sale of and develops, and expands markets for, commodities and value-added foods grown, harvested or manufactured by in-state farmers, watermen and food

processors, respectively. NCDA&CS supports only one seafood marketing specialist who is based in Elizabeth City, and his mission is to promote and help market both wild-caught and farm-raised fishery products.

NCDA&CS operates a statewide branding program called Freshness from North Carolina Waters. The goal of the Freshness brand is to increase consumer awareness and consumption of North Carolina seafood products, as well as the businesses that offer them. Membership in the program is free to in-state watermen, seafood processors, retailers and restaurants. Benefits of membership include continuous promotions through cooperative advertising via television, radio, newspaper, outdoor promotions and a website (www.nc-seafood.org). Members are also invited to food-oriented trade shows where they can network with grocery and food-service establishments based in and outside the state⁵.

Once a year NCDA&CS's seafood marketing division enables North Carolina seafood processors to exhibit at the world's largest seafood exposition, the International Boston Seafood Show (www.bostonseafood.com), which is held every March. This event attracts approximately 1,000 companies, and NCDA&CS provides subsidized booth space to in-state processors so they can network with global buyers and suppliers.

The seafood marketing division also co-sponsors two events every October: the N.C. Seafood Festival in Morehead City and the Outer Banks Seafood Festival in Nags Head. In addition, the seafood marketing division assists in organizing the N.C. Aquaculture Development Conference, which is held annually in February.

Branding Local Seafood

In 2003, a group of community volunteers in Carteret County that included fishermen, seafood processors, chefs, fisheries researchers, educators and civic leaders began a project to raise the public's awareness of local seafood and of the county's commercial fishing industry. Encouraged by the growing local-food movement and with funding from the Ford Foundation's Rural Community College Initiative, the group launched Carteret Catch (www.carteretcatch.org) in 2005 to serve as the brand identity for the seafood landed by fishermen residing in Carteret County (Nash and Andreatta, 2011). The success of this program inspired four more initiatives along the coast. Brunswick Catch (www.brunswickcatch.com) and Ocracoke Fresh (www.ocracokeseafood.com) were launched in 2009, while Outer Banks Catch (www.outerbankscatch.com) debuted the following year. In 2012, the four groups joined to create an umbrella organization, North Carolina Catch (www.nccatch.org), to coordinate marketing and promote commercial fishing across the state. The salient message of each brand is "fresh, seasonal seafood harvested by local fishermen." They also emphasize that fishery stocks

⁵ NCDA&CS's Goodness Grows in North Carolina, available at www.ncagr.gov/markets/gginc/application.htm.

are managed for continuity, seafood is inspected for wholesomeness and buying local supports the livelihoods of commercial fishermen.

Direct Marketing

In fall 2005, Sea Grant extension specialists Scott Baker and Barry Nash partnered with UNCG's Andreatta to pilot the nation's first direct-marketing program for local seafood. In 2006, Andreatta received funding from the N.C. Fishery Resource Grant Program (FRG) to study consumers' buying preferences for local seafood, with an aim to improve marketing methods. A second proposal was funded in 2007 with the objective of piloting a Community Supported Agriculture (CSA) program for shrimp built around the Carteret Catch brand. Andreatta labeled the effort a Community Supported Fisheries (CSF). Since that time, the CSF model has been embraced by fishermen in Alaska, Australia, California, Connecticut, New Hampshire, New York, Nova Scotia, South Carolina and British Columbia (Nash and Andreatta, 2011). Those who operate or belong to CSFs can now sell seafood at premium prices to customers who value not only local products, but also a personal relationship with *their* fisherman. Direct sales also mean more money returning to fishing communities, which enhances their economic vitality.

ANALYSIS

Local Seafood Supply Chain: Sourcing, Distribution and Destination

North Carolina's commercial fishing industry is facing complex issues in processing, adding value to seafood, distribution and pricing. All of these areas fall within the confines of the seafood supply chain. While there are a few anecdotal stories of individual successes, the profession as a whole could contract further even as the demand for local seafood continues to increase.

Fishermen repeatedly noted that stricter state and federal fisheries regulations have restricted the volume of seafood the industry can harvest. Fisherman and fish-house owners on the other hand, tend to bristle at "cheap" imports that flood the market and depress margins overall. Regulations have impacted the fishermen directly, while less expensive imports have increasingly taken market share from fish houses, and depressed the watermen's dockside values. The majority of watermen, fish house operators and crab processors stated regulatory pressures and competition from imported seafood are most responsible for the decrease in production and consequently the decrease in the number of individuals engaged in full-time commercial fishing.

Volume Fishing Model: The Decline and Resultant Model

Watermen complain that regulations are forcing them out of their livelihood because the amount and the kinds of species they can harvest year-round are increasingly restricted. This report does not address the issue of regulation but focuses on the more important area of improving the existing value chain and supply chain so industry participants can realize more monetary value for the seafood they can currently harvest.

Since the late 1990s, stricter fisheries regulations have curtailed what fishermen called the volume-fishing model. Fisheries policies that predated the late 1990s allowed for a multi-species fishing practice. Watermen could harvest and sell most all seafood that was seasonally available in local waters. These large harvests precipitated a volume-fishing business model — selling particular commercial species at high volumes for low margins to large processors or wholesale markets. Harvest quotas, moratoriums and other regulations imposed by state and federal fishery managers have given rise to what the watermen call "derby fishing," where fishermen harvest as much of one commercial species as is allowed for as long as it is allowed. This practice has contributed to a periodic oversupply of product, or supply gluts, resulting in even lower profit margins for watermen and fish-house owners. Because many independent fish houses only have

ice and refrigeration as a means of retarding spoilage, the shelf life of iced, unfrozen seafood is generally less than a week, contingent on post-harvest handling practices. Therefore product must be moved quickly into distribution before it becomes unsalable. As a result, fishermen and fish house owners using exclusively North Carolina product receive very low revenues when supply exceeds demand.

Stricter regulations have led to a decline in production (landings), which in turn has led to decrease in the number of distribution channels (fish houses) available to waterman. In the long run, the decrease in both watermen and fish houses has led to a decline in the overall supply of North Carolina seafood. Ironically, this decline is occurring as consumer demand for local seafood is increasing. Despite the regulatory dilemma, enhancements to the current local-seafood supply chain could improve the availability of coastal commodities to inland consumers who are willing to pay price premiums to ensure their seafood purchases are supporting North Carolina watermen.

The Coastal Supply Chain: From Waterman to Fish House

The 2012 License-Statistics Annual Report (N.C. Division of Marine Fisheries, 2012) states there are 5,640 standard commercial fishing licenses issued in North Carolina, a decline of roughly 1,000 licenses in the last decade. Of these current holders, roughly 3,000 are practicing watermen. There are 83 reported operating fish houses (Garrity-Blake and Nash, 2012). Watermen and fish houses are located in three distinct areas on the North Carolina coast: northeast, central and southeast regions.

I give my catch to the fish house and then a few days later they tell me what they are going to pay me for it. I'm at their mercy.

– Commercial Fisherman

The basic supply chain that exists for seafood in North Carolina starts with the waterman and the fish house. The seafood supply chain operates with a number of inefficiencies that begins with those at the coast who hold “channel power.” Channel power refers to the degree that an entity controls others in the supply chain via pricing, product, or product placement.

Coastal Seafood Supply Chain Challenges

Watermen begin the supply chain and exert some control. Watermen, mostly working for themselves as small businesses and using their own equipment, fish for a number of species during the year. Once they reach the allowable harvest limit prescribed by their licenses and permits, they travel to a fish house to offload their catch. In most cases, watermen already have a business relationship with a certain fish house and return to the same fish house over and over. The business-to-business relationship between watermen and fish-house owners presents some unique challenges.

In addition to the challenge of controlling how much they *may* catch, watermen have little control over how much they *can* catch on any given fishing trip. The availability of wild-caught seafood is highly variable, due in part to state and federal regulations, the weather, the seasons and the changing migratory patterns of certain commercial species. This introduces the first “kink” in the supply chain: unpredictable supply (landings). Statements such as the following were commonplace from watermen regarding the variability of harvesting wild seafood:

I never know how much I'm going to catch, how long I'll be allowed to catch it, or how much I'll be paid for it after I catch it. That's a hard way to run a business.

– Commercial Fisherman

Not only is business planning difficult for the fish houses, it is challenging for the watermen who are doing their best to balance time on the water with issues such as fuel costs, regulatory quotas and harvest seasons. Neither the watermen nor the fish house know the total amount of product they can sell until the landings occur.

This variability sometimes can lead to an oversupply of product, which drives down market prices. Watermen end up being unhappy with the price they receive for their product, but they settle for low prices to recoup some of their front-loaded operating expenses.

The fish houses need product but may incur regular business challenges when too much or too little product arrives at the dock in a short period of time. The fish houses pre-sell some product to wholesalers or to local establishments (e.g., restaurants or other dealers). An oversupply of

product does not bring the fish house maximum revenue because it takes high-quality seafood off the market and turns that product into a lower value-added entity, for example, shrimp being sold for broader operations. This is the second, and potentially most costly, kink in the supply chain: converting a high-value raw material into a low value-added final product. This second kink robs both watermen and fish houses of higher profits.

These problems represent the Bullwhip Effect, which occurs when variability and uncertainty distort information within the supply chain, leading to tremendous inefficiencies (i.e., unpredictable supply as described in the first kink, excess or inadequate inventory as in the second kink and insufficient or lost revenues overall) for all supply chain entities.

Waterman and Fish House Relationship: Mutual Dependency

Watermen and fish houses have a symbiotic relationship. They need each other in the current business model. Watermen depend on fish houses for operational items such as docking, fuel, ice, product storage, and of course, income. The fish houses depend on the watermen for seafood to distribute to wholesalers and retailers. As watermen have with fish houses, fish house operators have long-term relationships with wholesalers.

Mistrust often exists between watermen and fish-house owners in areas such as pricing. In turn, information does not flow efficiently from the fish houses to the watermen, creating increased supply chain variability and exacerbating the Bullwhip Effect. Although this business relationship is strained at times, other business models do exist in North Carolina that foster better cooperation and should be studied and maybe even replicated by the fishing industry.

Agricultural examples of this are Eastern Carolina Organics (www.easterncarolinaorganics.com/about.php) and Feast Down East (www.feastdowneast.org) that connect producers and distributors and tend to allow for better information sharing. One remedy to counteract the Bullwhip Effect is to foster such information sharing across the supply chain, including but not limited to areas such as pricing, product placement and promotion.

Battle for Channel Power

In the struggle for channel power, information is withheld by either the watermen or the fish-house operators. This leads to much of the friction between the two entities. In the classic manifestation over the battle for channel power, both groups expressed sentiments that one entity was “taking advantage of” or withholding information from the other. Each cited their own supply chain investment and business risks as examples of how they tend to “give” and not receive any reward in return. When the discussion was framed in terms of supply chain investment and business risk, we gained insight on the source of friction between the watermen and the fish-house operators.

In this more traditional seafood supply chain, fishermen take risks via their investments in boat, equipment, fuel and time. Fish houses take risks through their investment in property (literally the land the fish house sits on), equipment (ice and cold storage facilities) and inventory (generally fish houses buy all product from watermen on a daily or weekly basis, and then must store product until a buyer is found).

As is typical at this point in the supply chain, both sides claimed to have the most at risk and that both were being mistreated by the other. In the vast majority of cases the waterman is paid out at this stage of the supply chain and goes back to fishing, whereas the fish house takes ownership of the product and is solely responsible for securing sales and profits that are not guaranteed.

Fish-house owners did not express anxiety regarding sales and distribution until supply exceeded demand, though a strong relationship with a wholesaler may result in the latter taking product with limited demand. With only ice and refrigeration as a means of preservation, supply gluts have to enter commerce quickly and as a result, garner prices that are not always conducive to sustainable revenues, and by extension, incomes. Aside from the fish-house challenges, it became apparent that the watermen suffered the most in this exchange since, unlike fish houses, they did not control sales or distribution (i.e., placement). In other words, the watermen have low channel power.

When asked how to remedy this situation, many watermen commented that cold-storage and flash-freezing infrastructure to process and store supply gluts would benefit the entire supply chain. However, some watermen admitted they would prefer not to be equal partners with fish-house owners in building and managing infrastructure. They seemed to want their participation in the supply chain to end at the dock.

Supply Chain Intermediaries: Fish Houses, Wholesalers and the Watermen

Intermediaries in the seafood supply chain are fish houses and their wholesale customers. Generally fish houses do minor processing of the seafood (e.g., heading shrimp or packing fish) or they add substantial value to seafood (e.g., individually quick-freezing headless shrimp, processing picked crab meat or producing ready-to-eat crab cakes). In addition, some watermen sell directly to consumers through family-run roadside stands, CSF programs such as Core Sound Seafood (www.coresoundseafood.org) and Walking Fish (walking-fish.org), or to restaurants with which they have long-running relationships.

Seafood Seasonality: Increasing the Variability within the Supply Chain

Given North Carolina's location along the East Coast, a number of popular commercial species are available to harvest only during certain seasons of the year. Ancillaries to seasonality are if product is purchased, product perishability and product distribution. Again, survey participants made numerous statements regarding smoothing the variability of product coming to the market when supply exceeds demand. For example, many shrimpers bring their catch to market simultaneously, which depresses prices. In turn, fish houses have a glut of product they need to "unload" onto wholesalers or other processors if they cannot freeze it. At this point in the supply chain, interviewees indicated the product is usually sold to economy food processors at low or near break-even prices. When high-quality seafood cannot be distributed to profitable markets, both producers and consumers who place a premium on the origins of their seafood lose out. This cycle is a hallmark of the current business model for processors who lack the capability to freeze and hold frozen supply gluts until market demand equals or exceeds supply.

Initial Solutions to Smooth Variability

Many watermen, fish-house operators and wholesalers commented that if there were more local seafood available, they would have no problem moving it through the existing supply chain. This supports regional market research by university researchers and the Catch initiatives that demand for North Carolina seafood is strong (Nash and Andreatta, 2011). When asked, interviewees expressed a strong desire for improved downstream management of the local seafood distribution system. Processors and watermen seemed to agree that a cold-storage, aggregation facility would smooth out seasonality and better control supply when large amounts of product land at the docks. A consistent supply of North Carolina seafood benefits the next stage in the supply chain, the movement of product to the end retailer and/or consumer.

Supply Chain Endgame: Wholesalers to Restaurant/Retail

As is evident from retail grocery stores and local restaurants, seafood is readily available. However, the availability of seafood does not translate into the availability of North Carolina seafood. In fact, the research indicates that many locales in North Carolina, especially moving away from the coast, do not carry North Carolina seafood. The concept of branding within the North Carolina seafood industry is addressed later in this report but the lack of North Carolina seafood in westward markets, such as Raleigh and Charlotte, presents a challenge. North Carolina seafood does exist in these inland markets but this research uncovered a dichotomy within the last stages of the North Carolina seafood supply chain.

Seafood Distribution: Shipping North

Distribution north along the East Coast is very developed. Routes north from the North Carolina coast into markets such as Washington, D.C., Baltimore, Norfolk, Va., Chesapeake Bay, Philadelphia, New York City and Boston are mature and well established. Transportation firms, such as Evans Trucking and Wanchese Fish Company, play a vital role in the shipment of seafood north into high-income urban areas and seafood auction houses, such as Fulton Fish Market. It is also the case that fish houses find it easier to manage one large wholesaler contract out of state than smaller in-state distributors who have irregular delivery schedules. Many indicated they sell their catch to wholesalers knowing that it will eventually make its way to markets in North Carolina. However, the same could not be said for the distribution network headed from the coast to inland markets within the state.

Fragmented Channels: Distribution Inland

Our research revealed that inland distribution channels for seafood in North Carolina were not well developed. The distribution networks tended to be fragmented with many small distributors taking product to the Raleigh, Greensboro and Charlotte markets. These efforts lacked coordination. When asked why more North Carolina seafood was not shipped inland, many respondents replied that since the routes were not well established, they were not willing to take the risk themselves to move product west from the coast. In contrast, many did believe there are profitable inland markets for local seafood but the risk of “going it alone” on distribution was a prime concern.

Most fishermen seemed to want to deliver their harvests to fish houses, get paid and prepare for another fishing trip. Similarly, fish houses seemed to want to deliver their seafood to their wholesaler accounts, many of which are located in Virginia to New York; get paid; and prepare to ship more seafood to their customers. As a result, North Carolina seafood mingles with product from other states and foreign countries, losing its commercial “identity.” East-to-west routes are undeveloped, in part, because there are no auction houses within the state that accept large volumes of iced, unfrozen seafood for distribution to urban markets. In order to tap new markets in-state, many small dealers would need a sales force to develop accounts, which they are currently not equipped to employ. Eastern Carolina Organics, or ECO, offers a sales and distribution model, dedicated to the needs of farmers, that is applicable to the seafood industry for better servicing inland accounts within North Carolina. ECO acts as an intermediary to market and distribute wholesale farm products to retailers, restaurants and buying clubs. Ownership of ECO lies with the farmers/growers but a team of experienced food-service and agriculture specialists oversees management of day-to-day operations. Farmers/growers concentrate on their core competency (farming) and ECO manages marketing, sales, promotion and distribution activities. This partnership allows small and limited-resource farmers access to markets they would not be able to enter alone.

Smaller retailers and independent grocers vary dramatically across markets. In coastal areas of the state, the smaller retailers all had a good supply of North Carolina seafood and were extremely knowledgeable about their products (origin, seasonality, etc.). In large retail markets, however, an interesting phenomenon became apparent. Most of the large chains in North Carolina did not specifically carry locally caught seafood. This was even more prevalent moving inland into markets west of the coast. It appears that the current North Carolina seafood business model is not very conducive to working with large supermarket chains. The large chains require a steady, reliable and consistent source of seafood all year long. In short, the current business model is just not capable of adhering to those types of supply requirements.

Distribution to Large Buyers: The Relationship with Supermarkets

Harris Teeter was identified as a supermarket chain that was engaged with the North Carolina seafood industry. Harris Teeter tends to offer a small area in their fresh fish section for North Carolina seafood and runs ads every Wednesday promoting North Carolina commodities. This relationship, although nascent, does provide a model for future collaboration between North Carolina seafood distributors and large supermarket chains. The partnership between the North Carolina local produce growers and some of the large supermarket chains was brought up as a model to study and possibly replicate.

Value-Added Manufacturing: Adding Value to Local Seafood

Not only is demand in this country growing for local seafood, but also more Americans are craving the convenience of pre-prepared meals as people are leading tightly scheduled lives. Many consumers no longer have the time or desire to cook at home. Hence the strongest demand for local seafood tends to be in regional restaurants and specialty markets.

What Constitutes Value Addition

The U.S. Department of Agriculture's Rural Business Development Program characterizes the addition of value to agricultural products as: 1) a change in the physical state or form of the product; 2) the production of a product in a manner that enhances its value, as demonstrated through a business plan; and 3) the physical segregation of a commodity or product in a manner that results in the enhancement of the value of the commodity or product (USDA, 2013).

Market research shows consumers will pay premium prices for further-processed foods that are healthy, flavorful and especially, easy to prepare (Sloan, 2008c; Swientek, 2008; Sloan, 2008d). In 2012, Garrity-Blake and Nash (2012) reported that 29 percent of the processors they surveyed were manufacturing and/or distributing pre-prepared seafood such as frozen crab cakes, deviled crabs, ready-to-eat seafood salads and spreads, stuffed fish fillets or shrimp, plain and bacon-wrapped scallops, smoked fish, frozen oysters on the half shell, and peeled-and-deveined shrimp.

Processors who did not manufacture value-added seafood cited, in part, the capital-intensive nature of value-added production and insufficient labor to diversify into new ventures.

Ready-to-Cook Convenience

Restaurant members of two local-seafood consumer education organizations, Carteret Catch and Outer Banks Catch, indicated a desire to serve more local seafood but noted some of it lacks an essential attribute that has a particular value to the busy chef: It is not ready to cook out of the package.

Chefs, for instance, prefer to purchase shrimp that is peeled and deveined and uniformly sized; however, a great deal of North Carolina shrimp is sold with the shell on. Fishermen and small processors do not have the equipment to peel and freeze shrimp or package it in resealable pouches for easy dispensing and storage. Due to strict health department rules mandating the separation of raw and cooked products in food-service establishments, chefs do not have the latitude to peel and devein shrimp themselves. In addition, peeling and deveining shrimp by hand is inefficient relative to time and the cost of labor.

One Dare County processor indicated he had constructed a cutting room to fillet incoming finfish for restaurant chefs from Corolla to Hatteras who did not have the time or interests to cut whole fish themselves. As far as this processor was aware, his business was the only one custom-processing finfish for the restaurant trade in the northern coastal region of the state.

Ready-to-Serve Convenience

Since 2001, North Carolina Sea Grant and its partners have assisted 14 seafood processors in developing pre-prepared seafood meals for the retail and/or wholesale trades. Of these, nine businesses launched a total of 37 items. This represents 11 percent of the industry participating in the market for pre-prepared foods among the 83 seafood processors known to operate in the state, according to the latest estimate by Garrity-Blake and Nash (2012).

In 2003, the wife of a Pamlico County processor developed a line of ready-to-eat (RTE) seafood dips and salads formulated with blue crab, shrimp and tuna that seemed to have strong commercial potential. With funding from the North Carolina Fishery Resource Grant (FRG) Program, Sea Grant and the North Carolina State University Seafood Laboratory assisted the processor to develop a preservation system that would extend the keeping quality of 12 products to 30 days under refrigerated storage.

The processor constructed a small manufacturing facility to produce his value-added line; however, production was discontinued within a year. The processor's only grocery customer at the time failed to maintain the temperature of the product below 40F during transit as required by state and federal seafood-safety regulations. The retail buyer then demanded the processor

deliver to the grocery chain's warehouse instead. This would have required the processor to buy a new truck and hire a new driver to service a single account. With the return on that investment uncertain, the processor dropped his grocery customer.

The processor noted that had his facility been located where he could access more common-carrier trucking services, he would have found a reliable transporter to deliver his RTE line. Unable to control the transportation variable for RTE products in his supply chain, the processor converted his value-added facility into an oyster-shucking operation.

A processor in Hyde County operates a successful business selling pre-prepared crabmeat products to retail and wholesale markets; however, the supply of crabs and the availability of labor are obstacles to expansion. With fewer crabbers on the water, the company can sometimes run short of live crabs to process its product line. Our interviewee noted there are fewer incentives for new people to harvest live crabs for a living. The company also is located in a rural area where access to domestic labor is extremely limited, so the company is highly dependent on migrant labor. However according to the processor, "the government is trying to change the H-2B visa program, which will hurt labor."

The H-2B program has long permitted small domestic employers, including seafood businesses, to secure temporary visas for foreign, unskilled labor to do seasonal, non-agricultural work (Lewis and Joe, 2012; Preston, 2012). Manufacturing cooked crabmeat is labor intensive, and since the 1990s, processors have relied on Latino migrants to compensate for a declining pool of local labor willing or able to work in their industry (Garrity-Blake and Nash, 2012).

Until recently the U.S. Department of Labor (DOL) allowed employers to simply declare they had searched for American workers without success before issuing visas. Now crab processors will have to formally consult with state workforce agencies to show they cannot find Americans before DOL will issue H-2B visas, making the search for labor much more onerous (Preston, 2012).

In addition, DOL recommended a wage increase of more than \$3 an hour, and for the first time, processors will have to pay their workers for three-quarters of a contract period even if there is no work to perform (Garrity-Blake and Nash 2012; Preston, 2012). For an industry dealing with very thin profit margins and an inconsistent supply of hard crabs, the new visa requirements could doom a struggling industry, leading to a loss of jobs tied to the production of domestic crabmeat. Thus far protests from crab processors have delayed full implementation of the new rules.

A major North Carolina success story dating to the late 1990s was the development of Scallop Medallions. With technical direction from NC State and funding from the FRG program, the

Wanchese Fish Company (www.wanchese.com) developed a profitable line of value-added seafood using Argentine scallops.

This item was launched in response to federal quotas that began restricting the quantity of fresh flounder the company could harvest starting in the early 1990s. To compensate for the loss of production, Wanchese Fish Company began harvesting scallops off the coasts of Uruguay and Argentina. While the scallop market was lucrative, the company also was accruing an inventory of small scallops it could not market.

While at a Japanese seafood trade show during the mid-1990s, one of the company owners, Sam Daniels, observed a vendor selling a scallop patty, which was a single piece of meat formed from smaller scallops, similar to a chicken nugget. In partnership with N.C. State University's Department of Food, Bioprocessing and Nutrition Sciences, the company developed their scallop patty using two types of commercially available protein binders.

Wanchese Fish Company is currently selling approximately 2.5 million pounds of Scallop Medallions annually. To meet the growing demand for its medallions, the company opened Suffolk Cold Storage, located in Suffolk, Va., in December 2001. The 300,000-square-foot facility serves as a state-of-the-art processing plant, cold-storage facility and corporate office for the company's multiple operations.

By constructing a manufacturing operation to produce and cold-store their medallion line, the company has been able to expand into new products made from other types of seafood to service their food-service and retail accounts. When federal rules mandated a 90-day harvest limit on flounder, markets became saturated with fresh product and the company's profits suffered. *With the capability to freeze seafood, market power has shifted from buyers to Wanchese.* Prior to launching Scallop Medallions, 90 percent of the company's seafood inventory was fresh fish. In 2010, the company was doing about 80 percent frozen sales and 20 percent fresh. Up until the mid-1990s, Wanchese offered 25 different items. Now, Daniels notes, the company offers nearly "200 items we sell with different species in all parts of the world" (Shore, 2010).

Barriers to Value Addition

Most North Carolina seafood processors are small, independent operations that do not have the infrastructure or the processing capability to manufacture pre-prepared seafood, particularly RTE products that are suitable for consumption without cooking or that require reheating prior to eating. The majority of fish houses are primarily structured to unload raw seafood from boats, pack and ice it in wax boxes, and distribute a highly perishable product to the wholesale markets where the "best" price can be negotiated.

The logistics of distributing value-added products to customers is another hurdle for fish houses. Many small packing operations are located on or near waterfronts that are distant from the major transportation routes that pass through metropolitan areas of the state. Many of the fish-house owners we interviewed did not have the means to transport their seafood. Those in the central coastal region seemed dependent on a single carrier — Evans Transport of Washington, N.C. — to ship their seafood to customers. In the northern coastal region, small processors seemed reliant on trucks operated by Wanchese Fish Company to distribute their seafood to wholesale buyers. We were struck by a salient realization: If either transport company were to discontinue operations in the near future, many small packing operations would be vulnerable to closure.

A third barrier small processors must contend with when considering the specialty seafood trade is a deficit of sales and marketing expertise to develop long-term, business-to-business relationships with in-state grocery chains and independent restaurant chefs. Many small processors simply lack the time to make sales calls since they are obligated to perform several managerial and labor functions daily just to maintain their businesses.

To be successful in the value-added market, processors need regular contact with grocery buyers to learn the kinds of new products consumers want. They need to be in frequent communication with chefs to learn the kinds of custom processing commodities require for ease of preparation and to ensure rigorous quality standards are routinely met. Absent hiring a dedicated sales person, processors could contract with food brokers who are paid on commission; however, brokers often can represent the interests of many clients. As a result, brokers may not always be willing or able to deliver an exceptional degree of effort to all of their clients' sales and marketing needs.

Pricing and Availability of North Carolina Seafood

We contacted 110 retailers across North Carolina over a three-month period. The markets were segmented into three geographic regions, with 40 surveys completed in the western region, 40 surveys in the central region and 30 surveys in the coastal region. The western region included Charlotte, Winston-Salem, High Point and Greensboro. The central region included Durham, Cary, Raleigh and Fayetteville. The eastern region included Greenville, Wilmington and a coastal market containing various towns primarily located in the southern half of North Carolina's coast. This coastal market was added to our study because most of the seafood sold across the state was found to originate from the mid to southern area of our coast.

Forty-seven percent of the 110 retailers surveyed were larger chain grocery stores, which included Food Lion, Fresh Market, Harris Teeter, Kroger, Lowes Foods, Piggly Wiggly, Trader Joe's and Whole Foods. Fifty-three percent were smaller retailers, such as independent grocers

and sole proprietorships. Pricing and availability data were collected for whole crab, flounder and shrimp caught and sold in North Carolina.

Our study found evidence that availability and knowledge of local seafood decreased from the coastal region toward inland markets. However, when local seafood was available at retail, we found no indication of significant price variation regardless of the retailer’s geographic proximity to the coast. This suggests that seafood prices are set based on market conditions as opposed to being largely cost based (e.g., accounting for shipping cost). This finding is in line with the long-standing practice of offering seafood to consumers at “market price.” **Figure 2** shows the number of retailers that carried each of type of seafood and separates the results into three geographic regions.

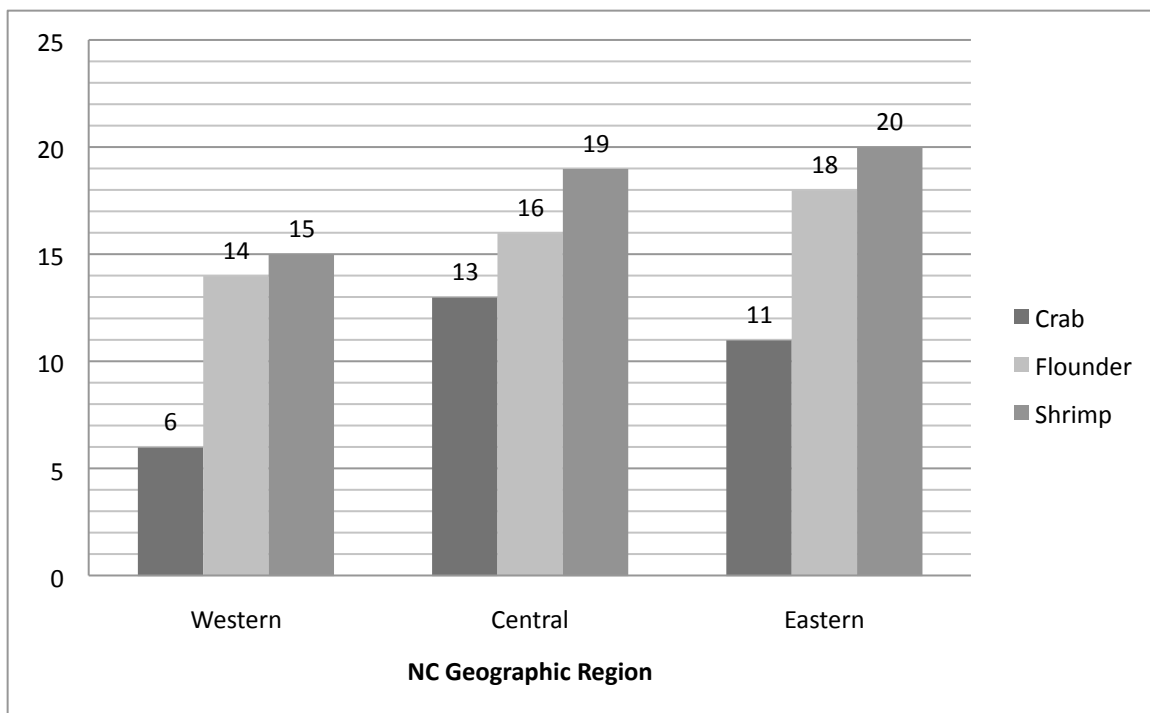


Figure 2: Comparison of North Carolina Seafood by Geographic Region

The percentage of retailers that carried each type of seafood in each region is shown in **Table 1**.

	Western (%)	Central (%)	Eastern (%)
Crab	15.00	32.50	36.67
Flounder	35.00	40.00	60.00
Shrimp	37.50	47.50	66.67

Table 1: Percentage of North Carolina Retailers Carrying Local Seafood

Our *a priori* assumption that retailers farther west in the state would be less likely to carry local seafood is supported for the most part by this data. For example, two-thirds of all retailers surveyed in the eastern region carried shrimp, which decreased to 47.5 percent across I-95 in the

central region, and decreased even further to 37.5 percent in the western region of the state. However, it should be noted that during the collection of this data, North Carolina was off season for flounder and shrimp. The results concerning the availability of those two types of seafood might be higher if data were collected during their in season.

Our research suggests that larger retailers and grocery stores like Harris Teeter, Kroger and Whole Foods tend to be uniform across the state in terms of seafood supply. This consistency of supply may be attributed to the heavy presence of imported, and often frozen, seafood being stocked in these retail grocery stores. Although some variation was found, these retailers have a limited, or nonexistent, offering of local North Carolina seafood. An unexpected finding from this study was the limited knowledge among purveyors about the origin of the seafood they were offering consumers. This is problematic because even if well-informed consumers inquire about the origin of the product, local or imported, the frontline seafood workers are in large part unable to answer this question.

The larger retailers and major grocery store chains offered a surprisingly small selection of local North Carolina seafood. Out of three Kroger stores, one Piggly Wiggly and four Trader Joe's surveyed, not a single store carried local seafood. None of the 10 Food Lions surveyed carried local whole crab or shrimp, and only one store carried flounder (Wilmington) but had very limited knowledge of where exactly in the state the flounder was caught. None of the 12 Harris Teeters surveyed offered local whole crab or flounder and only one carried local shrimp (Winston-Salem). The Harris Teeters in Durham, Greenville, High Point and Raleigh all carried "East Coast Shrimp" but at different prices (\$9.99, \$10.97, \$9.99 and \$8.99, respectively). The employees at these stores had very little knowledge of the seafood they sold and could only speculate as to the origin of the shrimp based on what they could read on the package.

The only local seafood the nine surveyed Lowes Foods carried was shrimp and they seemed to have a larger selection than many of the other retailers. Those stores carried medium-sized shrimp for a price range between \$6.97 and \$7.99, large shrimp for \$9.99 to \$10.99, and one location had jumbo shrimp for \$11.99. This could indicate that Lowes Foods tends to carry a better selection of seafood than many other large retailers, or that their seafood counter employees have greater knowledge of the seafood carried. Or it could simply mean that they have better customer service skills and offered more information than other stores.

Out of the seven surveyed Fresh Markets, none carried local whole crab and only one carried flounder (Greenville). However, that store also carried imported flounder from Canada that was being sold at the same price (\$12.99) as the local flounder. The employee at the seafood counter explained that the Canadian flounder was more popular but did not indicate a reason why imported seafood would be chosen over local seafood at the same price. All of the Fresh Markets but one (Raleigh) carried local shrimp, which was being sold for \$12.99. Only one of those

stores (Greensboro) offered local shrimp at a cheaper price (\$9.99), but that could have been a store special. Overall, the seafood counter employees at all of the Fresh Markets seemed to be more knowledgeable of the seafood their store carried.

The largest variance between stores was Whole Foods. Of the six stores surveyed, only one carried whole crab (Durham, \$5.99 each). All but one of the Whole Foods carried flounder (Cary), but there was a significant price difference among those stores. Two stores sold local flounder for \$8.99 and three sold it for \$17.99 (one store from each geographical region). This could indicate a difference in leftover supply from when North Carolina flounder was in season rather than a departure from uniform pricing at Whole Foods across the state. Only three carried local shrimp, which also showed a fairly large price difference. The Wilmington store offered shrimp for \$9.99, the Raleigh store for \$11.99 and the Durham store for \$12.99; however, this price range increased the farther west in the state the stores were located.

Our study also finds that smaller retailers and independent grocers vary significantly across the state in regard to availability of local seafood. In the coastal regions, smaller retailers tend to have a large supply of product across many types of local seafood. On a positive note, and as one might expect, these smaller retailers were far more knowledgeable about the source of the seafood they offered. Moving westward and further inland, the availability of local seafood diminished significantly. This finding is not unexpected and further bolsters support for our finding that local seafood suffers from a fragmented and underdeveloped supply chain moving west from the coast to large metropolitan centers and markets further inland.

Our research uncovered significant differences in prices of local seafood across the retailers sampled. Our survey indicated that shrimp was the type of local seafood with the highest availability in the state. However, very few retailers were able to report what variety of shrimp they had in stock. When considering only medium and large shrimp, the reported prices ranged from around \$4.99 to \$8.49 per pound for medium shrimp and from around \$7.99 to \$15.99 per pound for large shrimp. Of the 54 retailers that carried local shrimp, only 18 were large retailers.

Most retailers indicated that fresh flounder was too expensive in the off-season and were unwilling to pass along a per pound price of \$20 to customers. This indicates a need for managing finfish inventory in season to be distributed more profitably during the off-season. Local flounder ranged in price from around \$3.99 to \$17.99 per pound, and of the 48 retailers that carried local flounder, only seven were large retailers.

Few retailers reported having whole crabs available for consumers, often citing a lack of demand. The prices ranged from \$2.79 to \$3.99 per pound, \$4.00 to \$5.99 per crab, or \$10.00 to \$18.99 per dozen. Our survey identified a small number of retailers near the coast selling crabs by the bushel at a rate of \$145 for ones (large males), \$65 to \$85 for twos (smaller males) and

\$55 for threes (females only). Anecdotally, a retailer in Raleigh offered whole crabs by the bushel available by special order only at a price of \$130 per bushel with size depending on availability. Of the 30 retailers that carried local whole crab, only one was a large retailer.

Although not the focus of our survey, we unexpectedly found that knowledge of local seafood (product origin, local or import, etc.) decreased as we surveyed retailers moving away from the coast. We also observed a noticeable difference regarding local seafood knowledge among retail type. For example, smaller retailers were more knowledgeable about price, availability and origin of their seafood than larger retailers.

In sum, our survey did not identify a correlation between the price of local seafood starting from the coast and moving inland toward western markets. However, a clear correlation emerged in relation to the supply of local seafood available at larger grocery stores (less available) and smaller, independent grocers (more available). As mentioned, one noteworthy and unexpected finding was the pervasive lack of knowledge among retailers regarding whether the seafood they offered was locally harvested in North Carolina. One may infer from this lack of knowledge that the seafood in question was most likely not local to North Carolina and was most likely imported.

While enormous resources have been spent studying the marine environment, little has been done until recently to address the problems of watermen and processors as they face rising costs, increased competition from imported seafood, lower monetary return for their products and a decrease in the availability of waterfront access where they can land their harvests. Efforts in other coastal states, from government entities, the private fishery sector and by industry participants, continue to experiment with ways to mitigate these challenges and leverage new opportunities. **Figure 3** shows the challenges faced by North Carolina's seafood distribution channels that we identified during the course of this study.

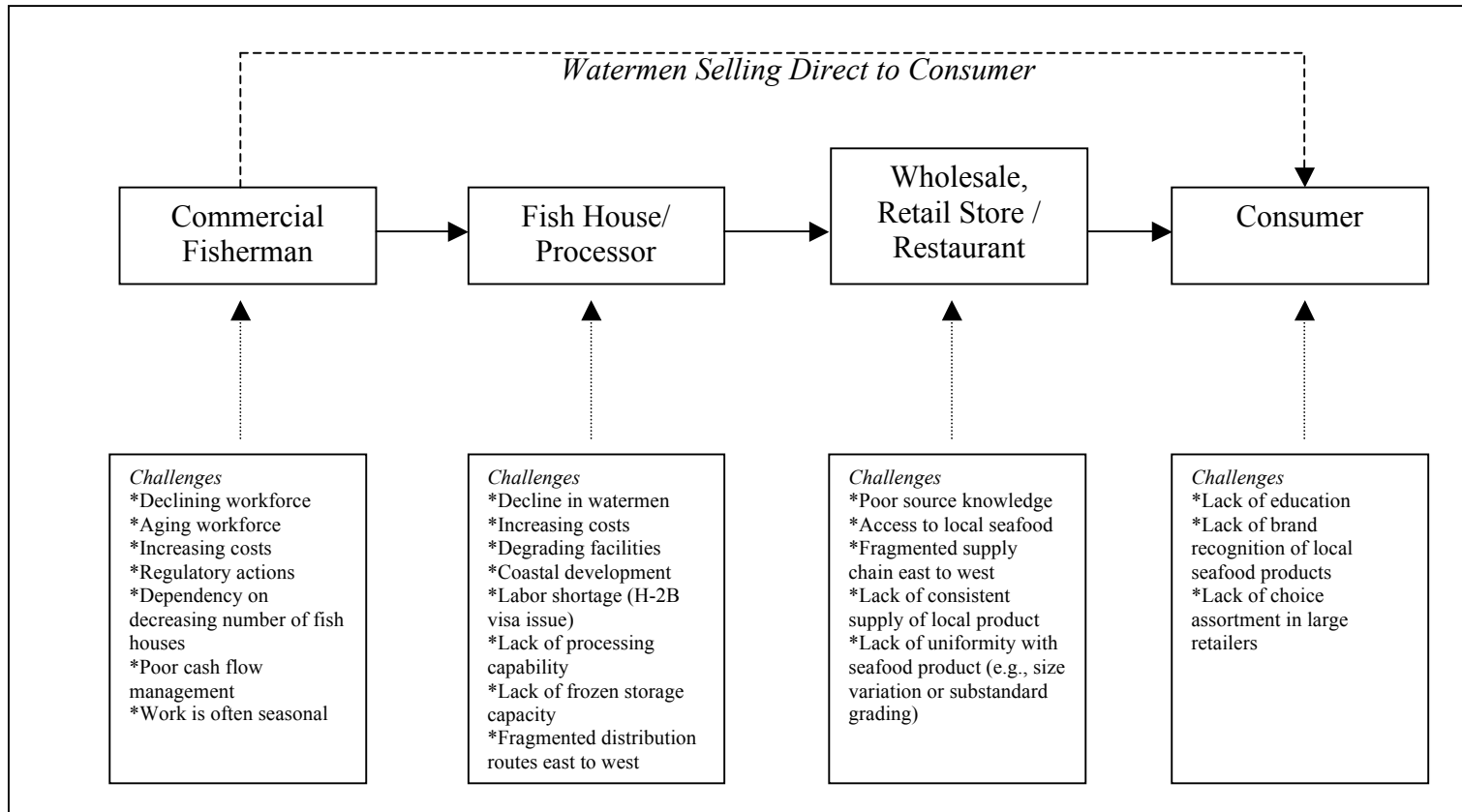


Figure 3: North Carolina Commercial Seafood Distribution Channel — Industry Challenges

RECOMMENDATIONS

There is so much uncertainty in the industry right now. That makes it tough to plan for the future. Just reducing some of that uncertainty would help.

– Fish-House Operator

Our research identified five primary areas of concern across the commercial fishing industry in North Carolina: (1) a fragmented supply chain from the coast to inland markets within the state, (2) watermen becoming increasingly dependent on a declining number of fish houses, (3) a decline in the number of commercial fishermen, (4) a need for a more coherent and aggressive marketing strategy statewide, and (5) a need for consumer education regarding the source of seafood, as well as the economic benefit of buying local seafood.

Improve the East to West Supply Chain

Shipping seafood north from the coast is not a problem, but shipping routes going west toward Raleigh and Asheville are not really available.

– Fish-House Operator

The North Carolina fishing industry and the state of North Carolina must strengthen the seafood supply chain and more opportunities must be provided for the industry to process, store, market and sell its products within the state. We have two recommendations. First, develop a coastal cold-storage and processing facility. Second, develop an inland aggregation and distribution facility.

- 1) A coastal cold-storage and processing facility would increase the flow of local seafood into both coastal and inland markets. This endeavor could raise the capacity for high-quality freezing and storage, while also housing the value-added production facilities that wholesale and retail accounts require. One or more of these facilities could be aggregation staging areas to help move seafood product up and down the coast and inland. This would facilitate local seafood penetration into coastal restaurants and retail operations.
- 2) The development of an inland aggregation and distribution facility would be a large step toward improving east-to-west seafood distribution. It is our assessment that one of the most pressing issues facing the commercial fishing industry in North Carolina is the lack of established distribution channels moving westward across the state. Such a facility would consolidate product and establish a central location for shipping from the eastern part of

North Carolina and then aid distribution into major urban markets in the west. These western markets hold great potential as they have high-income populations that maintain a strong desire for North Carolina seafood.

Interview respondents had many ideas surrounding the development and management of such a facility. The vast majority was particularly concerned with the potential facility's management structure, with watermen and fish house operators both suggesting that a third-party be enlisted. The most promising suggestions focused on current models onto which the facility could be piggybacked, such as the State Farmers' Market or agricultural marketers/distributor enterprises such as Eastern Carolina Organics or Feast Down East. These organizations already are skilled in food marketing, sales and distribution. Such enterprises create links between farmers and buyers, including restaurants and even individual chefs. Business relationships are then created, along with distribution programs that deliver farm products directly to these buyers.

Marketing Strategy

Local seafood has a positive image but we need more promotion letting people know that commercial fishermen are really running a family business on the water.

– Fish-House Operator

Research identified three primary opportunities to enhance the current efforts to market local North Carolina seafood.

- 1) Greater support is needed to help local catch groups promote the use of North Carolina seafood products to coastal restaurants. While tourists and other visitors may assume they are enjoying North Carolina seafood when dining at coastal restaurants, our research suggests this is often not the case. Provided with the appropriate funding, catch groups can address this problem at the local level.
- 2) Frequently during this research, interview participants explained how they had found success by developing a niche marketing strategy. For example, some fishermen had created opportunity within a particular consumer segment, others had experimented with harvesting and processing techniques to cater to the broader sushi market, and still more had increased profits by processing local seafood into value-added packaged consumer goods. Successful fishermen and fish house operators were innovators, characterized as creative thinkers open to new ideas. The state of North Carolina would benefit by supporting these individuals as they continue to build inland distribution routes and develop niche markets for high-value local seafood products.

- 3) Seafood certification and traceability programs are growing in popularity among seafood providers and conscientious consumers. Paralleling similar trends in agriculture, seafood consumers increasingly want to feel connected to the source of their food, and they want to know their food has been grown and harvested in an environmentally friendly manner. The seafood industry in North Carolina can leverage this consumer trend by investing in efforts to develop a commercial seafood certification program while incorporating a more comprehensive element of traceability. Such a program would confirm to consumers a product's local origin, and provide assurance that any price premium over imported seafood is well worth it.

Consumer Education

We have good safety standards so local seafood is safe to eat. With imported seafood, who knows? Consumers don't think about this or realize where their seafood comes from.

– Commercial Fisherman

Research indicates that additional education is needed among consumers and purveyors of seafood at the retail level. One approach is to further enhance the efforts underway by North Carolina's catch groups, NCDA&CS and North Carolina Sea Grant. The catch groups have developed websites to promote the processors, restaurants and retailers that offer local seafood to the public. The Seafood Marketing Division at NCDA&CS provides services to help businesses better promote local seafood and workshops to help owners improve their business acumen. The N.C. Fishery Resource Grant Program, administered by North Carolina Sea Grant, funds cooperative research among commercial fishermen, seafood processors and university researchers to improve, in part, efficiencies in harvesting seafood, in processing and developing value-added products, and in creating marketing programs to support new products. Unfortunately, the Fishery Resource Grant Program no longer receives state funding. This funding should be restored. Both the North Carolina Catch program and NCDA&CS efforts merit stronger support to maximize economic opportunity.

RECOMMENDATIONS FOR FUTURE RESEARCH

We send our seafood to other states where it's processed and then sold back into North Carolina. Why don't we have the facilities to process our own seafood and brand it right here?

– Fish-House Owner

We recommend six areas for further research related to the North Carolina commercial fishing industry.

- 1) A formal economic impact analysis should be conducted as part of the facility development strategy of both a coastal cold-storage/processing facility and an inland aggregation/distribution facility.
- 2) The state should carry out a new comprehensive assessment of the commercial fishing industry's contributions to the state economy. Although at the outset this study cites the analysis done by Hadley and Crosson (2010), their research is problematic in that the total economic impact of the North Carolina commercial fishing industry is unknown. Such a lack of knowledge is likely to lead to an underestimation of the true economic impact of this industry and presents challenges when making decisions on the allocation of resources.
- 3) The commercial fishing industry faces labor issues on two fronts: A decline in fishermen due in part to an aging workforce, and the challenges around H-2B visas for the labor necessary to operate a processing facility. An analysis needs to identify successful practices that create opportunities for new and young farmers, and evaluate their potential for the commercial fishing industry.
- 4) Regulatory activity surrounding the H-2B visa program has made it increasingly difficult for seafood processors to access the required labor. Due to the inherent seasonality of the harvest, seafood processors rely on this program to source temporary labor when need is high and reduce labor costs when the need is not as great. Future research may wish to consider possible solutions to this labor challenge that would allow processors to become less dependent on the H-2B visa work program.
- 5) Effort would be well spent gaining a better understanding of the potential economic impact of developing the state's marine aquaculture assets. Currently, there are a number of marine aquaculture scientific research projects underway in North Carolina.

This continues to be a developing industry with nearby states (Virginia and Maryland) emerging as leaders. North Carolina is uniquely positioned to benefit from aquaculture due to the state's abundant coastal resources. Although urgency is called for in regard to the commercial fishing industry, aquaculture represents an intermediate and long-term strategic opportunity for North Carolina.

- 6) Research is needed on methods and strategies to improve profitability of commercial fishing operations. For example, how well do watermen understand business practices such as cash flow management and acquiring capital to expand and operate a commercial fishing enterprise? What practices are being used for accounting, managing costs and budgeting in the presence of limited financial resources? This research would be particularly beneficial when paired with a youth entrepreneurship program to encourage and educate the next generation of watermen.

CONCLUSION

North Carolina faces the very real possibility of continued decline in the commercial fishing industry unless immediate strategic steps are taken. This report identifies a set of findings and recommendations that will help establish sound strategies. Far more analysis and engagement is required, however, to fully plumb the economic potential of what can be a sustainable natural resource industry. Continued decline need not be the future when demand is growing for fresh, safe, high quality local seafood. Capitalizing on the opportunities will assure not only economic stability and growth, but also the heritage of a way of life that has long been a point of pride for North Carolina.

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APPENDIX A: INTERVIEW QUESTIONS FOR FISHERMEN
COMMERCIAL FISHING RESEARCH
FISHERMEN INTERVIEW QUESTIONS

GENERAL INFORMATION:

Business / Fisherman Name and Location

Interview Location (if different from above)

Interview Respondent(s)

Researchers Present ___ Kros ___ Nash ___ Rowe ___ Other (_____)

Interview Date ___ Month ___ Day 2012 Year

Interview Time Start _____ am / pm Finish _____ am / pm

Additional Notes:

**COMMERCIAL FISHING RESEARCH
FISHERMEN INTERVIEW QUESTIONS**

GENERAL QUESTIONS:

1. How long have you been in business in commercial fishing?

2. How did you get started in commercial fishing?

3. What varieties of seafood do you harvest?

4. When one species is out of season, do you continue fishing for something else?
____ Yes ____ No

5. When you need information to help you with your business, where do you look?

OPERATIONS QUESTIONS:

1. If money was no object, how would you improve your operations on-the-boat?

2. Of the improvements you mentioned, which ones would add the most efficiency to your operations?

3. Do you talk with fishermen from other states?

_____ Yes _____ No

a. If so, how often?

4. What are fishermen in other states doing that could be done in North Carolina to benefit your business?

5. What can the State of North Carolina do to help your business?

DISTRIBUTION QUESTIONS:

1. What percentage of your catch goes to wholesale versus retail?

_____ % Wholesale _____ % Retail

2. We are trying to learn where North Carolina seafood goes after it is harvested and sold by fishermen. Where does your catch go once you sell it?

3. Do you think your catch is being blended with imports?

_____ Yes _____ No

4. Other than the customers you are currently selling to, what are some other ways you could sell your catch?

5. How do you think efforts to brand “North Carolina Harvested Seafood” are benefiting your business?

6. How could practices in the North Carolina seafood industry be changed in a way that would improve your business?

7. What can processors and distributors do to help your business?

PRICING QUESTIONS:

1. The purpose of our research is to learn more about your industry and to help you make more money. To do that, we need to understand important information about the pricing of seafood. Any information you provide will not be shared with anyone else. Would you feel comfortable discussing some issues related to the pricing of the seafood you harvest?

_____Yes _____No

- a. If no, why not?

2. Who do you believe makes the lion's share of the profit from the seafood you harvest?

3. Do you believe you are being treated fairly in regard to the price you are paid for your catch?

_____ Yes _____ No

a. If no, what do you think could be done to increase the price you are paid for your catch?

4. On average, how much are you being paid for shrimp, crab, and/or flounder by retail and by wholesale?

Shrimp	Retail: \$_____ /	Wholesale: \$_____ /
Crab	Retail: \$_____ /	Wholesale: \$_____ /
Flounder	Retail: \$_____ /	Wholesale: \$_____ /

5. How much do you think wholesalers are charging their customers for shrimp, crab, and/or flounder?

Shrimp	\$_____ /
Crab	\$_____ /
Flounder	\$_____ /

6. In your opinion, would North Carolina consumers be willing to pay a higher price for locally harvested seafood?

_____ Yes _____ No

a. If yes, how much more do you think consumers would pay on a percentage basis for shrimp, crab, and flounder?

Shrimp _____ % More

Crab _____ % More

Flounder _____ % More

SUMMARY QUESTIONS:

1. Overall, do you believe the commercial fishing industry in North Carolina is heading in a positive or negative direction?

_____ Positive _____ Negative _____ Neutral _____ Don't Know

a. Why do you feel this way?

2. In your opinion, what is working well right now in your industry?

3. Are there any questions that we did not ask that you feel we should be asking?

4. What else should we know about being a commercial fisherman?

5. Do you have any questions for us?

APPENDIX B: INTERVIEW QUESTIONS FOR PROCESSORS
COMMERCIAL FISHING RESEARCH
FISH HOUSE / PROCESSOR INTERVIEW QUESTIONS

GENERAL INFORMATION:

Business Name and Location

Interview Location (if different from above)

Interview Respondent(s)

Researchers Present ___ Kros ___ Nash ___ Rowe ___ Other (_____)

Interview Date ___ Month ___ Day 2012 Year

Interview Time Start _____ am / pm Finish _____ am / pm

Additional Notes:

**COMMERCIAL FISHING RESEARCH
FISH HOUSE / PROCESSOR INTERVIEW QUESTIONS**

GENERAL QUESTIONS:

1. How long have you been in business?

2. How much seafood do you sell annually?

_____ Overall	_____ Local	_____ Imported
_____ Shrimp	_____ Local	_____ Imported
_____ Crab	_____ Local	_____ Imported
_____ Flounder	_____ Local	_____ Imported

3. Do you sell North Carolina harvested seafood to international buyers or markets?

_____ Yes _____ No

a. If yes, approximately what percentage of the local seafood you sell is being shipped outside of the U.S.?

OPERATIONS QUESTIONS:

1. In regard to the operation of your business, do you typically buy local seafood from the same fishermen each year?

_____ Yes _____ No

2. Do you blend local seafood with imports?

_____ Yes _____ No

3. What kind of financial risks do you take, like selling on credit for example?

4. What are processors in other states doing that could be done in North Carolina to benefit your business?

5. Do you have frozen storage capacity?

_____ Yes _____ No

a. If not, how would this improve your business?

b. What is preventing you from having frozen storage capacity?

DISTRIBUTION QUESTIONS:

1. What percentage of your sales goes to food service versus retail grocery versus other customers?

_____ % Food Service _____ % Retail Grocery _____ % Other

2. Do you use company owned fleet trucks or a third party service?

_____ Company Owned _____ Third Party _____ Both

3. How could the current distribution channel for local seafood be improved?

a. What are the barriers to making these improvements?

4. What improvements could be made to the processing of local seafood to better meet the needs of North Carolina consumers?

a. What are the barriers to making these improvements?

5. How could the way you currently sell local seafood be improved?

6. Do you think the sale and distribution of local seafood is similar to the sale and distribution of other foods, like pork or poultry for example?

_____ Yes

_____ No

a. In your opinion, what could the commercial fishing industry learn from these other industries?

PRICING QUESTIONS:

1. The primary purpose of our research is to help you make more money. To do that, we need to understand important information about the pricing of seafood. Your information will not be shared with anyone else. Would you feel comfortable discussing some issues related to the pricing of the seafood you harvest?

_____ Yes

_____ No

b. If no, why not?

2. Who do you believe makes the lion's share of the profit from the local seafood you handle?

3. Do you believe you are being treated fairly in regard to the price you are paid for your product?

_____ Yes _____ No

a. What do you think could be done to increase the price you are paid for your product?

4. On average, how much are you being paid for shrimp, crab, and/or flounder?

Shrimp	Retail Grocery: \$_____ /	Food Service: \$_____ /
Crab	Retail Grocery: \$_____ /	Food Service: \$_____ /
Flounder	Retail Grocery: \$_____ /	Food Service: \$_____ /

5. On average, how much do you think fishermen are being paid for shrimp, crab, and/or flounder?

Shrimp	\$_____ /
Crab	\$_____ /
Flounder	\$_____ /

6. When considering fishermen selling their catch to the wholesale market, do you believe they are getting a fair price for the seafood they harvest?

_____ Yes _____ No

a. Why or why not?

7. In your opinion, would North Carolina consumers be willing to pay a higher price for locally harvested seafood?

_____ Yes _____ No

b. If yes, how much more do you think consumers would pay on a percentage basis for shrimp, crab, and flounder?

Shrimp _____ % More

Crab _____ % More

Flounder _____ % More

SUMMARY QUESTIONS:

1. Overall, do you believe the commercial fishing industry in North Carolina is heading in a positive direction or a negative direction?

_____ Positive _____ Negative _____ Neutral _____ Don't Know

a. Why do you feel this way?

2. In your opinion, what is working well right now in your industry?

3. Are there any questions that we did not ask that you feel we should be asking?

4. What else should we know about the processing of North Carolina harvested seafood?

5. Do you have any questions for us?

APPENDIX C: RETAIL PRICE SURVEY FORM

Retail Price Survey

[1] Market

- Cary Greenville Other
-
- Charlotte High Point
 Durham Raleigh
 Fayetteville Wilmington
 Greensboro Winston-Salem

[2] Retailer Information

Name: _____
Address: _____
_____ Phone: _____

[3] Species Price

Crab
North Carolina \$ _____ / _____ Not Available
Imported \$ _____ / _____ Not Available

Flounder
North Carolina \$ _____ / lb Not Available
Imported \$ _____ / lb Not Available

Shrimp
North Carolina \$ _____ / lb or _____ ct Not Available
Imported \$ _____ / lb or _____ ct Not Available

[4] Where does your local seafood come from?

[5] General Notes:
