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. North Carolina commercial fishermen battle uncooperative weather, rising capital costs, and volatile fuel prices. The challenges are many, but there are also opportunities.

This research identifies ways the commercial fishing industry can meet rising consumer demand efficiently and profitably. The methodology includes a supply chain analysis using in-depth interviews with key stakeholders/participants in the commercial seafood supply chain. A market survey on the pricing and availability of local seafood across North Carolina supplements the research.
KEYWORDS: Supply chain coordination, Commercial seafood distribution, Stakeholder analysis

BACKGROUND

Until the late 1990s, North Carolina fishermen earned sustainable incomes supplying wild-caught seafood along the East Coast. 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 licensed fishermen participating in the North Carolina industry declined from 5,495 in 1995 to 3,169 in 2011, a 42.5 percent reduction (N. C. Division of Marine Fisheries, personal communication, August 9, 2013). Furthermore, the number of seafood packers declined 36 percent between 2000 and 2011 (Garrity-Blake and Nash, 2012). This research included interviews with twenty packers/processors/fish house operators with 11 from the Northern coast, 7 from the Central coast, and 2 from the Southern coast. In addition, 17 watermen were interviewed with 9 in the finfish area and 8 in the shellfish area. Finally, 7 interviews were conducted with wholesalers/distributors and/or Marine Fisheries officials.

Challenges Confronting the North Carolina Seafood Industry

Imported Seafood

The value of local seafood has declined as less expensive imports took market share from North Carolina producers. A drastic reduction in the number of crab-processing facilities illustrates the devastating impact of imports North Carolina’s most valuable fishery. In 1982, the state had 45 certified crab-picking operations. As of 2011, the number was 12 (N.C. Shellfish Sanitation, 2013).

Regulatory Environment

Analysts at the North Carolina Division of Marine Fisheries, the state agency that manages marine resources, concluded depressed prices and declining harvests since 1997 were due primarily to regulations and natural fluctuations in fisheries stocks (Garrity-Blake and Nash, 2012). Stricter regulations have resulted in a 15 percent decrease in the number of watermen over the last decade in addition to declining seafood-packing capacity (N. C. Division of Marine Fisheries, 2012a; N. C. Division of Marine Fisheries, 2012b; Garrity-Blake and Nash, 2012).

Labor Shortage

Globalization and tighter regulations have generated a shortage of captains and crew to operate fishing vessels. Sociocultural and economic research by the North Carolina Division of Marine Fisheries reveal a state at risk of losing its commercial-fishing workforce as older fishermen exit the industry with fewer younger individuals willing to replace them (Garrity-Blake and Nash, 2007).

Waterfront Development

A dramatic increase in new residents along the state’s coast during the last decade coupled with the rising price of waterfront real estate incented 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 incomes. Those who could not or would not endure any more financial hardship were predisposed to sell their harbors and waterfront fish houses to homebuilders.

**Volume Fishing Model: The Decline and Resultant Model**

Since the late 1990s, harvest quotas, moratoriums and other regulations imposed by state and federal fishery managers have given rise to what 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 that 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. Today, more than 86 percent of the seafood consumed in the United States comes from overseas, (NOAA Fishwatch, 2013). Yet the demand for local seafood is increasing because of concerns over product safety, nutrition and viable local-food economies.

**Consumer Preferences for Local Seafood**

A 2005 survey at the North Carolina 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 the University of North Carolina-Greensboro showed 83 percent of respondents were willing to pay a price premium to ensure they were served local seafood (Andreatta 2006).

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 seafood: People who value local want a personal connection with their fisherman (Nash and Andreatta, 2011).

A 2007 survey by the University of North Carolina-Chapel Hill revealed 95 percent of respondents said they would buy branded, local seafood if it were available in North Carolina markets further inland from the coast (Nash and Andreatta, 2011). Furthermore, sixty-seven percent of seafood processors surveyed in 2011 said the demand for local seafood had increased since 2005, particularly among tourists, second-home owners and out-of-state retirees. These individuals tended to be college-educated professionals with sufficient disposable incomes to pay premium prices for local products (Garrity-Blake and Nash, 2012). As a result, the demand for North Carolina seafood is increasing even as the number of watermen and processors continues to decline.

**LOCAL SEAFOOD SUPPLY CHAIN**

North Carolina’s commercial fishing industry faces complex issues in processing, adding value to seafood, distribution and pricing. Figure 1 displays the challenges faced by North Carolina’s seafood supply chain identified during the course of this study. 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.
Coastal Supply Chain Challenges: From Waterman to Fish House

The supply chain for North Carolina seafood starts with the waterman and fish houses, and operates with a number of inefficiencies, one of which involves those holding “channel power” — the degree that an entity controls others in the supply chain via pricing, product, or product placement.

Watermen generally work for themselves as small businesses, and in most cases, they have established relationships with a particular fish house. 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 to fishery regulations, the weather, the seasons and the changing migratory patterns of certain commercial species. This introduces the first “kink” in the supply chain: unpredictable availability.

Business planning is challenging for watermen who attempt to balance time on the water with fuel costs, regulatory quotas and harvest seasons. The watermen do not know the total amount of product they can sell until the landings occur. This variability sometimes leads to an oversupply of product, which drives down market values. This is the second, and potentially most costly, kink in the supply chain: a high-value, raw material being sold at economy prices. This second kink robs both watermen and fish houses of higher profits, termed the Bullwhip Effect. It occurs when variability and uncertainty distort information within the supply chain, leading to tremendous inefficiencies for all the entities.

Waterman and Fish House Relationship: Mutual Dependency and Battle for Channel Power
Watermen and fish houses have a symbiotic relationship. 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. In the struggle for channel power, information is withheld by either the watermen or the fish-house operators and increases supply chain variability, exacerbating the Bullwhip effect. Both sides claim to have the most at risk and that both are mistreated by the other.

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. Watermen appear to have low channel power compared to fish houses as they have little control over sales and distribution.

**Supply Chain Intermediaries: Fish Houses and Wholesalers**

The main intermediaries in the seafood supply chain are fish houses and their wholesale customers where supply chain issues also manifest. When the supply of shrimp, for instance, exceeds consumer demand, fish houses have a glut of product they need to “unload” quickly as most fish houses rely on ice as their only means of preservation. Consequently, high-quality, domestic shrimp is often sold to economy food processors at low or near break-even prices. Interviewees seemed to agree if they could freeze and aggregate their seafood, they would have greater control over distribution, especially when demand translated into higher market prices.

**Supply Chain Endgame: Shipping North, Fragmented Inland Channels, and Relationship to Large Buyers**

The availability of seafood in general does not translate into the availability of North Carolina seafood at grocery chains and restaurants. This research indicates the availability of local seafood decreases as distance from the coast increases. Distribution north along the East Coast is well developed in wholesale markets such as Washington, D.C., Baltimore, Philadelphia, New York City and Boston, but not from the coast to inland markets within North Carolina. These networks are fragmented, with several small independent distributors moving product to markets in Raleigh, Greensboro and Charlotte. 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 accounts. Profitable inland markets do exist but the risk of “going it alone” was too great for many fish-house owners.

Most watermen want to deliver their harvests to fish houses, get paid, and prepare for another fishing trip. Similarly fish houses want to deliver their seafood to wholesalers, 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.”

Along the coast small retailers all had a good supply of North Carolina seafood and were extremely knowledgeable about their products. In large retail markets, however, most in-state grocery chains did not specifically carry locally caught seafood. This was more prevalent moving inland into markets west of the coast. Most fish houses are independent entities located largely in rural coastal areas that are remote from transportation routes that feed into metropolitan markets. Consequently, the current industry business model is not conducive to servicing large supermarket chains that require a steady, reliable source of local seafood the year round.
The research suggests grocery stores tended to have a uniform supply of seafood because of the availability of imported products. In the coastal regions, smaller retailers tend to have a diverse supply of local seafood. In sum, the research identified a clear correlation in relation to the supply of local seafood available at larger grocery stores (less available) and smaller, independent grocers close to the coast (more available).

**OPPORTUNITY IN VALUE-ADDED MANUFACTURING**

The national demand for local seafood is growing, but more Americans are seeking out the convenience of pre-prepared meals since they 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. The U.S. Department of Agriculture's Rural Business Development Program characterizes the addition of value to agricultural products, in part, as a change in the physical state or form of the product.

Market research shows consumers will pay premium prices for further-processed foods that are healthy, flavorful and especially, easy to prepare (Sloan, 2008a; Swientek, 2008; Sloan, 2008b). In 2012, Garris-Blake and Nash (2012) reported that 29 percent of the seafood 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.

Although the opportunity is clear, there are 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. A majority of fish houses are primarily structured to unload raw seafood from vessels, pack and ice it in wax boxes, and distribute a highly perishable product to wholesale markets where the "best" price can be negotiated. 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. As a result, the logistics of distributing value-added products to customers is a significant hurdle for fish houses.

**RESULTS**

This study addresses the challenges of managing the seasonality of local seafood versus the level of consumer demand throughout the year. In particular, suppliers were asked how they can avoid supply shortfalls by storing seafood when it is abundant and holding it for later sale at a more favorable price.

The 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. This 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 (Kros, Rowe, and Nash, 2013).

**Aggregation Facility Development and Marketing Strategies**

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 focused on marketing and product branding emerged from research and extensive interviews with participants in the commercial fishing industry:

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**

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.

North Carolina faces the likelihood of continued decline in the commercial fishing industry unless immediate strategic steps are taken. This research 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 industry. Continued decline need not be the future when demand is growing for local seafood. Capitalizing on the opportunities will assure not only economic stability and growth, but also will preserve a heritage and lifestyle that has long characterized the North Carolina coast.

REFERENCES


