

BUILDING A SUSTAINABLE VALUE CHAIN FOR NEW ENGLAND GROUND FISH

Finance Needs and Opportunities for Investment

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New England Finfish Finance Needs Assessment project

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Future of Fish is a nonprofit systems change incubator. We work with entrepreneurs, industry players, and investors to create business solutions to ocean challenges. Based on previous work, we continue to engage with several entrepreneurs working in New England fisheries who may be appropriate participants in the opportunities outlined herein. However, all opportunity areas provided in this report are based on new research and analysis and are not designed to benefit any particular business entity.

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Table of Contents

1	Executive Summary
9	Chapter 1 Overview and Current Status
22	Chapter 2 High-Level Value Chain Analysis
36	Chapter 3 Financial Needs Assessment
43	Chapter 4 Existing Sources of Financing
46	Chapter 5 Gap Analysis
57	Chapter 6 Opportunity Areas and Next Steps
68	Bibliography
73	Appendix A Historical and Regulatory Highlights of the New England Groundfish Fishery
77	Appendix B Recent Trends Related to Fleet Consolidation
87	Appendix C Study Methodology
88	Appendix D Sample of Grassroots Initiatives Needing Financing (Gloucester, MA)
93	Appendix E Available Financing to the New England Groundfish Fishery
111	Project Team

Executive Summary

Introduction

The goals of this report are to assess the constraints in the New England groundfish fishery and uncover opportunities for fundable initiatives that might both ensure its economic viability and support the conservation management successes secured through sector management.

The New England groundfish fishery has experienced decades of decline, and the communities that rely on it for economic sustenance have faced continual crisis. In 2010, the New England Fishery Management Council implemented a system of sector management with the intention of reversing those trends. However, achieving overall improvements in stock health and fishers' livelihoods has proved challenging.

The fishery was declared a disaster by the US Department of Commerce in September 2012, and quotas for key stocks were slashed severely in early 2013, further burdening already flailing businesses. Local waterfront landscapes are dotted with vacancies and companies on the verge of bankruptcy. A significant portion of fishers and other seaport business owners—overwhelmed by uncertainty and the prospect of losing their incomes, as well as their only known way of life—show signs of psychological stress disorders. The need for intervention is critical, and the timeline is urgent.

As with any crisis situation, within the desperation also lay creativity and resilience, demonstrated by the actions of key community and industry players fighting to save this iconic fishery. Our research aimed to learn from those stories. We interviewed fishers and seaport businesses (75 total), whose individual tales knit a tapestry of challenge, disruption, and loss; we also spoke with representatives from financial

services institutions (25 total) tasked with the unenviable challenge of finding ways to invest in an industry rife with risk and lacking in capacity.

We conclude that there are a number of opportunities for foundations and financial institutions to engage with the fishery now as it continues to adjust to conditions under sector management, as well as to invest in philanthropic and business initiatives that show promise for bringing the fishery back to prosperity. Among those opportunities, three thematic intervention areas were identified:

- Facilitate the transition to effective quota management at the fisher level.
- Streamline and enhance policies to build more efficient market structures and regulation.
- Support the development of new, innovative, early-stage development opportunities and the establishment of potentially scalable business models.

While there are no easy paths forward, our assessment offers valuable context for any actor interested in creating new opportunities and participating in the next phase of innovation in financing fisheries work.

The following pages summarize key content for each chapter.

Chapter 1—Overview and Current Status

Overfishing in the Western Atlantic is not a contemporary development, as consumers across the globe have been gorging on New England's iconic groundfish stocks for centuries. Yet formal policies to curtail overfishing are fairly new. Beginning in the 1980s and until the early 2000s, fishing was governed largely (and rather unsuccessfully) by command-and-control measures, such as restrictions on vessel size and gear, daily catch limits, finite numbers of days-at-sea, and closed seasons and fishing areas. In 2010, the New England Fishery Management Council (NEFMC) adopted a new regulatory regime for the Northeast multispecies fishery: sector management.

Sector management relies on self-forming cooperatives of permit holders that receive portions of each groundfish species' total annual catch limit based on members' individual permit histories. Sectors were intended to revolutionize how

fishers approach their trade by redirecting the competition that tends to drive common-property resource conflicts. In its nearly four-year existence, sector management has redefined the culture and economy for New England's groundfish fishers. Many have had to change their harvesting strategies, purchase different gear, implement new data-collection and reporting systems, accept new monitoring requirements, enter into financial and legal arrangements with other fishers, and create new transaction schemes with buyers.

Compounding those challenges, a combination of environmental, regulatory, and market factors has made it difficult for fishers and port-based businesses to maintain profitability. Severe cuts in quota, decreased local landings, uncertainty over future stock assessments, dock-price fluctuations, competition from foreign imports, high quota lease pricing, and the threat of fleet consolidation are creating economic problems for both the individuals and the waterfront communities reliant on New England groundfish. The long-term sustainability of the fishery is in jeopardy, and efforts to intervene must address the fragile reciprocity between nature and culture so that both may thrive together.

Chapter 2—High-Level Value Chain Analysis

The value chain is defined as the entire suite of activities involved with bringing a product from its origin through to its delivery to the final consumer. In New England, the seafood value chain comprises three primary channels—the high-end consumer market, the midrange consumer market, and the commodity market—which all differ in terms of quality, price, volume, sales method, and level of processing.

Our snapshot value chain analysis outlines the roles, relationships, constraints, and opportunities of key players and entities involved in the Northeast multispecies groundfish fishery, including: sectors; permit banks; small- and large-vessel fishers; port-based vessel services; auctions; processors; distributors; community-supported fisheries (CSFs); specialty distributors; sales outlets; and end buyers. Our summaries and insights are based on interviews with value chain players in each of the major New England ports, and highlight their perspectives on current challenges and potential solutions for a sustainable future in the industry.

That network of interrelated players encompasses local, regional, national, and even international markets. Inputs such as quota availability, as well as fuel and ice, impact the flow of fish through the value chain—and in some cases, the quality of the product itself. To illustrate those dynamics, we examine how players interact within and operate through four distinct marketing channels: CSF, differentiated product, forward contract, and commodity. The majority of fish moves through the commodity channel (~90%); the least moves through the CSF channel (~2%).

Our assessment indicates that certain segments of the market are beginning to capitalize on growing demand for differentiated products—similar to what has been seen in recent years for agriculture—revealing the potential to shift more of the industry away from commodity fish and toward end markets that value local, storied, and/or traceable fish. These channels tend to involve shorter value chains, more balanced power distribution among players, and higher prices for fishers. Further, shifting from middle-chain business models built on margins to models based on fee-for-service could capture the true value added by each player in the chain. Finally, when demand dictates supply, the result is better planning, less waste, and less uncertainty.

Chapter 3—Financial Needs Assessment

The financial needs of the New England groundfish industry vary across regions, ports, and even wharves. Common denominators exist among the challenges these communities face, but individual and business situations are highly specific. Both environmental change and regulatory volatility contribute to business uncertainty, which ripples throughout the value chain and remains a deterrent for the financial sector in providing investment, and for fishers and port-based businesses in seeking investment. The challenges exist within a complex milieu of hostile and strong opinions about the viability of the fishery, along with the predictable human impulse to assign blame for the local economic toll caused by the combination of scarce fish and a shift in fishery management.

The inability to catch ample volumes of fish—whether because of natural causes or falling quotas—was universally listed as the primary challenge by fishers, vessel servicers, auctions, processors, distributors, and financial institutions alike. Other common concerns of fishers included: lack of

necessary quota; high cost of leasing quota; high operating costs; unpredictable and insufficient dock prices; competition from imports; vessels in disrepair; poor portside infrastructure and market access; and psychological stress. The challenges of port-based businesses often mirrored those of fishers, especially because their profitability depends on the viability of the fleet they serve. Unlike those that rely exclusively on landings, however, dealers and processors have the option—which they have readily pursued—to offset local fish shortages by abandoning the domestic market in favor of imports, which represent a significant component of the New England supply chain.

Based on interviews with fishers and port-based businesses, we outline some specific initiatives that could help meet their immediate and long-term needs. Given that any intervention will require buy-in from stakeholders, one financing strategy could be to fund initiatives conceived within the communities themselves. Already some New England fishing communities, sectors, and community-based organizations are working to innovate around the most pressing problems posed by the groundfish crisis (see Appendix D).

Chapter 4—Existing Sources of Financing

Due to the nature of the constraints identified in the New England groundfish value chain—and in particular, the immaturity of the opportunities for intervention—we use an intentionally broad interpretation of “financing” and “investment” for the purpose of this report. Although traditional definitions of those terms do not include grant-based instruments, we incorporate grant-based opportunities on a selective basis into our analysis of existing sources of financing to the fishery, in addition to traditional debt and equity options. A representative list of specific financing options available to participants in or related to the New England groundfish value chain can be found in Appendix E.

Debt financing is widely available in the region. While the majority of financial institutions we spoke with accept a variety of collateral, few are able to accept permits, or do so at steeply discounted values. Most require 100 percent of the loan value in collateral. And although some that are more familiar and comfortable with the fishing community accept vessels and other equipment as collateral, the majority accept only more traditional forms, such as real estate and assets.

State and federal loan programs have a strong presence in the region through the Farm Credit System and the Small Business Association (SBA), which made low-interest disaster loans available to groundfish fishers in Massachusetts and New Hampshire in November 2013. Community development financial institutions (CDFIs), such as Coastal Community Capital and the Coastal Enterprise Institute (CEI), are examples of local banks working directly with the fishing community to meet their needs on the best terms possible while encouraging sustainability in the fishery. We include quota leasing through permit banks as a form of debt financing for this assessment, as we found that it is an essential instrument for some fishers.

Finally, we spoke with Wells Fargo, Alaska Commercial Fishing and Agricultural Bank (ACFAB), RSF Social Finance, and the California Fisheries Fund (CFF) to provide perspective from other regions and other fisheries. Although these organizations offer essentially the same terms as others local players interviewed, CFF and ACFAB have a core mission of supporting the regional fishery, while RSF and CFF support only sustainable organizations. Additionally, these organizations are generally willing to use permits as collateral (unlike in New England) and have developed a practice of and familiarity with lending to participants in the seafood value chain.

Other financing instruments are available, but are limited in various ways. Equity investment options remain narrow, compared with debt financing. Although interest exists, the continued flow of equity out of this market and the continued business uncertainty make new equity investments a difficult proposition, except at the higher levels in the value chain or for certain innovators.

Grants and other financial instruments, such as the New Market Tax Credit program, also exist in this market, as do grant programs such as the Saltonstall-Kennedy Grant Program and the National Fish and Wildlife Foundation (NFWF) Innovation Fund. However, those are typically targeted at enhancing collaboration and innovation at a community level, as opposed to at a company or corporate level. As such, they tend to focus on nonprofits, community initiatives, or research programs with limited applicability to the current value chain. In large part, this is driven by a concern regarding private gain from public funds.

Chapter 5—Gap Analysis: Industry Needs, Existing Capital Resources, and Potential for Impact

While we found a good number and variety of existing capital resources, gauging the effectiveness of those resources is confounded by dynamic market conditions and temporal changes: what was well designed for the fishery as it existed two years ago may not be appropriate today. We conclude that barriers to the economic viability of the fishery are attributable to multiple causes, and are not necessarily due to the lack of effective financing.

In fact, biomass decline, uncertainty about the status of groundfish stocks, and stock assessment variability all affect the ability of fishers to land sufficient volume and are significant barriers to offers and acceptance of financing. In fact, they are leading drivers to a self-reinforcing negative feedback loop (adapted from M. Odlin, 2013) constraining the value chain and causing stagnation of capital resources for value chain participants, particularly fishers. Those factors are:

Leading Drivers

Biomass decline and stock health uncertainty. Diminishing populations of certain species and uncertainty about the future health of groundfish stocks remain high in the system, making business planning difficult, if not impossible.

Stock assessment variability. The variability of the stock assessment process, which determines annual quotas, is a key driver of business uncertainty, but also influences stock recovery (if quotas are set too high or too low).

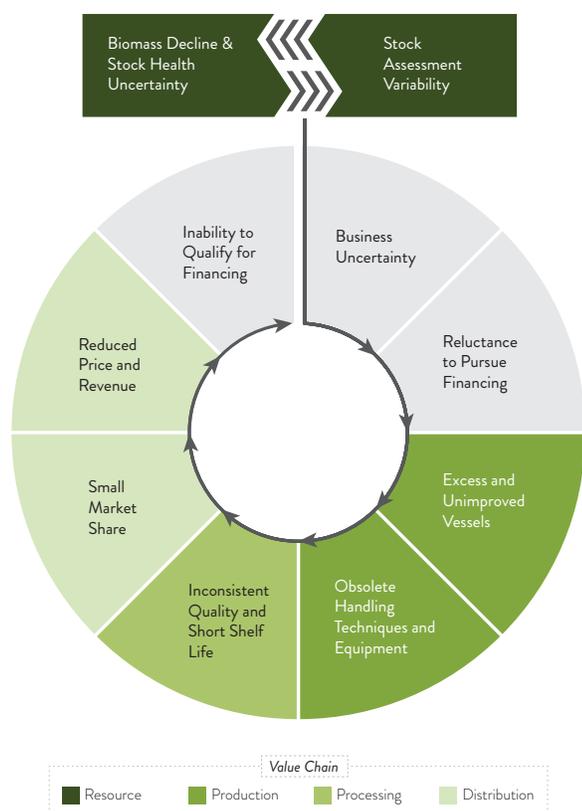
The signals generated by those two elements have created a crisis of confidence in the business community, demonstrated by a high degree of business uncertainty, especially for those most reliant on the resource.

Lagging Indicators

Business uncertainty. Given the challenges with declining biomass and accessing stocks, both fishers and groundfish-related businesses are uncertain about their abilities to generate sufficient volumes to even remain in business,

let alone repay any investments. Business uncertainty, due to the leading drivers, is a key element that perpetuates the feedback loop.

Reluctance to pursue financing. Borrowers or potential borrowers, concerned about the business uncertainty generated by the leading drivers, cannot be confident of a positive cash flow from fishing. Because of previously pledged collateral as well as a conservative approach to financing, most fishers are either unwilling to apply for financing or unable to qualify.



Credit: adapted from Odlin, 2013

Excess and unimproved vessels. The current trend of fleet consolidation and contraction, and de facto capital flight, is expected to continue, and the inventory of inactive vessels for sale has reduced resale prices, depressing the collateral value of active vessels for fishers seeking financing. This depression, along with business uncertainty, means vessel owners are very cautious about investing in vessel upgrades.

Obsolete handling techniques and equipment. Because vessel owners are not investing in vessel or fleet improvements, their equipment and handling techniques have not kept pace with international competition or with sustainability practices.

Inconsistent quality and short shelf life. Older vessels utilizing obsolete techniques and outdated on-board equipment compromise the quality of local, fresh seafood products, placing them at a disadvantage in the local market, where they are considered a commodity. Processors are able to import higher-quality frozen products instead.

Reduced market share. When higher-quality substitutes are available in the market at lower prices, demand declines for the local, higher-priced product and shrinks market share. On a related note, over time the diminishing production of New England fishers reduces their influence on players higher in the value chain, making it harder to negotiate for either market share or better price when quality improves.

Reduced prices and revenues. With the exception of CSFs and specialty distributors operating in the “high value” channel of the value chain, no quantifiable demand currently exists for a differentiated fish product from the Northeast multispecies groundfish fishery, which makes imports ready substitutes for the majority of the market. Landing fish at a cost greater than their value on the market naturally leads to lower revenues and profits.

Inability to qualify for financing. For many fishers, the existing constraints combine to make accessing financing impossible. Risk assessments of their businesses by any financial institution would highlight the preceding factors, and make them ineligible for a loan or equity investment.

Perceived risk of investment is typically determined by location of the applicant within the value chain, with those closest to the resource deemed the riskiest. Vessel owners are subject to variability in regulations, fishing quota, market pricing, and environmental conditions. Whereas port-based businesses typically can insulate themselves from those dynamics, once fish landings and fleet sizes contract below a certain level, even they find it difficult to make a business case for financing.

Given the perceived risks, the debt activity in this market is fairly stagnant. Debt-based financing typically requires proof of positive cash flow in addition to collateral, which is a difficult proposition for most value chain participants, particularly vessel owners. Our interviews with lenders indicated that traditional forms of value chain-based investments such as short-term inventory, contracting finance, or longer-term cash flow finance are available in the market, but may or may not be utilized due to market conditions.

An even more difficult sell is equity financing, although it could be appropriate for a few supply chain innovators with the right investors. The high returns needed in exchange for flexible repayment schedules and lender patience are unlikely to materialize for most value chain participants at this time.

The grant activity in the Northeast fisheries, however, seems rather robust in building enabling environments. We identified several debt programs designed to address the concerns of the fishery, all of which resulted from an initial grant-based approach that either led to or is leading to additional, traditional investment opportunities.

The most readily identifiable environmental consequences relate directly to the lack of ongoing investment in vessels and gear. Upgrading vessels, gear and/or engines could improve (1) fuel efficiency, which would decrease both operating costs and greenhouse gas emissions; (2) fish selectivity, which would reduce bycatch and discards; (3) handling and cold storage, which would reduce waste and increase fish quality; and (4) minimize negative impact to marine habitats.

Due to the low capital activity in New England, and given that we only found one program directly integrating environmental considerations into financing, assessing the influence of capital provisions on environmental considerations is difficult. That said, we think this could be an opportune time to engage the industry and financial community on the topic of sustainable practices with multiple beneficial outcomes. We know that impact lending organizations such as California Fisheries Fund and Conservation International's Verde Ventures Fund have successfully used proactive environmental screens to identify traditional investment opportunities that promote conservation and healthy environments. Permit banks are another mechanism for promoting good environmental practices.

Chapter 6— Opportunity Areas

Based on our assessments of the New England groundfish value chain; the needs expressed by fishers, port-based businesses and financial institutions; and the types of financing available, we have identified eight opportunities for intervention that represent potential solutions to the systemic issues in the value chain, and that target specific factors in the negative feedback loop. Note that some of these opportunities mirror current efforts in the region that are in need of support and scaling.

Opportunity 1: Improve stock assessment methodology. The current stock assessment process has had challenges in accurately projecting groundfish species abundance from year to year—a key driver of uncertainty for members of the fishery, as well as for financial institutions in their assessments of risk. Not only have the models used to estimate stock health resulted in highly variable catch limits, but they have failed in their goal of rebuilding overfished stocks according to established timelines, even though fishers are reporting fishing within their set quotas. We recommend that efforts to develop and implement improved stock assessment methodology, with improved monitoring, should be collaboratively developed by the relevant stakeholders, from fishers to NOAA's National Marine Fisheries Service (NMFS) and the New England Fishery Management Council (NEFMC).

Opportunity 2: Promote transparent permit transfer and quota leasing mechanisms. The opaque nature of permit transfers and quota leasing prevents some financial institutions from accepting permits as a form of security, which, in turn, denies fishers access to capital. Currently, because there is no permit registry that records ownership, liens, and transfer history, a financial institution runs the risk of a permit owner transferring a permit without first paying the loan. The lack of quota lease information makes it difficult to calculate a capitalization rate to determine asset value. A transparent permit transfer and quota lease market would build awareness of price fluctuations over the long-term, enabling fishers to more efficiently plan purchases and manage their business practices. Permit and quota price trend information would also be valuable to financing institutions seeking either to collateralize permits or to invest in the fishery. Initial efforts may focus on engaging the relevant financial institutions in

identifying and addressing constraints to financing permits and in promoting a transparent leasing market through grant-based opportunities. This would ideally support the involvement of a network of brokers in the region. It should be noted that while some of financial institutions have encouraged transparency in the quota lease market, fisher resistance to this idea seemed particularly high, and their significant mistrust would need to be addressed. Given the relatively nascent sector management system and the unique regional conditions, more research is needed to explore market-led solutions to enable this opportunity.

Opportunity 3: Recapitalize permit banks. Expanding permit bank capacity—through the purchase of additional permits or by setting up an exchange to reallocate unused quota—is one way to improve access to affordable quota, increase landings, and raise revenues throughout the local value chain. Grants or low-interest loans (with permits serving as collateral) would be utilized to purchase additional permits and/or help permit banks develop new models of quota acquisition and transfer. Cash flow from leased quota would cover loan payments and overhead, and could eventually cover the purchase of more permits or pay monitoring expenses, as appropriate. An analysis of the various permit banks’ capital structure, as well as the permit and quota leasing markets (supply and pricing) would be required in order to determine the optimum capital size and the expected cash flow from leasing operations.

Opportunity 4: Help fishers diversify. Stock uncertainty, wildly variable catch limits, and insufficient quota allocation make exclusive reliance on the groundfish fishery a risky business model for many fishers. One way to generate smoother, more stable incomes over the short and the long term is through revenue diversification. Diversifying could take the form of continuing to fish, but targeting other, more abundant species; continuing to captain a vessel, but for purposes other than fishing; or pursuing a new career activity altogether. A few existing financial institutions provide grants, debt, and limited equity to individuals and firms seeking to diversify under a range of conditions. In cases where fishers are considered too risky by the traditional banking community, or are unwilling or unable to take on debt, philanthropic capital may be appropriate for guaranteeing loans or otherwise providing transitional support. Given that a chosen diversification strategy must

align with a fisher’s skill set, interests, and ability to receive capital investment—and also be appropriate geographically and with respect to the market and stock health—it is possible that participants in a diversification assistance program will require customized solutions. More research is needed to better understand how this opportunity can be implemented effectively in New England.



Credit: adapted from Odlin, 2013

Opportunity 5: Improve gear and fish handling, and reinvest in vessels. This intervention would serve directly to increase fuel efficiency, species selectivity, and fish quality while reducing environmental impacts in the marine ecosystem—factors that are essential for reestablishing financial sustainability and market competitiveness (specifically with imports). Appropriately structured risk mitigation mechanisms—such as irrevocable letters of credit, guarantees (through philanthropic funds), loan loss reserve provisions and insurance options—could put these changes within reach of fishers and financial institutions. A number of fishers could also benefit from working capital, bridge loans, lines of credit, refinancing of existing loans, and debt restructuring. A proper assessment of the level of risk parties are willing to assume would need to be conducted; likewise, the willingness



of the philanthropic community to underwrite this risk is a key component of this transition-related intervention.

Opportunity 6: Support market development and differentiation.

The development of differentiated markets for locally landed groundfish should help fishers garner better, more stable prices, and could result in increased demand for catch landed at local ports. If accompanied by increased quality, then branded, storied fish could gain competitive advantage over imports and help shift demand back to local fisheries. Grants or debt could help establish a program or organization to assist with the development of markets or product branding to effectively differentiate the New England groundfish industry from the global commodity supply chain. Debt or equity may help existing businesses grow their brands or market share. Additional work is needed to determine which specific players are interested in this opportunity, and whether it makes sense to expand existing brands or create something new.

Opportunity 7: Facilitate forward contracting marketplaces.

Current uncertainty over landing prices and volumes is creating a level of market volatility that makes it difficult for anyone in the industry to plan their businesses. Facilitating the development of forward contracting marketplaces would offer fishers the ability to plan their catches based on market demand from seafood buyers, targeting certain species at prearranged prices. As opposed to being beholden to volatile spot pricing, the price stability offered by forward contracts means fishers know their margins and can decide when to fish, how long to fish, what to catch, and when and how much quota to lease-in before they leave the dock. Capital requirements include debt and risk equity to grow the business of the forward contracting marketplace, and short-term debt to prefinance product purchases from fishers. Due to the nascent nature of the opportunity, this is a high-risk investment, and attracting traditional financing may be challenging. Philanthropic capital could be instrumental in providing startup grants, loan guarantees, or program related investments, any of which could be tied to sustainability or impact criteria. Players at multiple levels of the value chain must be recruited to build these systems.

Opportunity 8: Build business ecosystems. “Business ecosystem” refers to the network of value-chain players involved in the delivery of a product through competition

and/or collaboration. In New England, new business ecosystems could successfully address some of the current problems in the Northeast groundfish fishery by convening around embracing forward contracts, securing a differentiated market for local fish, creating a market for underutilized species, etc. As business ecosystem development requires multiple entities, grants are necessary to support design, convening, and partnership agreements to undertake value chain improvements. Specific pilot projects need to be recognized and businesses need to be aligned to work together. Due to the complexity involved with coordinating agreements among multiple players—as well as the need for a mix of finance vehicles—it is critical to obtain commitments from value chain participants as well as potential funders.

Next Steps

We’ve identified several opportunities for improving the viability and sustainability of the groundfish industry in New England. And while there are no easy or short-term finance solutions to the challenges in the New England groundfish value chain, nor are there readymade options for the instant deployment of traditional investment capital, that doesn’t mean there never could be. In fact, there is an immediate and catalytic role for grants, not only to aid in developing a sustainable groundfish value chain, but also to prepare the fishery for more traditional types of financing and investment.

Given the diversity of the challenges and capabilities of particular fishers, sectors, and ports, we do not expect that every opportunity outlined will be applicable or feasible for every person or business involved in the fishery. Rather, the opportunities are starting points for dialog and for the development of solutions that can be customized to meet specific needs and circumstances. As they stand, the opportunities require further refinement—potentially through convening stakeholders and launching pilot programs—before full pursuit.

Once tested, if the opportunities are to move from proof-of-concept to established business models capable of scaling (and thereby attracting private capital, as has occurred in other markets), they will require grant support. They will also require an unprecedented level of investor collaboration and meticulous deal structuring for the New England markets.

Chapter 1

Overview and Current Status

Overfishing in the Western Atlantic is not a contemporary development, as consumers across the globe have been gorging on New England’s iconic groundfish stocks for centuries. Yet formal policies to curtail overfishing are fairly new. Beginning in the 1980s and until the early 2000s, fishing was governed (rather unsuccessfully) by command-and-control measures, such as restrictions on vessel size and gear, daily catch limits, finite numbers of days-at-sea, and closed seasons and fishing areas. (See Appendix A for a fuller history of the New England groundfish fishery and of US fisheries policy.) In 2010, the New England Fishery Management Council (NEFMC) adopted a new regulatory regime for groundfish permit holders: sector management.

The shift to sector management has required fishers to change how they conduct business—new fishing strategies, managing choke species, timing when to fish and when to lease quota, how to price quota, and whether and how to sell their catch. A number of challenges have emerged as a result:

- **Leasing quota.** The need to lease quota in order to fish is a true cost that fishermen must factor into their decisions about whether or not to fish, and whether or not to hire a crew. Although leasing by days-at-sea was part of the previous management regime, the need to lease quota for specific stocks under sector management requires more complex planning and more risk.
- **Choke species.** The existence of “choke species,” which are assigned low annual catch limits (ACLs), creates a situation where fishers spend more time managing and monitoring their catch. The consequence of exceeding the quota on any one species is either (1) fishers need to backlease to cover the overage, or (2) the entire sector is forced to stop fishing (we found no evidence that this has yet occurred). Fishers often have to travel farther, expending more fuel, to find clean schools with little choke. Leasing quota for choke species can be prohibitively expensive.

- **Business strategy.** The shift from high-volume, low-quality fish to low-volume, high-quality fish often requires the adoption of new fishing strategies and new business models. The ability to recognize quota as part of the business strategy—as opposed to simply an amount of fish—has also required a steep learning curve.
- **Market uncertainty.** Uncertainty about how much fish will be landed, dock prices, and how ACLs will change from year to year (or even within a season) makes it difficult for fishers to business-plan. Many attribute market uncertainty to variable ACLs rather than to sector management itself.
- **Survival of the most entrepreneurial.** Those fishers who have been able to acquire quota, vertically integrate their operations, and add marketing have largely succeeded under sectors, even expanding their businesses on lo-

cal and regional scales. Those who have not been able to make that transition have suffered financially.

- **Concern over consolidation.** After three full years under sector management, the decade-long concerns over excessive consolidation and lack of diversity in the groundfish fleet are reaching their peaks. In January 2011, NEFMC began considering Amendment 18 to address those issues.

Sectors were created to enable fishers to tailor their harvesting approaches in a manner responsive to market demand and fish availability. Sector management aimed to cultivate responsible fishing practices by offering incentives to shift away from the “race to fish” mentality. Without the pressure to fish harder than necessary, proponents of sector management believed that fish stocks would react positively to more

Overview of Sector Management

In 2010, the Days-at-Sea policy that formerly governed the New England groundfish fishery gave way to a system of sector management under Amendment 16 to the Northeast Multispecies Fishery Management Plan. Sector management involves allocating a portion of the annual catch limit (ACL) to temporary, voluntary, self-organized fishing cooperatives (sectors), which can be formed by a group of three or more federal groundfish permit holders.

During the final years of the days-at-sea (DAS) management scheme, when it became clear that a catch-shares management system was inevitable, many fishermen took out loans to finance the purchase of additional permits. Some wrongly assumed that quota allocation would be based on the number of DAS, when in fact, the New England Fishery Management Council chose to base quota allocations solely on vessel landings histories between 1996 and 2006. Those who made extensive landings during the qualifying years (some of whom were the worst overfishing offenders) received adequate allocations; those who either invested in DAS permits with minimal or inapplicable landings histories or who temporarily stopped fishing to give stocks a break

(sometimes at the urging of NGOs or NOAA) received relatively few. Saddled with debt and without the ability to fish, those fishers are suffering the most under sector management.

Sector membership is limited to owners of groundfish permits, although some sectors have additional criteria based on geography or gear type. Sectors receive annual catch entitlements (ACE) for each groundfish species equal to the total Potential Sector Contribution (PSC) of their members. Under sector management, quota is not “owned” by individual fishers, but rather by the sector organization itself. And although sectors can technically choose to redistribute that quota however they wish, every sector reallocates quota according to the PSC brought in by each fisher (minus a risk buffer in some cases). The sector is responsible for ensuring that its members do not collectively exceed the ACE for any species, and for submitting an annual operations plan to NMFS.

As of 2012, 446 (58 percent) of the 764 vessels with groundfish permits were enrolled in sectors, but those permits accounted for 99 percent of the total commercial catch limit for all groundfish stocks.

measured fishing effort. Despite the promise of this policy change, key groundfish stocks remain low and continue a slow recovery. Changing environmental factors such as warming water temperatures and forage fish scarcity make it difficult to gauge the impact of sectors on the environmental sustainability of the fishery. Some attribute the lack of improvement to inaccurate stock assessments, which overestimated the health of the stock, leading to overfishing despite compliance

by fishers. Others allege that the loss of regulations (such as rolling closures or trip limits) that limited fishing effort in ecologically rich areas has undermined the health of inshore environments. There is also concern over the rate of discards, which can easily go undetected or unrecorded due to lack of observation. Still others argue that the quota system has eliminated the worst of the rampant discarding that took place under days-at-sea.

Groundfish Stock Assessment

The Northeast multispecies fishery consists of up to 16 stocks of gadoid and flounder that school together, including Atlantic cod, haddock, pollock, yellowtail flounder, witch flounder, winter flounder, windowpane flounder, American plaice, Atlantic halibut, redfish, ocean pout, and white hake. Some stocks are further divided by geographic region (e.g., Gulf of Maine, George's Bank). Groundfish species share similar habitats and feed on benthic organisms such as polychaete worms, crustaceans, mollusks, and finfish. Food availability, reproduction, and water temperature drive their migration patterns and seasonal distributions. As members of both inshore and offshore ecosystems, they tend to aggregate together and are often caught in mixed numbers by fixed and mobile bottom-tending gear.

Before each fishing season, the New England Fishery Management Council announces annual catch limits for each species in accordance with estimations of stock health and rebuilding timelines for depleted populations. The stock assessment process involves mathematical modeling using a combination of catch data, abundance data, and biological data. Catch data is composed of dealer reports as well as monitoring and observation results, while the other input variables are drawn from data gathered from trawl surveys conducted every three years by the Northeast Fisheries Science Center, a program of the National Oceanic and Atmospheric Administration (NOAA).

Stock assessments have high levels of variability, and are revised frequently due to the appearance of “retrospective patterns” that indicate stock levels are different from what was previously indicated. Some of the inaccuracy stems from the practice of assessing groundfish populations on a stock-by-stock basis, which incorrectly assumes the ecological independence of species within a given ecosystem.

In recent years, consensus among fisheries scientists has built around moving toward an ecosystem-based fisheries management approach that adopts a more holistic perspective on marine predator/prey relationships and the interface between human activities (e.g., fishing, shipping, climate change, offshore energy development) and the ocean environment. The Northeast Fisheries Science Center Ecosystem Assessment Program states that ecosystem-based fisheries management emphasizes a shift toward “establishing spatial management units based on ecological rather than political boundaries . . . consideration of the relationships among ecosystem components, the physical environment, and human communities . . . [and] the recognition that humans are an integral part of the ecosystem” (NEFSC n.d.). To date, there has been no significant move toward implementing an ecosystem-based approach to the management of New England groundfish.

Current Status of the New England Groundfish Fishery

Under sector management, the livelihoods of fishing individuals and businesses depend heavily on annual catch limits. Each year fishermen go into the season with an expectation about what they will catch based on the annual catch limit for each species. Part of their expectation is an assumption that the science is accurate. When it turns out that the catch limit was set too high or too low, then fishermen run into problems maximizing their portfolios of fish, and the effects of unexpected scarcity or abundance ripple through the value chain.

In September 2012, the New England groundfish fishery was declared a disaster owing to the poor stock recovery of many of its species. In January 2013, NEFMC voted to reduce annual catch limits for nine species of cod, haddock, and flounder, with cod quotas being cut by 77 percent compared to 2012. The drastic cuts were based on revelatory scientific findings that stock assessments from 2008 had overestimated levels by as much as 67 percent.

A 2014 report from the NEFMC lists the current status of New England groundfish stocks (see Table 1.1). Of the species under sector management, eight are considered overfished and four are currently undergoing overfishing. Note that every stock at some point was declared overfished, some more than once. Only three are currently considered rebuilt.

Overfishing vs. Overfished

Fishery management in the US is based on the idea of maximum sustainable yield (MSY)—the largest average annual volume (tons) of fish that theoretically can be harvested on a continuing basis from a specific stock given existing environmental conditions.

“Overfishing” is defined by the National Marine Fisheries Service as a current rate of harvest that exceeds the rate of harvest needed to achieve the MSY. If overfishing is severe enough, the remaining stock will be affected, and the stock will be declared “overfished.” That is, its current biomass is less than or equal to half of the calculated biomass needed to produce MSY. Overfished stocks require rebuilding plans to bring populations back to a level where they can produce the MSY.

Despite the terminology, a stock can receive an “overfished” designation for any number of reasons, including actual overfishing, habitat degradation, climate change, ocean acidification, extreme population cycles, and disease.

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Sector management aimed to cultivate responsible fishing practices by offering incentives to shift away from the “race to fish” mentality.

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Table 1.1. Status of New England groundfish stocks under the Multispecies Fishery Management Plan.

Species	Status	Overfishing Now	Year Declared Overfished	Year Declared Rebuilt	Last Year Assessed
American plaice (GOM & GB)	Rebuilding	No	2003		2012
Atlantic cod	Overfished	Yes	2002		2010
Atlantic halibut	Overfished	No	1997		2012
Haddock (GB)	Rebuilt	No	2000	2010	2012
Haddock (GOM)	Nearing overfished	Yes	1999	2011	2012
Ocean pout	Overfished	No	1999		2012
Pollock (GOM & GB)	Rebuilt	No	2002	2010	2010
Redfish (GOM & GB)	Rebuilt	No	2001	2012	2012
White hake (GOM & GB)	Overfished	TBD	1999		2012
Windowpane flounder (GOM & GB)	Overfished	Yes	2010		2012
Winter flounder (GB)	Rebuilding	No	1999 & 2010	2003	2011
Witch flounder	Overfished	No	2003		2012
Yellowtail flounder (GB)	Overfished	No	2005		2011
Yellowtail flounder (GOM)	Overfished	Yes	2002		2012

Note: Several species are managed as two or more separate stocks, based on geographic region: Gulf of Maine (GOM) and George's Bank (GB). Source: New England Fishery Management Council 2014.

Discrepancies in Annual Catch Limits vs. Landings

Table 1.2 provides a summary of groundfish landings by stock compared to annual catch limits (ACLs) during the 2012–2013 fishing season. The data reveal that, in all, less than

one-third of the total allocation was landed. This figure can be explained a number of ways, and each interpretation has its merits.

Table 1.2. Summary of 2012 season landings and ACLs for groundfish species (May 1, 2012–April 30, 2013).

Stock	Cumulative Kept (mt)	Cumulative Discard (mt)	Cumulative Catch (mt)	Sub-ACL (mt; does not include sector carryover)	Percent Caught
Cod east (GB)	37	30	68	162	41.6%
Cod (GB)	1,489	133	1,622	4,605	35.2%
Cod (GOM)	2,084	127	2,211	3,699	59.8%
Haddock east (GB)	288	78	366	6,880	5.3%
Haddock (GB)	927	271	1,198	27,438	4.4%
Haddock (GOM)	213	33	246	653	37.7%
Yellowtail flounder (GB)	202	13	216	368	58.5%
Yellowtail flounder (SNE/MA)	419	44	463	760	60.9%
Yellowtail flounder (CC/GOM)	845	113	958	1,046	91.5%
Plaice	1,368	237	1,605	3,278	49%
Witch flounder	917	66	983	1,448	67.9%
Winter flounder (GB)	1,927	5	1,932	3,387	57%
Winter flounder (GOM)	251	9	260	715	36.4%
Winter flounder (SNE)	1	105	106	303	35%
Redfish	4,108	321	4,429	8,325	53.2%
White hake	2,432	38	2,471	3,283	75.3%
Pollock	6,360	104	6,463	12,612	51.2%
Northern windowpane	0	130	130	129	100.5%
Southern windowpane	0	106	107	72	147.9%
Ocean pout	0	39	39	214	18.3%
Halibut	16	45	61	36	168.7%
Wolf fish	0	30	30	73	41.3%
Totals	23,884	2077	25,964	79,486	32.7%

Note: Numbers are rounded to the nearest metric ton. Some stocks are differentiated by geography, even though some research shows that species do not limit themselves to particular fishing grounds. The regions listed are Cape Cod (CC), George's Bank (GB), Gulf of Maine (GOM), Massachusetts (MA), and Southern New England (SNE). Source: Northeast Regional Office 2014.

1. The fish simply aren't there. That is, fishers are trying to catch the full ACL, but are unable to find adequate numbers of fish. Any number of human and environmental factors could explain this phenomenon, including overfishing, natural cycles of scarcity, or climate change. With respect to the latter, several fishers mentioned that their vessel gauges indicated ocean temperatures had risen three degrees in recent years, and they had seen the mix of species changing as well—more warm-water species from the Mid-Atlantic, and fewer numbers of historically abundant species. If some stocks have simply moved to colder waters (as some conjecture), then the implications for management are enormous. It is futile to base ACLs on projection models for stocks that are unlikely to return because of a changing environment.

Yet, while that explanation may apply to some species, it does not tell the whole story. For example, although total groundfish landings were low, there was significant variability in landings based on particular stock, ranging from 4.4 percent for George's Bank haddock to 168.7 percent for halibut.

2. Choke species. In a fishery where populations share habitat and are often caught together, the stock with the lower ACL limits the harvest of the more abundant stock. And fishers must have quota for all species that might come up in their nets. An example of this interplay can be seen in Table 1.2 with George's Bank haddock and George's Bank yellowtail. GB haddock, which is rebuilt as of 2010, was assigned an ACL of over 27,000 metric tons, whereas GB yellowtail, which is overfished, received an ACL of just 368.3 metric tons. Because haddock and yellowtail school together, fishers with haddock quota also have to hold yellowtail quota in order to account for the bycatch and assumed discards. Fishers limited by GB yellowtail quota simply avoided catching GB haddock. Had fishers accessed their fully allotted quota on GB haddock during the 2012–2013 season, the total percent of all ACL-caught groundfish would have increased from 32.7 percent to 65.7 percent.

3. Midseason ACL increases. Midway through the 2010 season, regulators raised the pollock ACL to six times its original amount, causing pollock prices to plummet. In another instance in 2012, the scallop fishery, which catches yellowtail as bycatch, was projected to have fewer discards than had

been assumed when the ACL was initially established, and the quota was subsequently increased—which would have allowed for additional GB haddock landings. Unfortunately, the fleet had already lost several months of good fishing weather, and some had already begun fishing species in other fisheries (e.g., lobster).

4. Weather. For many fishers, their 2012–2013 fishing season was cut short due to unexpectedly severe wind and storms. Thus, a significant amount of quota was left unfished.

5. Underappreciated species. For redfish and pollock—two abundant, low-value species—over 10,000 metric tons of quota was not landed, presumably due to the lack of a market for those fish. Efforts to build demand for underappreciated species could result in better alignment of quota and landings.

6. Instability of the quota lease market. In its current state, the quota lease market fails to equilibrate supply and demand due to its opacity and variability in prices and quantities. When lease-only permit holders hold out for high prices or when quota floods the market toward the end of the season, the result can be a high volume of quota left on the table. To some degree, this is an issue that could be mitigated with a more efficient leasing market. In our interviews with fishermen, sector managers, NGOs, and NOAA scientists, we found that all these reasons were offered to explain the discrepancy between ACL and actual landings. Fishermen and sector managers were more likely to be optimistic about stock levels and tended to cite inaccurate stock assessments and issues with the quota lease market as the main reasons they weren't catching the full ACL. NGOs were more likely to believe the stocks were depleted and that the fishermen simply couldn't find them. NOAA scientists were aware of the different hypotheses and launched a research project in early 2014 to better understand the issue.

Recent Trends in Fishery Performance

Table 1.3 shows fishery performance measures across the past six years (2007–2012) and reveals several trends, some of which can be attributed to the implementation of sector management, and others that resulted from steady reductions in allocation (either days-at-sea or quota). Among vessels with multispecies permits, the following factors have

all declined substantially since 2007: groundfish landings, total revenue from groundfish, total revenue from all species, total number of groundfish trips, number of active vessels (all species), number of active groundfish vessels, and crew positions. Interestingly, the introduction of sector management in 2010 met with nearly a 50 percent reduction in groundfish trips between 2009 and 2012. While groundfish revenues rose slightly during that time, they fell by over 20

percent between 2011 and 2012, presumably due to cuts in ACE and to a fishing season cut short because of bad weather. Reduced numbers of active vessels have likely led to observed reductions in crew positions, which have fallen nearly 25 percent since 2007. Given the quota cuts for the 2013-2014 fishing year, total landings, total revenues, number of vessels, crew positions, and average revenues are expected to decline further.

Table 1.3. Performance of New England groundfish fishery, 2007–2012, based on vessels with multispecies permits.

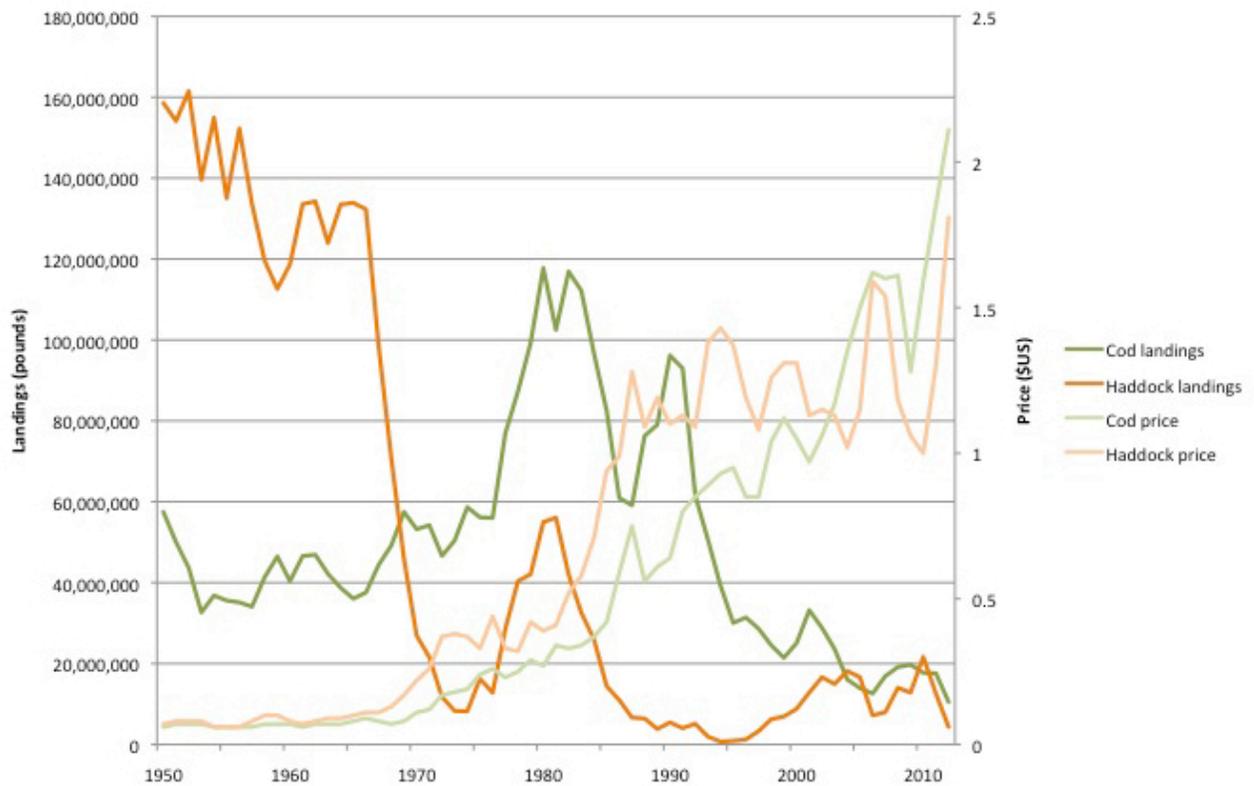
	2007	2008	2009	2010	2011	2012	Change 2007–2012
Landed groundfish (million lbs)	64.00	72.16	68.42	58.18	61.66	46.30	-27.7%
Total gross revenue from groundfish (million dollars)	\$89.06	\$90.13	\$82.51	\$83.18	\$90.45	\$69.79	-21.6%
Total revenue from all species (million dollars)	\$298.25	\$291.48	\$264.74	\$293.81	\$240.36	\$235.73	-21.0%
Total number of groundfish trips	27,004	26,468	25,897	13,474	15,958	14,496	-46.3%
Active vessels (with revenue from any species)	1,082	1,012	916	854	776	764	-29.4%
Active groundfish vessels (with revenue from at least one groundfish trip)	658	611	566	445	419	401	-39.1%
Total Crew Positions	2,687	2,544	2,159	2,099	2,083	2,025	-24.6%

Note: Variations from year to year are not reflected in the percent change from 2007-2012. Sources: NOAA 2011 and NOAA Fisheries 2012. Where discrepancies occurred between the two data sets, the most recent figures were used.

Because cod and haddock have historically been the most lucrative stocks, and the ones on which most fishermen have built their businesses, the reduced landings in recent years have placed many in dire straits financially (See Figure 1.1). Government programs in the 1970s and 1980s incentivized

fleet capitalization, causing stocks to plummet below historic levels in the mid 1990s. Recent price increases are not commensurate with the degree of stock decline due to competition from imports and the global nature of the commodity price.

Figure 1.1. Atlantic cod and haddock landings and prices, 1950–2012.



Source: NOAA n.d.a.

Markets

Unlike businesses that base productivity on the strength of market demand, fishing is a supply-driven enterprise. Because of the unpredictable nature of what may come up in a net, fishers typically supply markets without ascertaining demand, much less price. The result is a volatile and often significant

misalignment of supply and demand, forcing markets to absorb high volumes of product at low prices. Sector management is meant to facilitate business models that can dynamically respond to buyers' needs, a shift away from the old procedure of flooding markets first and asking questions

later. This would lead to stable prices because there would theoretically be fewer instances of oversupply. In a few cases, this shift has occurred. Unfortunately, the overarching problem of uncertain stocks and inconsistent landings creates a level of instability that buyers find intolerable. Many have disengaged from the local groundfish industry and are looking to imports to meet their needs.

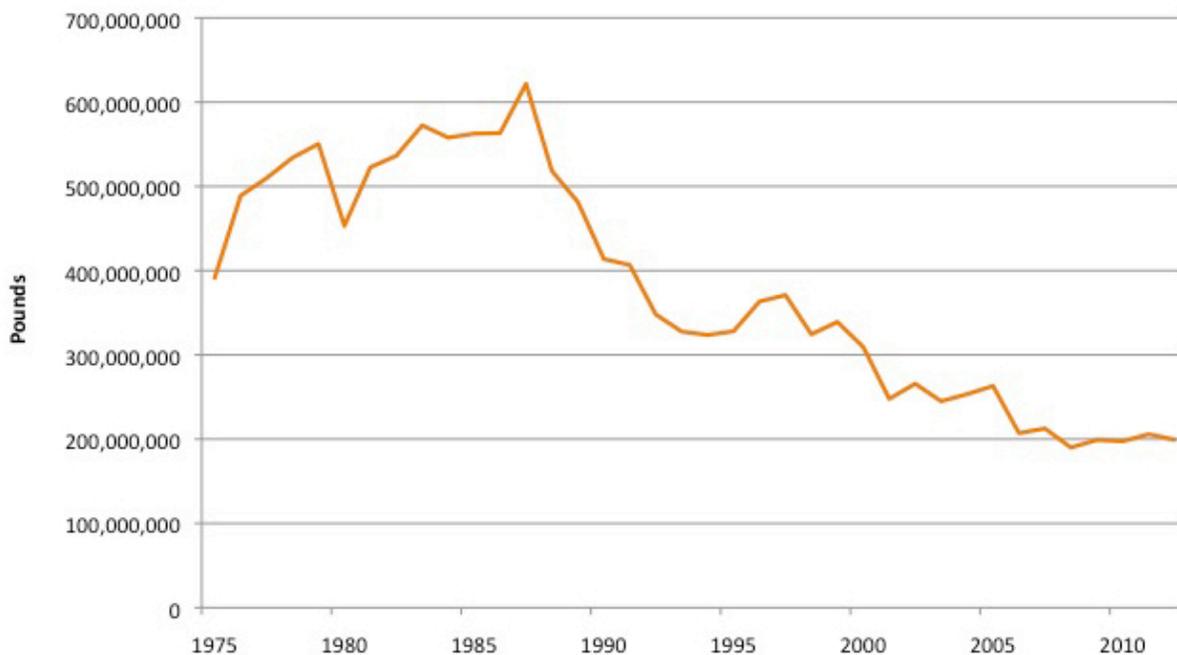
Imports

In 2011, groundfish made up 23 percent of total revenue from all species landed in New England, with cod and haddock accounting for more than half of groundfish volume. However,

New England groundfish supply less than 10 percent of the fish processed and distributed by local seafood companies; some of the major port-based processors buy little, if any, local product. The bulk is domestic and foreign imports, whose fisheries have advantages over New England groundfish due to newer fleets, more technologically advanced handling, and on-vessel freezing.

Annual groundfish foreign imports to New England ports from 1975 to 2012 are charted in Figure 1.2. Overall, groundfish imports to the local ports are declining and are at historic lows. At roughly 200 million pounds per year, imports are more than four times greater than local groundfish landings.

Figure 1.2 Annual groundfish foreign imports to New England ports, 1975–2012.



Source: NOAA n.d.b.

Icelandic Cod

Despite declining cod populations in New England, cod is not a victim of poor management and environmental change everywhere. Cod populations in Iceland and the Barents Sea remain healthy. In Iceland, the total allowable catch for cod for 2013–2014 stands at 214,400 metric tons—a quota 258 times greater than the 830 metric tons set for Gulf of Maine cod. In the Barents Sea, the cod quota of one million metric tons is divided between Norway and Russia.

Many attribute the abundance of Icelandic cod to proper management measures that include an ITQ (individual transferable quota) system, area restrictions, gear restrictions, closed areas to protect habitat, full retention, and proper law enforcement. One of Iceland’s management techniques includes temporary area closures for the protection of juvenile cod; such closures protect immature fish on an immediate and as-needed basis.

Iceland’s waters and the Barents Sea are also home to robust populations of capelin and Atlantic herring, both of which are major food sources for cod and other groundfish species.

The Icelandic fleet embodies a diverse cross-section of vessels and gear types that include longlines, trawls, gill nets, and seines. The fleet’s newer vessels feature on-board refrigeration technologies that allow them to freeze fish while at sea. Other trip and day-boat vessels supplement Iceland’s contribution of fresh cod to international markets. American and European seafood dealers gravitate toward these imports for their quality and reliable supply, especially since Western North Atlantic stocks have continued to decline.

Quota Leasing

Lack of sufficient quota is currently perceived by most groundfish fishers to be their main business challenge. That is in the context of the data indicating that not all quotas are consistently fished. While a range of different reasons may drive this, the opacity in the market is not assisting. While some fishers with insufficient allocation have sold their permits and exited the fishery entirely, others have invested in vessels and equipment that allow them to maximize their efforts to target select species. Often, their ability to fish depends on accessing a lease market that can supply allocation at affordable rates in a transparent manner.

The annual catch entitlement (ACE) lease market is a key component of the groundfish fishery and has factored heavily into fishers’ business strategies. Quota lease transactions occur both within and between sectors, with sector managers serving as brokers. Information about ACE for lease is typically emailed to members of the sector. If there is no interest within the sector, the sector manager will contact other sectors to find a lessee. The amounts and prices of available quota at any given time are unknown, and opaque trading markets and price lags mask the true value of quota.

Fishers typically lease in quota for two reasons: they’re targeting the leased species and intend to sell the catch, or they’re targeting another species and need to lease in quota to cover unintended bycatch (actual or assumed discards). Quota leasing was intended to produce efficiencies. Under ideal conditions of stock abundance, a lease market would equalize supply and demand for quota. Given the current state of the fishery, the scarcity of available quota for some species (i.e., choke stocks) has resulted in a high-priced lease market that is forcing some fishermen out of business.

Demand for choke stocks creates competition between potential lessees, often pitting large-vessel owners against smaller ones. With the days-at-sea (DAS) management system, DAS could only be leased within a vessel size class, or from a larger vessel to a smaller vessel. With sector management, these restrictions have been lifted, allowing large vessels to lease allocation from small vessels, often pricing other small vessels out of the lease market.

So-called “slipper skippers”—permit holders that lease out their entire allocations as opposed to incurring the costs

and risks of fishing—control access to significant quantities of quota, which elicits resentment from many active fishers. It should be noted, however, that some of those permit holders are retired, and quota leasing is a major source of their income. Other such permit holders have too little quota to justify the costs of taking fishing trips, but are hopeful that stocks will recover. In 2012, roughly one-third of permit holders leased their entire quota to other fishers.

In the first two years of sector management, substantial amounts of leased quota went unused, and many fishers lost money. The lesson learned was, don't lease today when you can lease tomorrow. To that point, fishers will fish until they've exceeded their own quotas, and then backfill with leased quota. Thus, quota leasing is being used as a risk mitigation strategy rather than as the planning tool for which it was intended. For some qualifying fishers, permit banks offer small amounts of quota at below-market rates. (Permit banks are discussed in more detail in subsequent chapters.)

Currently, there is not a transparent leasing market for quota, and price volatility is a major issue, inhibiting fishers' ability to plan. The season's market trajectory typically starts in May and June with high lease prices, and then plummets at the end of the season as unused quota and diminished effort drive prices down. Fishers are often uncertain of when to invest in more ACE, as they cannot predict whether they'll be able to land the fish they lease, and do not know the price they'll receive for their catch.

It is not uncommon for the lease prices of choke species to be close to landing prices, which—after factoring in fuel, crew, and other costs—prohibits leasing quota. Lease prices for abundant species can be fractions of a penny per pound, but that quota is typically useless without the accompanying quota for choke stocks. Fishers now speak of spending more time avoiding fish than catching them. In 2011, over 17.8 million pounds of quota (\$15M) was leased between sectors, which accounted for 30 percent of total landings. That figure does not include undisclosed leases that occurred within sectors.

Permit Purchase

Due to the various market challenges documented here, few groundfish permit transfers are reported at the present time.

The following three factors combine to restrict outside capital from interested financial institutions from actively participating in the permit and quota markets in New England.

- **Opacity in the quota lease market.** Lack of information makes it difficult to calculate the cash-flow potential from leasing and, thus, the value of the permit and fishing enterprise.
- **Lack of permit transfer information.** No mechanism exists for sector managers to validate the presence of a lien on a permit with the financial community before a transfer.
- **No third-party verification.** While sector managers facilitate transfers, traditional markets rely on appraisers and brokers to value assets so financial institutions can invest in or lend against the asset. This mechanism is not functioning in New England, where brokers are currently either avoiding or leaving the market due to the uncertainty associated with quota transfers within sectors.

Consolidation

Stock declines, global economic forces, and supply chain demands have contributed to significant structural changes in the industry over the past two decades, including increased fleet consolidation, which has been a point of contention since the move to sector management. Specifically, small-scale fishers and smaller ports are concerned that the current model of quota distribution and reallocation through leasing is driving the industry toward a focus on large vessels with fewer vessel owners (more corporate owners), and fewer ports. They fear consolidation will eliminate the diversity that has historically defined the fishery and is likely key to its longevity.

Many close to the fishery believe diversity provides more than just iconic charm; it confers attributes that help reduce risk and increase resiliency amidst changing ecological and managerial conditions. A more diverse fleet is by nature more flexible—able shift focus among different species and deploy a greater range of gear, which distributes the environmental impact on the ecosystem. Fleet diversity also affects market differentiation (e.g., day boats vs. trip boats, gear selectivity, handling) and allows a greater range of port accessibility. The result is an economic footprint with benefits accruing differentially across portside businesses, communities, and geographic scales. However, while a more diverse fleet may be



more flexible, economically viability is the core of the problem in the New England groundfish fishery today.

More detailed examination of recent trends related to fleet consolidation and diversity in the New England groundfish fishery, as well as the value of the fishery to local economies, can be found in Appendix B.

Challenges to the Sustainability of the Fishery

Just as the definition of “fishery” includes both fish and fishers, the sustainability of a fishery takes on multiple shades of meaning. Environmentally, it entails rates of harvest that allow for the perpetuation of thriving fish stocks and healthy marine ecosystems. Economically and culturally, the term implies the ability of fishermen and waterfront communities to maintain their livelihoods, heritage, and traditions through fishing. Ideally, the sustainability of the stocks and the sustainability of the fishing businesses would go hand-in-hand. Unfortunately, for the New England groundfish fishery both are currently in crisis.

The fishery’s environmental sustainability faces challenges from both anthropogenic and environmental sources. Fishing methods, equipment, and gear types have surged into the twenty-first century propelled by unprecedented technological advances. Many of these improvements have enabled fishers to pursue groundfish with greater efficiency than ever before. At the same time, coastal development has irrevocably altered estuarine habitats that many commercially important fish species and their prey require for successful reproduction. The effects of climate change are apparent: As ocean temperatures rise and pH levels fall, ecosystems are shifting. Fish behavior and lifecycle processes are changing; formerly abundant fish species in the Gulf of Maine and Southern New England have become scarce, and traditionally mid-Atlantic fish are now encroaching on those areas.

The threats to environmental sustainability in the New England groundfish fishery present us with a complex set of environmental, social, cultural, and economic factors, all of which reside in an industry unique for its heterogeneity. The challenge of these issues is how to meaningfully address the fragile reciprocity between nature and culture so that both may thrive together.

Chapter 2

High-Level Value Chain Analysis

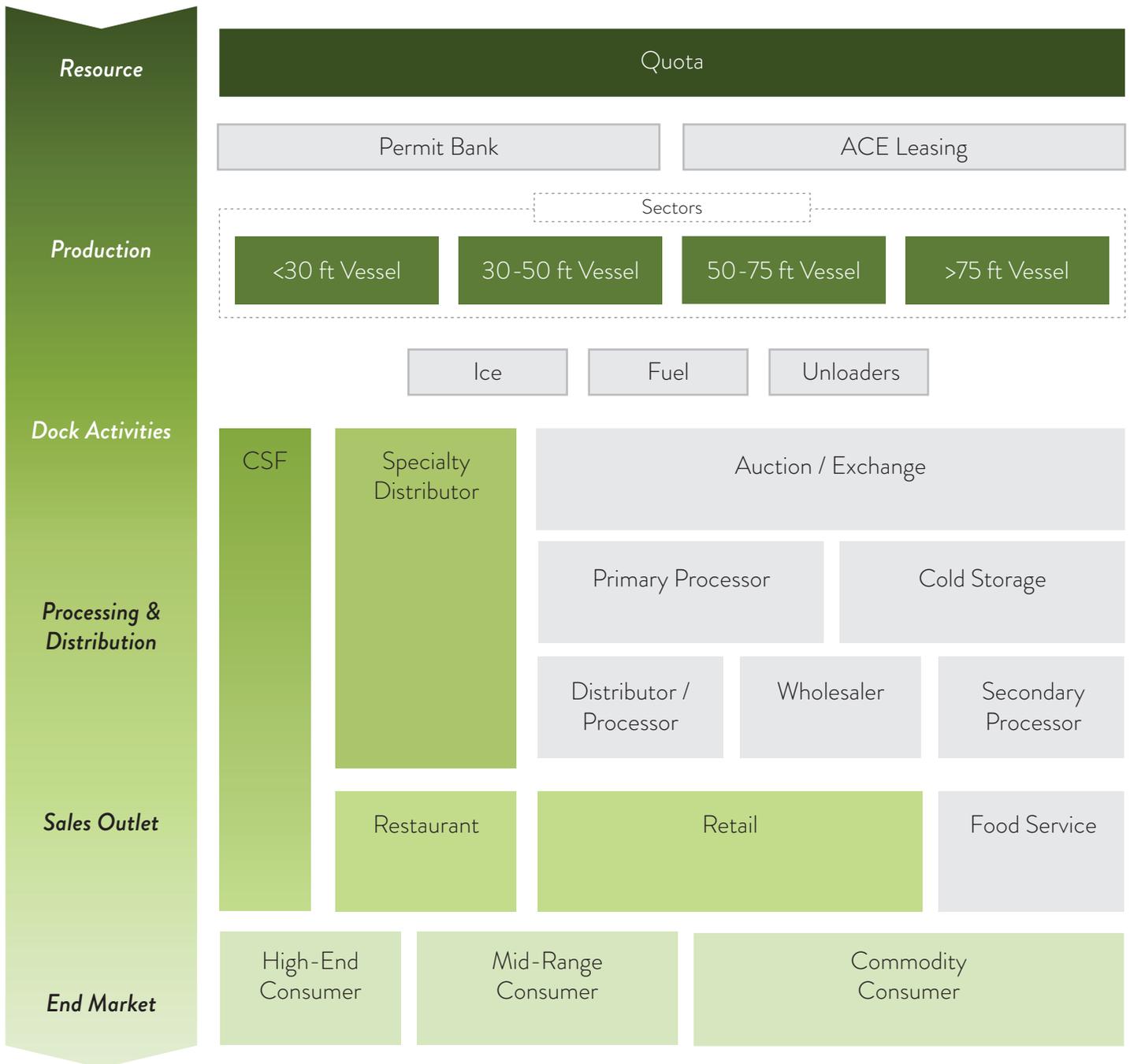
THE VALUE CHAIN

The value chain is defined as the entire suite of activities involved with bringing a product from its origin through to its delivery to the final consumer. While a value chain analysis (VCA) can be as complex as the system of production and exchange being observed, the purpose of our work here is to understand the dynamics of players and entities within the groundfish industry, with attention to fishers and portside businesses as they've adjusted to sector management.

At the simplest level, as reflected in Figure 2.1, VCA maps the flow of goods and services up and down the chain, focusing on the interaction of players in the system, from producer to consumer. Each entity has a different relationship to the resource, and more or less ability to influence its sustainable management (depicted by deepening shades of green). In general, the closer the player's proximity to the resource, the greater the impact. However, there are some upstream players who tend to be more or less indifferent and/or have no sway as to how the resource is managed or harvested.

In the following section we outline the roles, relationships, constraints, and opportunities of the players involved in the New England groundfish fishery. Our entry point is at the level of producers, mapping forward to processors, buyers, and their customers, and backward to input suppliers, with fishing quota as their foundation. Finally, we analyze four marketing channels through which New England groundfish is reaching consumers. We discuss how higher-value fish is differentiated within a small segment of the value chain, which provides lessons on how to maximize the value chain for fishers and other businesses reliant on the fishery. The information presented here is drawn largely from personal interviews with industry members (see Appendix C for our study methodology).

Figure 2.1. New England groundfish industry value chain.



Sectors

Role: Sectors are essentially fisher cooperatives for allocating and managing groundfish quota. Each sector is responsible for submitting an annual operations plan to the National Marine Fisheries Service, as well as for tracking annual catch entitlements (ACE), individual quota and leases, and regular reporting. The sector manager is a government-mandated position that oversees all quota transactions within and between sectors, submits sector operations plans, and reports catch data to the federal government. Most sectors are incorporated as 501(c)(3) organizations. As of the 2012–2013 fishing season, there were 20 total groundfish sectors, four of which were lease-only sectors, in which members were not active fishers.

Relationships: Within the sector, members are required to enter into financial and legal arrangements with one another, as they are mutually accountable for not exceeding the sector’s total allocation of fish. Sector managers act as the interface between sector fishers and the federal government, and are key players in the trading or leasing of quota both within and between sectors. Sectors occasionally work with NGOs and other industry members on gear modifications, administrative training, electronic reporting, business planning, sales, or marketing.

Constraints: Fishing under sector management began May 1, 2010, less than one month after it was implemented by rule under Amendment 16 to the Northeast Multispecies Fishery Management Plan. Now in its fourth year, sector management is still a relatively new system to which the entire fishery continues to adjust. Currently, many sectors have financial difficulties because not enough fish are being caught to cover the fees for overhead costs, such as the salaries of sector managers. Revenues to the sectors include member dues, landing fees (usually pennies per pound), and ACE leasing transaction fees. With recent declines in annual catch limits (ACL), especially for choke stocks, landings have decreased significantly, lowering sector revenues. Most sectors have no history of obtaining outside funding other than the federal grants that covered their startup costs. Several sector managers mentioned the need for short-term working capital to cover the costs of leasing quota. Looming requirements for sectors to pay for at-sea

observers will likely make most sectors insoluble. To date, NOAA has covered this cost.

Opportunities: In addition to providing administrative support—including monitoring ACE and managing data—some sector managers play a larger role in cultivating market opportunities, stocking up on ACE for members, buying permits collectively, and getting involved in policy. Sectors’ nonprofit status makes them potentially eligible for grants, which could be used for any number of purposes, including research, business planning, marketing initiatives, gear changes, or on-board vessel electronic monitoring.

Permit Banks

Role: To date, permit banks have been programs within nonprofit organizations or state governments that purchase permits (and the PSC associated with those permits) for the sole purpose of leasing out allocation to active fishers. In Maine, permit-banking organizations include the Penobscot East Resource Center, the Island Institute, and the Nature Conservancy. In Massachusetts they include the Gloucester Fishing Community Preservation Fund and the Cape Cod Fisheries Trust. The states of Maine and New Hampshire have state-run permit banks. Combined, permit banks own over 95 groundfish permits and serve roughly 190 vessels.

Relationships: Permit banks serve as a backstop against excessive private quota accumulation and help level the playing field for (usually) small-scale fishermen by leasing quota at submarket rates based on eligibility criteria (e.g., geography, gear type, vessel size). Some fishermen claim they would not be able to stay in business without the permit banks. Some others who are succeeding under sector management resent those who rely on permit banks, believing that permit lessees should have made smarter permit investments if they had “wanted more of the pie.” Fishers who lease out their allocation perceive that the permit banks hurt them by suppressing market prices for quota and permits. Despite the stated mission of permit banks, some fishers are wary of institutions that become repositories of quota.

Constraints: High permit values can limit permit banks from acquiring new permits, and declining stocks can make recouping operating costs difficult, as lease revenues

fluctuate based on ACLs. Even with lease prices below market rates, low ACLs inhibit permit banks from making a substantial difference to fishers. Funding to purchase permits and to cover operational costs is typically provided by government or foundation grants, or low-interest loans, with permits serving as collateral.

Opportunities: Permit banks have been useful for gear research, allowing new entrants into fisheries and affordable access to quota. By establishing specific eligibility criteria related to gear specifications or fishing grounds, permit banks could influence fishing behavior toward better resource stewardship. There is interest in exploring ways to grow small fishing businesses using permit banks. With loans and grant funding, some permit banks are expanding into other species besides groundfish to facilitate revenue diversification. For permit banks with positive cash flow, there may be opportunity to use those profits to offset monitoring costs, which are presumed to eventually be the responsibility of the industry.

Small-Vessel Fishers

Role: Small-vessel (day-boat) fishers operate 40- to 60-foot boats and typically do inshore day trips only. During DAS, when inshore fishing was limited to small vessels, their inability to fish in stormy or windy weather resulted in de facto fallow periods for fish stocks. Day boats are typically owner-operated, with captain and crew working together on deck. Day boats have limited geographic range and capacity, and thus tend to fish within a relatively short radius of their home harbors. Small ports, in exchange, rely on small vessels to support local businesses, as most small port infrastructure and services cannot accommodate larger vessels.

Relationships: Day-boat fishers sell to auctions or independent buyers. Some have arrangements to tie up at these facilities for the convenience of unloading directly and picking up ice. However, the tradeoff is often an inability to negotiate on price or sell to other buyers. Pricing for these transactions can be highly volatile and based on the global commodity market, with little to no premium recognized for quality. In most cases, fishers have no knowledge of the price they will receive until the fish is landed. However, some day-boat fishers sell to CSFs or specialty distributors; through forward

contractors; and, occasionally, directly to consumers where quality and provenance are valued.

Constraints: Small vessels are limited by an inability to access offshore grounds and by weather restrictions. High fuel costs, vessel maintenance expenses, and crew shares mean vessel owner-operators already struggle to make positive margins; many have cash flow problems. Increased pressure from high quota prices, an opaque lease market, and fluctuating ACLs make business planning impossible, and have created a significant financial burden for many. Because many captains are fishing only a few months out of the year, they are finding it difficult to hire and keep experienced, dependable crew. Others can't justify the cost and now fish without a crew, which raises safety concerns.

Additionally, small-vessel fishers have few options for conventional financing, as many are already in significant debt. Some have used state-run revolving loan funds to buy new vessels. Most refuse to take out bank loans for capital improvements when the future of the resource is so uncertain. Some are hamstrung by poor credit and limited, if any, collateral. Friends and family tend to be more reliable sources of outside funding when it is needed. Some fishers rely on permit banks for accessing affordable quota.

Opportunities: Some small-vessel fishers are increasingly relying on non-groundfish species—such as lobster, scallops, or monkfish—to become more profitable. Others are vertically integrating and actively marketing their fish through co-ops, CSFs, or direct relationships with buyers, in order to control price and distribution. Some are attempting to stay in the groundfish fishery by targeting and promoting more abundant, yet underutilized species (e.g., redfish, pollock, dogfish). Many day-boat fishers are convinced that their fresh product is superior to anything flash-frozen, and are attempting to gain a competitive advantage over frozen imports in some small markets. More work should be done to explore the possibility of helping small vessels implement gear and handling shifts for sustainability gains.

Large-Vessel Fishers

Role: Large vessels in the 60- to 100-foot class have the ability to fish inshore and offshore on multiday voyages. Their size makes them better able to handle adverse marine

conditions, though they are more expensive to operate—fuel costs alone on some large vessels can be upwards of \$500,000 per year. Large vessels can be owner-operated, or may be owned by corporations that contract with captains and crew. The vessels, because of their range and horsepower, can offload at distant ports depending on captain/owner preferences. Thus, they are less reliant on any single port to provide necessary services, and may be able to base their landing decisions on buyer needs or price.

Relationships: Large vessels sell through auctions and direct to buyers and processors. Fewer sell to CSFs, specialty distributors, or forward contractors, as these buyers usually do not have capacity to absorb large volumes.

Constraints: Poor fuel efficiency, vessel deterioration, poor and dated handling techniques, and lack of seawater ice refrigeration hinder large-vessel profitability. Their products often cannot compete with the quality, price, and consistency of frozen groundfish imports. Offloading vessels have a tendency to further depress prices with low-quality/high-volume catches.

Large-vessel owners do tend to be able to access more traditional sources of financing—such as banks, SBA, and farm credit—for loans and to refinance existing debt. However, as with small-vessel fishers, most are unwilling to take on financing for vessel improvements given the uncertainty of the future. Some large-vessel fishers receive lines of credit from buyers. Large-vessels owners are typically ineligible to use permit banks.

Opportunities: Some large-vessel owners are looking to forge contracts with major retail suppliers in order to circumvent the auctions. Some are seeking soft funding to make vessel improvements to increase fuel efficiency and product quality. Others are relying on more lucrative fisheries (e.g., scallops) to supplement or replace groundfish. For vessel owners with significant quota, it's often a better business decision to lease out quota than to incur the costs and risks of fishing. To reduce costs and mitigate risk, large vessels are reportedly doing more inshore fishing in recent years, which creates competition with small-vessel fishers who have less geographic flexibility. More work should be done to explore the possibility of helping large vessels implement gear and handle shifts for sustainability gains.

Icehouses

Role: Ice facilities are integral to a vessel's ability to refrigerate catch once it's brought on board, especially for trip vessels, which can stay at sea for several days at a time.

Relationships: Icehouses and vessels are mutually dependent. Icehouses serve vessels across the spectrum of size and gear type, as well as providing ice to processors and distributors.

Financing: Ice facilities are theoretically eligible for conventional small business loans. However, in at least one instance where an icehouse owner recently sought financing, the loan officer expressed concern about the undefined, open-ended timeframe of the groundfish fisheries “disaster period”, and wanted to know when the local groundfish industry could reasonably be expected to turn around. Some funds, in recognizing the seasonal nature of the fishing industry, offer “winter deferrals” in loan payments.

Constraints: High water costs, previous debt, and lack of demand have strained ice facilities, forcing some to shut down. In some locations, fear that the icehouse may not be sustainable has led processors to invest in making their own ice, which eventually results in the demise of the icehouse. Icehouses are further threatened by on-board icing, which is common in more modern vessels.

Opportunities: Some ice dealers are seeking markets outside the fishing industry, have tried to adopt new production techniques, or are looking to diversify into other products and services. For remote ports, geographic isolation makes it difficult to compete when attempting to diversify.

Vessel-Service Providers

Role: Fishing vessels require services for upkeep and trip preparation, and vessel services provide supplies, marine hardware, maintenance, fuel, and oil.

Relationships: Vessel service providers in smaller ports are heavily reliant on small fishing vessel customers, as their harbors cannot accommodate (nor can many service) larger boats.

Constraints: Fleet contraction has diminished the need for vessel services. Many vessel owners are delaying maintenance; they either lack the money or cannot justify the cost given their reduced quota. Some smaller ports where there are few active vessels have completely lost their infrastructure, forcing vessels to land catches and seek repairs in other locations. Further, new regulations (usually related to wastewater management or safety measures) create additional financial burdens for portside businesses. Vessel-service providers are theoretically eligible for small business loans, but many are facing declining profits due to shrinking fleets, and thus may be considered too high a risk for conventional financing.

Opportunities: Some vessel-service providers are surviving by expanding their service offerings and diversifying their clientele to serve the recreational charter fleet and other waterfront businesses.

Lumpers (Unloaders)

Role: Fish lumpers unload vessels at commercial locations such as auction houses. The catch is removed from the fish hold via 55-gallon drums.

Relationships: Lumpers work with small and large vessels, although their usefulness has waned in some places due to catch declines. They work together with vessel crews and cutters, behaving as the point of contact when fish leave the ship. Lumpers are paid by weight.

Constraints: Low volumes of fish at auction have diminished the need for lumping crews. Wages have declined as well because they depend on volume.

Strategies: Lumpers and deckhands have traditionally moved back and forth from the vessel to the wharf as opportunity dictates.

Auctions/Exchanges

Role: Auctions and exchanges are meant to provide transparent marketplaces for fishers and buyers. Fish are unloaded and brought to the auction/exchange floor, where they are separated by species. There is typically no

differentiation between day-boat and trip-boat catches, although some buyers use in-person inspectors to grade fish (A+ to F) by quality: skin appearance (scaled, ice dimpled or off-colored); gills out; blood traces show red not brown; belly cuts clean and centered; firmness of the fish; sand flea or parasitic evidence; eyes clear; and no off-odors. Most purchasing is done online. Once sold, fish are loaded onto trucks and transported to the next step in the chain (e.g., cold storage, processing, distribution center, retailer, restaurant). The four main auctions selling groundfish in New England are the Portland Fish Exchange, New Bedford's Whaling City Display Auction, Gloucester's Buyers and Sellers Exchange (BASE), and Gloucester's Cape Ann Seafood Exchange (CASE).

Relationships: The auction or exchange serves as a platform for buying and selling fish, and thus is a hub connecting fishers, lumpers, processors, buyers, brokers, and distributors. The auction/exchange earns revenue from transaction fees, which are usually a percentage of sales (either by price or pounds). Despite their geographic distances, auctions are in direct competition with one another. It is not uncommon for fishers (particularly with larger vessels) to unload at the port whose auction is likely to yield the best price. In some cases, fish are landed at smaller ports and then transported via truck to the desired auction. Although many vessel owners, particularly small boats, sell their fish on the exchange, there is, on average, an equal share of fish that bypasses the auctions and is sold directly to buyers.

Constraints: Falling catch volumes have caused a decline in auction and exchange business. Price volatility is also an issue, as price closely follows the balance between supply and demand, and the volume of fish available on any given day fluctuates based on landings. The auction is notorious for offering the lowest price possible, and there is little coordination between fishers to prevent price drops. While fishers who sell at auction are guaranteed a buyer for their fish, the tradeoff is relinquishing all control over price. Auctions typically feed into the commodity market, as there is little product differentiation and no traceability. Some fishers and fishing co-ops have begun circumventing the auction through direct relationships with buyers (with or without forward contracts), including community-supported fisheries (CSF), which promise higher prices.

Opportunities: Auctions remain viable and are, in some cases, still profitable. Most own large port-based lots or warehouses, which can be rented to other industry players. The fact that such high volumes move through the auctions indicates that any movement in their business philosophies toward adding value or differentiating product could create powerful positive change in the value chain. More work needs to be done to explore how auctions can be involved with and/or facilitate the growth of CSFs and forward contracting.

Primary and Secondary Processors

Role: Primary processors are involved in the filleting and/or freezing of fresh fish. Secondary processors prepare and/or portion already-processed fish into frozen, chilled, or packaged products for retail or food service. Processors operate on extremely low margins and rely on economies of scale.

Relationships: As a midchain entity that buys and sells fish, processors maintain relationships with fishers, auctions, truckers, cold storage companies, buyers, brokers, and retailers. Processors may buy fish to meet demand, or may sell on existing inventory, or both. In terms of power structure, processors typically have the upper hand over fishers. In locations where there are few buyers, fishers have little choice but to accept the price offered to them. Processors typically take ownership of the fish. However, some processors work on a fee-for-service basis, which changes the dynamics of their role in the value chain. Due to falling volumes, general instability, and the availability of low-priced imports, local processors currently rely very little on the groundfish fishery, and some are disconnected entirely. Processing of New England groundfish can also occur outside the region, even internationally. At the processor level, when traveling through traditional commodity channels, most fish has lost its traceability and provenance.

Constraints: Satisfying demand in times of reduced landings, unpredictable supply swings, and volatile auction prices hampers business productivity. Even for prized stocks such as cod, haddock, and yellowtail, domestic volumes are so low that processors can't establish markets. In some instances, the quality of freshly landed groundfish falls short of buyers'

standards, which have come to be based on the quality offered by frozen-at-sea imports. International and domestic imports now compose the bulk of what processors offer, such that locally landed groundfish are forced to compete as the underdog in a commodity market. For some port-based processors, their purchases are 10 to 1 in favor of imports. A number of primary processors have either closed or merged as they face pressure from inconsistent supply, and from secondary processors entering their market.

Opportunities: Some local processors who are committed to the groundfish fishery have diversified their sales and have upped promotion of underappreciated species. Others have further integrated their modes of production by maintaining interest in vessels and permits, or by operating separate distribution or retail businesses. Others have used technology to modify their processing equipment to handle a greater diversity of species, increasing efficiencies while expanding product lines.

Distributors

Role: "Distributors" is a collective term that includes brokers, wholesalers, distributors, and any other middle-chain player involved with market transactions. Many distributors have in-house logistics, while others hire this out. For the value chain analysis, distributors are largely responsible for supplying fish to sales outlets.

Relationships: Distributors typically buy directly from fishers, processors, or wholesalers, and sell to restaurants, retailers, or institutional buyers. However, in today's global economy, many distributors simply move fish to and from other midchain players. That can include arranging transport for overseas processing or smoothing volumes to meet customer demand. Distributors may contract a logistics company to move the fish, or may have their own trucks. In some cases, they may not take ownership of the fish, but rather are paid on a fee-for-service basis. Others may take full ownership of the fish, potentially holding it (presuming it's frozen) to maximize margins when demand is high and supply is low.

Constraints: Given the highly perishable nature of fresh fish, balancing supply and demand can be challenging. Having access to local or regional cold storage facilities to hold

inventory is crucial. Like processors, distributors have little to no dependence on the New England groundfish fishery.

Opportunities: Because distributors are not typically tied to a port, they have more varied supply options and aren't as affected by the instability of particular fisheries. Product diversification is vital to success of the business model.

Community-Supported Fisheries (CSFs)

Role: CSFs involve fishers (or a coordinating organization) selling their catch directly to end consumers who are willing to pay a premium for local, fresh fish. Typically CSF members pay up front for a share, which entitles them to a set amount of fish on a regular or seasonal basis. The species represented in the basket may vary by recent landings.

Relationships: CSFs place fishers in direct contact with consumers and require coordination among vessels, shareholders, and distributors. In some cases, the CSF buys local seafood from a local processor, which works with a secondary processor to portion and package the fish, which is then sold to the consumer.

Constraints: Transportation, expansion of consumer bases, and consumer education are the main challenges. CSFs currently handle extremely low volumes compared to the standard supply chain. CSFs are usually replicable business models but not individually scalable, because they are localized, are based on personal relationships with fishers, and rely on consumers willing to pay a premium to be connected to the local fishery.

Opportunities: Some CSFs have built regional franchises to expand their reach. Gloucester's Cape Ann Fresh Catch, for example, serves 6,500 members in eight locations. They have adopted marketing strategies for underappreciated species to build demand, and work with a local processor to fillet and package fish, providing a level of convenience that caters to a broader customer base than would be comfortable buying whole fish. New Hampshire Community Seafood is a CSF that offers an equity stake to its members.

Specialty Distributors

Role: Specialty distributors are differentiated from other distributors because they sell to niche markets by emphasizing product quality, branding, and story. They target high- to middle-income consumers who value local products and sustainability.

Relationships: Specialty distributors require an abbreviated supply chain to ensure the integrity of the product and that its story is maintained from boat to plate. They have relationships directly with vessel owners and process in-house before selling to other distributors or end markets. Because specialty seafood marketing is often based on region (e.g., Maine lobster), the business relationships between specialty distributors and fishing communities are more personal and interdependent than in commodity channels. In exchange for better fish-handling practices, fishers are often offered higher prices than they would receive through conventional market channels. Across the value chain, specialty distributors compete with traditional distributors, and in some cases CSFs. However, specialty distributors control a relatively small share, and thus are not perceived as a serious threat by traditional channels.

Constraints: Because they depend on a high degree of product specificity and typically have relationships with particular vessels, specialty distributors are tied to the productivity of the resource and the success of fishers with whom they work.

Opportunities: Specialty distributors have adopted branding and marketing schemes that emphasize traceability, local sourcing, and story. Some further differentiate themselves by assisting fishers with reporting requirements, and/or pooling catches from day-boat fishers in order to reach high-volume buyers.

Sales Outlets

Role: Seafood sales outlets include supermarkets, specialty markets, restaurants, and institutional/corporate food service. They typically buy fresh or frozen fillets, value-added products, or fish in prepared meals, but also can purchase H&G (headed and gutted) or whole fish.

Relationships: Seafood sales outlets meet consumer demand with supply from distributors and processors. Depending on the business model, they may work directly with vessels if servicing a highly specialized market. Sales outlets compete for the same customer base across the value chain; those selling outside the low-end market are often seeking sustainability claims that can differentiate their products.

Constraints: Seafood margins tend to be low for most sales outlets. Product costs are high; waste due to spoilage is common; and consumer willingness to pay for fish is limited by the fact that cheaper substitute proteins exist. For most supermarkets, the fresh seafood case is a loss leader. Because consumers are familiar with only a few types of species, sales outlets tend to rely on imports and aquaculture to satisfy inflexible demand. Even in New England, sales outlets are more likely to sell seafood from Canada, Norway, or Chile than they are to sell fish landed by local fishers at nearby ports. That may be because of price, quality, and consistency, or it may be that a local retailer is part of a national chain for which purchases are made at the corporate (rather than at the store or regional) level.

Opportunities: Some niche markets and high-end restaurants have tried to enhance public appeal of different species by marketing the story of the fish. However, as more mainstream restaurants and food service providers try to gain competitive advantage, many are distinguishing their products on the basis of story and sustainability criteria. This designation appeals specifically to younger consumers.

End Market

Role: The end market consists of the high-end consumer, midrange consumer, and commodity consumer.

Relationships: End-market consumers gravitate toward sales outlets that reflect their preferences and match their willingness to pay for products with certain qualities. Depending on their commitment and interest, they may patronize high-end, niche establishments, or opt for convenience and low prices.

Constraints: Consumer constraints are typically price-based and influenced by product availability. Psychological unwillingness to deviate from a few familiar species prevents market permeation by more abundant, underutilized types of seafood.

Opportunities: Some consumers have sought out ways of expressing a consumer identity through CSF membership or locating storied or traceable seafood. A growing consumer ethos of sustainability now emphasizes smart fish choices, primarily in the upper or high-end consumer markets.

Psychological unwillingness to deviate from a few familiar species prevents market permeation by more abundant, underutilized types of seafood.

MARKETING CHANNELS WITHIN THE VALUE CHAIN

Having clearly delineated the roles, relationships, constraints, and opportunities for the major players within the value chain, we now examine how these players interact and operate through specific marketing channels through which fish moves from producer to consumer. According to end-market demands, each marketing channel values fish differently, which affects governance, risk, and benefits. The marketing channels we'll outline are: (1) CSF (community-supported fishery), (2) differentiated product, (3) forward contract, and (4) commodity.

CSF Marketing Channel

In this channel, a CSF organization manages relationships with fishers, contracts with fee-for-service processors, and brokers transactions with consumers.

Figure 2.2. The CSF marketing channel.



Description: In the CSF marketing channel, fresh fish caught by specific fishers in a specific fishery are landed, may undergo some degree of processing (H&G or fillet), and then are packaged and distributed to CSF members who have paid up front for a share of fish on a regular basis. Administration of the CSF is usually handled by a nonprofit, for-profit, or fishers' co-op.

Governance: The CSF marketing channel is distinct in that it is a relatively short chain, is (usually) fully transparent, and ends with a discerning consumer who values quality and sustainability, and is willing to pay a premium for the story of the fish. CSF customers want to know—or at least feel a connection to—the fishers providing their food, and to believe that their purchases are helping fishers prosper. Because this channel in the value chain is more personalized, the CSF provides high margins and price certainty for fishers.

Risks: CSFs handle such low volumes that they often struggle to cover overhead costs. They tend to suffer from high customer turnover, as the membership model often provides customers with more fish than they need or with species they don't know how to prepare. Consistency in quality can be another challenge.

Benefits: CSFs bring great consumer awareness to the sustainable manner in which fish are caught, promoting environmental stewardship and social equity values.

Market Share: We estimate that CSFs currently make up less than 2 percent of the market for New England groundfish. As such, they will always be supplemental. Further growth of this market chain will be determined by customer demand, the distribution constraints of the business model, and access to high quality product.

Differentiated Product Marketing Channel

A specialty distributor manages relationships with fishers, provides primary processing, and sells to a wholesaler who sells to high-end restaurants.

Figure 2.3. The differentiated product marketing channel.



Description: In the differentiated-product marketing channel, fish from specific fishers in a specific fishery are landed by a specialty distributor and labeled with differentiating information before being processed and sold at a premium into the wholesale market. Wholesalers then sell the fish (and its story or brand) to high-end retail or restaurant establishments that serve high- to middle-income consumers. The story of the fish or the fishery is part of the value proposition.

Governance: The marketing emphasis for this channel is a trusted brand to provide high quality and/or environmentally sustainable fish to end consumers. It is not uncommon for the specialty distributor to make the story of the fish (e.g., the name of the fisher, where the fish was caught) part of the value proposition. The supply chain is short relative to the commodity channel, in that the product is typically caught and processed regionally but can be distributed and sold nationally, usually to high-end markets or restaurants. Fishers selling into this market channel are paid a premium for the quality they deliver, and thus this is a more equitable channel than the commodity channel.

Risks: Similar to the CSF, the differentiated product customer base is limited to consumers who are willing to pay a premium price for their fish. Thus, without creating public awareness and increased demand for branded, traceable fish, the product will not be able to compete with undifferentiated, commoditized fish. Some specialty distributors are limited by supply of fish that meet their stringent criteria rather than by demand.

Benefits: Some end markets are starting to demand a certain percentage of their seafood be sustainably harvested. This creates an opportunity for the specialty distributor, who is better positioned than a CSF to serve many niche and institutional sales outlets due to the ability to scale, and can also outcompete many traditional processors and distributors due to having traceable fish.

Market Share: Specialty distributors make up a small portion of the market for New England groundfish. This marketing channel has greater potential for growth than the CSF channel based on the fact that businesses due to branding are more scalable than those that rely on personal relationships with customers.

Forward Contract Marketing Channel

The forward contract broker matches sales-outlet demand with fisher supply, and then negotiates fee-for-service contracts with processors, distributors, and shipping providers.

Figure 2.4. The forward contract marketing channel.



Description: In the forward contract marketing channel, the forward contractor provides a platform where fishers and buyers can secure contracts to supply and purchase fish at specified prices and volumes before the boat leaves the dock. This affords fishers a level of security on pricing they cannot find at auction or with noncontract buyers. In order to satisfy the need for processing and distribution, the platform bids out these activities on a fee-for-service basis to ensure the price commitments can be met. The forward contractor earns a small fee for managing the transaction, but is also in essence providing a temporary financing service to fishers during the contract period between the time the fish is landed and when it is received by the end processor. It should be noted that currently some processors are offering forward contracts to both fishers and end buyers on occasion per request, but this represents a minimal number of transactions.

Governance: The forward contract platform becomes the key link in this relationship by bringing the fisher and sales agent in direct contact. It transitions the traditional power players in the commodity relationship to a service provider working on a fixed-fee basis. Thus, the dynamics of the governance in this chain is shifted toward more equitable relationships.

Risks: It is difficult to arrange contracts for variable stocks and inconsistent landings when forward contracts make up such a small percentage of the market. Thus, they typically apply to niche markets and not high-volume buyers. Despite the security, some fishers are leery of being locked into a contract price that could end up lower than auction rates. Another concern is that in bypassing the middle players of the supply chain, forward contracts may jeopardize

long-standing vessel/auction/buyer relationships, making traditional sales more difficult. A number of interviewed fishers expressed this as the biggest resistance to exploring forward contracts with a broker.

Benefits: Brokers are working to incentivize forward contracts based on the benefits of price security, while also attempting to dispel the notion that forward contracts necessarily eliminate or do not deliver value to middle-chain players. They are also targeting particular species—and thus a subset of fishers—to capture market share and gain market acceptance. If demand increases to a tipping point where end buyers prefer forward contracts, the potential is there to shift the middle of the supply chain to a fee-for-service basis. With fee-for-service, parties get paid for value-add rather than on the margin model, which tends to inflate margins further down the chain at the expense of fishers. In interviews with fishers and sector managers, forward contracts were most often mentioned as a mechanism that could create more stable and equitable pricing for fishers. Many stated that it was not well understood by most of the industry.

Market Share: Forward contractors provide a small percentage of the New England groundfish market and are currently a very small player in the industry. With low market penetration, the growth in market share initially is heavily reliant on a very active role in building relationships and bringing parties to agreement. As market capacity builds, however, a more traditional trading platform can evolve where end buyers, fishers, and middlemen would freely use the platform to manage their own transactions.

Commodity Marketing Channel

The fisher unloads at auction/exchange. Fish is purchased by a processor, who ships it to cold storage until ready to be processed. Fish is shipped back to the processor and processed, and then goes to a secondary processor for further processing and packaging. It is then shipped to a distributor or wholesaler, who sells it to a sales outlet.

Figure 2.5. The commodity marketing channel.



Description: The commodity market represents the channel through which most fish is delivered. Our research indicates it accounts for more than 90 percent of landed groundfish in New England. It places little emphasis on quality, while relying on low prices as a driver. The players within this marketing channel are varied and numerous. In some cases, a fish will change hands more than 20 times between boat and plate. Any distinguishing features about how the fish was caught, by whom, where, and when is lost upon landing, as commodity fish are undifferentiated and untraceable. In fact, it is not uncommon for fresh local groundfish to be comingled with frozen imports and sold as generic whitefish. Commodity fish make up the majority of the seafood industry, as most consumers do not demand more from their seafood and have many other options for protein.

Governance: The commodity market channel is a transaction- and margin-based model that relies on economies of scale. Most players trade on market prices to earn very small margins. This channel actually benefits from lack of transparency, as the loss of fish provenance enables simple supply and demand for unspecified product to drive

profit. Thus, the incentive is to acquire the most fish at the cheapest price. Fishers selling into this channel are in a weak position and have no bargaining power; they are price takers.

Risks: The greatest risks are borne by the fishers, who have the least control over prices and the most to lose if their fish have no buyers.

Benefits: Making slight modifications to this market channel—either to shorten the supply chain or to mandate traceability—could completely transform the industry. By introducing some of the fundamental demand-driven attributes of the other market channels, a much more equitable value chain could be achieved.

Market Share: At an estimated 90 percent, the commodity market absorbs the largest portion of groundfish landed in New England and dominates the local industry. The general lack of quality being supplied by local fishers (compared with the quality of frozen imports) is one barrier that keeps product in this market, rather than moving it to higher-value marketing channels.



Conclusions from Analyzing Marketing Channels

Our assessment indicates that a small segment of the groundfish value chain is beginning to capitalize on growing demand for differentiated products—similar to recent years in the agriculture industry—revealing the potential to shift more of the industry away from the commodity channel and toward end markets that value local, storied, and/or traceable fish. Generally, these channels involve shorter value chains, more equitable relationships among players, and higher prices for fishers. Further, shifting from middle-chain business models built on margins to ones based on fee-for-service could capture the true value added by each player in the chain. Finally, when demand dictates supply, the result is better planning, less waste, and less uncertainty.

Chapter 3

Financial Needs Assessment

To assess the financing needs of New England groundfish fishers and port-based businesses, we interviewed 75 industry members across 11 ports in four states. We spoke with day-boat and large-vessel fishers, sector managers, auction executives, vessel service providers, processors, seafood distributors, CSFs, NGOs, and government scientists. We approached the question of financing needs from a number of angles (e.g., What do you need to improve your business that could be financed? If someone gave you \$25,000/\$100,000 that you had to use to improve your business, how would you use it? What do you need to be more profitable?). Although we received quite varied answers from respondents, some clear themes emerged. Below is a list of common challenges, which shaped our analyses of both financing needs and opportunities.

Common challenges voiced by fishers:

- an inability to business-plan due to uncertainty
- the belief that current stock assessment methods are flawed and are to blame for the wide fluctuations in ACL from year to year
- perceptions of an inequitable, unfair quota allocation system
- low quota, choke stocks, and assumed discard rates impeding fishing success and profits
- an inefficient quota leasing process
- competition from imports depressing prices
- aging, poorly maintained fleets
- loss of seasoned, experienced crew
- declining port infrastructure

- go-to-market challenges
- existing debt hindering their desire and ability to take on additional financing
- personal financial and psychological despair

Common challenges voiced by port-based businesses:

- inability to business-plan due to uncertainty
- unreliable and insufficient supply of groundfish
- increased reliance on imports (processors/buyers)
- no processing infrastructure or mature end-market for underutilized species
- the need to diversify to other products/services (vessel service providers)
- disappearing fleets due to consolidation or moving to other ports

Immediate and long-term needs of New England groundfish fishers and port-based businesses are outlined below. We also describe briefly one or more financeable opportunities that could address each need and the types of financing instruments that would be appropriate. We then discuss some of the underlying challenges that must be considered before launching potential interventions. Note that several entities in the region are already working on aspects of these problems.

CHALLENGES AND NEEDS OF FISHERS

More Consistent Annual Catch Limits (ACLs)

“Each year fishermen go into the season and they have an expectation about what they’ll catch and they know what the TAC [total allowable catch] is. Part of their expectation is an understanding that the science is right. That they should be able to catch such an amount. A lot of deals in the beginning of the year are based on those expectations. Then the year plays out and they realize that some of those assumptions are wrong.”

—Sector manager

One of the critical business challenges listed by players throughout the value chain was the inability to plan based on the volatility of ACLs from year to year. Fishers’ incomes fluctuate wildly—quota can be high one year and then cut by 75 percent the next year. Processors and buyers are intolerant to that level of volatility, and out of necessity have reduced their dependence on New England groundfish in favor of more consistently available domestic and foreign imports. That movement away from local landings exacerbates the financial stress fishers are already facing. The current climate of uncertainty has paralyzed the entire value chain in terms of any business planning or financial decisions pertaining to groundfish. Financing opportunities include:

New methodology for stock assessments. Wide swings in ACLs from year to year could be mitigated through more precise stock assessments. Opinions vary on how to get the science right and how to make the information more timely, but there is consensus around the fact that in order for the fishery to thrive economically, the assessments must more accurately reflect actual stock levels. Some fishers mentioned that they would accept lower quotas if they could be guaranteed that those quotas wouldn’t change significantly from one year to the next. They are also eager to be part of the assessment process—as partners, not water taxis. Grant financing to experiment with new survey methodology and/or data modeling could expedite the development of more precise assessments. Another option is to create a center where cooperative research continuously informs the management and permitting framework.

Improved Access to Affordable Quota

“I already caught my full quota for the year. It took me 12 days to do that.”

—New England groundfish fisherman

Since the introduction of sector management, the main need—which was stated by all fishers regardless of vessel size—was more quota; specifically, of choke species. Some lifelong fishers currently receive such little allocation that they fish their entire quota in just a few days. Clearly, this need is tied directly to annual catch limits, which are based on stock assessments. Current options to obtain more quota include

buying additional permits, leasing quota from other permit-holders, and leasing quota from a permit bank. While useful for some, each has barriers that must be overcome in order to help more fishers remain viable businesses under sector management. Financeable opportunities include:

Creative financing for the purchase of new permits. Permits with substantial allocation are currently prohibitively expensive (approx. \$500,000)—if they're for sale at all—while permits with little allocation are worth a fraction of their original purchase price. Although the purchase of a permit is theoretically financeable with a loan, practical application is hampered by multiple barriers. One key constraint is that lenders are unwilling to lend against permits alone, given the uncertainty of stock levels, fluctuating ACLs, the opacity of the market, and legal questions around securing permits. Most require other collateral (e.g., vessels, homes). Even if loans were available, most fishers are currently unwilling to risk taking on new debt when future stock levels are so uncertain. Many are still paying off their current permits.

Transparency in the quota leasing market. The lease market is plagued by variability and opacity of prices, which are often cost-prohibitive for small-scale fishers. A transparent market for leasing quota would offer greater efficiency in meeting supply and demand, improve access to finance, and result in wins for lessors and lessees alike. Getting buy-in from fishers will be a challenge, as many express the concern that publicizing lease prices would result in further consolidation of the fleet. There is also an issue of quota being owned not by individual fishers, but by the sectors; thus, within-sector trades would not be part of this marketplace. Any between-sector transactions would still need to be approved by the sector manager, who is responsible for ensuring that the sector does not exceed its ACE for any species. This opportunity could range from encouraging the participation of supporting services such as brokers and valuers to facilitate quota transfers (similar to those that exist on the West Coast), to the creation of a central online trading forum. Financing could take the form of grants or debt, with loan payments being covered by revenue earned from transactions.

Permit bank expansion. Permit banks can help some fishers lease quota at submarket prices, but they are limited by low ACLs and cannot make significant volume available. When

permit banks run out of quota, some fishers are unable to fish. That drop-off is prevalent in several small ports, where both fishers and portside businesses are faced with financial failure because of reduced landings. Expanding permit bank capacity through the purchase of additional permits is one way to improve access to affordable quota and increase landings, and to raise revenues throughout the local value chain. Another option is for permit banks to set up an exchange where fishers are paid for unused quota; that quota is then reallocated at subsidized lease rates to fishers who can use it. (This model is being tested by the Cape Cod Fisheries Trust, and is of interest to the Gloucester Fishing Community Preservation Fund.) Capital could be funded through government or foundation grants, or low-interest loans, with permits serving as collateral. Cash flow from leased quota would cover loan payments, overhead, and monitoring costs, and could eventually cover the purchase of more permits. The main challenge to permit bank expansion is the exorbitantly high cost of high-allocation permits.

Less Reliance on Groundfish

“I’m trying to maximize my multispecies allotment while avoiding stocks that will put me out of business. I used to exclusively fish for groundfish but have had to diversify into whiting and skates.”

—New England groundfish fisherman

One option fishers have for overcoming the challenge of insufficient quota and stock uncertainty is to change their business models so that they are less dependent on scarce groundfish for their livelihoods. That could take the form of (1) continuing to fish but targeting other species; (2) continuing to captain a vessel, but for purposes other than fishing; or (3) exiting the industry and transitioning into a new career. Financeable options include:

Market development for abundant underutilized species. Amid record quota cuts for cod, haddock, and yellowtail, some lesser-known stocks are thriving. The development of markets for these low-value, low-demand species, (e.g., redfish, hake, pollock, dogfish) could stabilize incomes for fishers, potentially reduce pressure on overfished stocks, and serve the dockside businesses dependent on landed fish. Initiatives could include broadening the reach of CSFs,

contracting with institutional buyers, and partnering with chefs and culinary schools to develop recipes and consumer awareness. In addition to building markets, increasing volumes of some underutilized species will require new processing infrastructure and training in special handling.

Diversification into other fisheries. Some fishers have begun to pursue non-groundfish species, either by changing gear or purchasing a new vessel. The opportunity is not without its challenges, however. For instance, one must acquire permits, change gear, train crew, learn new fishing techniques, locate proper processing facilities, and find buyers. Low-interest loans or working capital to cover upfront costs can facilitate this transition. Like groundfish, other fisheries also face variable regulatory and market barriers that can impede short-term profitability. Further, some of these fisheries (e.g., lobster, scallops, squid) are already quite competitive. Even if barriers to entry are not high, fishers might be reluctant to take market share from their neighbors.

Alternate employment for fishers and fishing vessels. Fishers and their vessels, regardless of size, could provide valuable knowledge and services to academics, government departments, NGOs, individuals, and businesses seeking help with collaborative marine research, stock assessment surveys, chartered recreational trips, or corporate R&D (e.g., pharmaceuticals and biotech). Many fishers expressed interest in this opportunity, but most lack the connections to land this type of work. Further, many fishers cannot afford the costs they must incur to be eligible (e.g., vessel insurance, certain upgrades). Another challenge is how to create long-term partnerships that supply regular income to fishers, rather than short-term intermittent projects funded with soft money. Financing for these types of collaborations could take the form of grants: to establish waterfront collaborative research centers; to help match fishers to contracts appropriate for their type of expertise; and to fund academic research that employs fishers.

Transition assistance out of the fishery. Some fishers want to exit the industry entirely but are ill prepared to enter another line of work; fishing is all they know. Programs to facilitate career transitions into fields that utilize existing skills and knowhow (e.g., subtidal shellfish aquaculture) could be extremely successful at both providing steady employment for fishers and, in the case of aquaculture, sustaining

portside infrastructure. Such programs could be funded through grants or loans. Some older fishers who had planned to use their boats and permits as a nest egg for retirement are finding that, because of sector management, vessels and permits with low catch histories are worth little. Several fishers expressed the need for a boat-and-permit buy-out program to cover existing debts in order to retire.

Ability to Compete with Imports

“The industry is old. Equipment is worn, old, and dated. There have been few new boats in 30 years, so the majority of the fleet is very fuel inefficient. They use fish handling practices that are 30 to 40 years old, all of which impact the quality. The industry has failed to keep up with the market demand and is both losing market share in the US and seeing prices decline.”

—New England groundfish fisherman

Low volume, inconsistency, and uncertainty of groundfish landings in New England have driven local seafood buyers to fill their customers' orders with groundfish from the abundant and reliable fisheries of Iceland, Norway, and Canada. In most cases, this imported (usually flash-frozen) product is less expensive and of higher and more consistent quality than fresh New England groundfish, forcing local fishers to sell their fish at discounted prices. Although imports are currently essential to the shore-based industry beyond the port, a number of initiatives could serve to distinguish locally caught fish so that fishers are no longer subsumed by the commodity market. Financeable opportunities include:

Rejuvenation of the aging fleet. Most groundfish vessels were built in the 1970s and 1980s. They lack the fuel efficiency, seawater-ice machines, on-board freezing capacity, and durability of the state-of-the-art vessels that make up the foreign fleets. If New England groundfish fishers could match the quality offered by imports, then with accompanying branding, storytelling, and traceability, a case could be made for charging a premium for the local product. Grants and debt could finance gear and vessel improvements or even new boats. The challenge remains, however, that many fishers are unwilling or unable to take on new debt when the future of the fishery is uncertain.

Local branding with traceability. Better marketing was listed as a need by most fishers interviewed. In the era of slow food, farmers' markets, and CSFs, "local" sells. So does story. (In fact, some consumers are already paying a premium for the story of "local New England" groundfish when, in reality, their fish was imported from somewhere else.) There is opportunity to capitalize on the demand for story and to market New England groundfish with a distinguished brand that's both traceable and delivers better prices to fishers. A number of seafood distributors are already working with the New England groundfish fishery on this model, and could use debt or equity for expanding. An equity model also exists for one of the groundfish sectors that has formed a co-op/CSF with 16 fishers and 65 owner-customers.

More Predictability in Prices

"Dock price is still as volatile as ever. The first year of sectors, prices were higher. Since the second year, they are down and fluctuate according to landings."

—New England groundfish fisherman

Not only are New England groundfish fishers competing in an international commodity market, but also prices are volatile and fluctuate according to landings. Prior to the current groundfish crisis, prices were fairly predictable because volume was consistently high and landings were steady. Now fish are landed in such small amounts that a single vessel bringing in a large haul can cause prices to plummet. Fishers typically don't know how much their catch is worth until a day or two after they've sold it. That level of uncertainty makes planning difficult for when to fish, how much to fish, whether to lease quota, and whether to hire a crew. On any given day, fishing costs can possibly exceed revenues. With a highly perishable fresh product, no option exists to hold out for higher prices; fishers must take what they're offered. Financeable opportunities include:

Forward contracts. One way to hedge the volatile market is for fishers and buyers to create contracts that lock in fixed prices, quality, and volumes prior to fishers leaving the dock. By agreeing (sometimes months in advance) on the details of the transaction, both fishers and buyers avoid the volatility of the market and are able to efficiently plan and execute their business strategies. The building and expanding of forward

contracting marketplaces could use financing from grants, debt, and equity. One challenge around forward contracts is how to manage perpetual uncertainty over stock health and volumes. Another challenge is navigating the fishing culture and how to work with (or around) long-standing fisher-buyer relationships.

Specialized markets. With or without forward contracts, fishers can often garner better, more stable pricing by differentiating their products through special marketing, thus circumventing the auctions. Whether that is through a specialty distributor, CSF, fishers' co-op, or personal brand, a variety of business models rely on the value that can be added by focusing on quality, special processing, and/or the story of the fish. One fisher we interviewed mentioned being able to secure prices that were nearly four times the auction price by marketing low-value "oddball" species. Consumer and buyer education alike are essential, as the success of this strategy requires a shift in mindset and public preferences around seafood. Although typically confined to niche markets serving middle- and high-income customers, there is huge potential to market high-volume, low-value fish to institutional buyers such as schools and hospitals that are looking for local or low-carbon sources of food. Fishers would benefit from marginal increases from floor prices, and buyers would still be able to meet their budgets. Financing for this opportunity could include grants, debt, or equity.

Personal and Financial Stability

"It's so stressful, I can hardly take it. There's not enough fish, not enough money."

—New England groundfish fisherman

The challenges associated with the transition to sector management combined with deep cuts in quota have resulted in financial and psychological crises for many members of the fishery. Some are unable to bring in enough income to cover basic living expenses; they are defaulting on loans, and several are facing foreclosure. Others are barely hanging on and, due to lack of funds, are taking personal safety and financial risks by forgoing essential vessel repairs and maintenance. A recent study found that due to the fishery's disaster declaration in late 2012, incidence of social disruption (e.g., changes in family, work, and community interactions) and high levels

of psychological stress were common among groundfish permit holders. Some fishers and NGOs have stated that the groundfish situation is exponentially worse than expected and is quickly spiraling even further. Some mentioned the need for crisis-management expertise. Financeable opportunities include:

Direct financial support. A number of fishers expressed a need for working capital or bridge loans for vessel improvements, equipment upgrades, regular maintenance, retooling and repairs, and safety retrofits. Other needs include the refinancing of existing loans, debt restructuring, unemployment insurance, mortgage protection, and fuel subsidies. This type of financing could be made available directly through lending institutions, or in conjunction with grants that subsidize interest rates or provide loan guarantees. If and when observer costs become the responsibility of fishers or sectors, those will emerge as another immediate finance need.

Fisher resiliency. High levels of stress can inhibit the ability to innovate, think creatively, and solve problems effectively. In the case of the groundfish fishery, stress may be a significant barrier to fishers being able to successfully transition to sector management, especially if that transition involves pursuing new fishing strategies, business models, or relationships with buyers. Grant financing to provide mental health and other support services to fishers and their families would benefit both individuals and communities alike.

CHALLENGES AND NEEDS OF PORTSIDE BUSINESSES

New and Updated Service Equipment and Infrastructure

Like the groundfish fleet, many portside businesses suffer from deterioration and obsolescence. Those that depend on servicing vessels or on landings are being forced to diversify their offerings to attract more customers, which often involves purchasing new equipment, updating infrastructure,

and repurposing space. Financing for this work is most commonly debt. The challenge is that many businesses are already credit-strapped, and some are unwilling to risk a loan when the future of the fishery is uncertain.

Increased Processing Capacity, Especially for Underutilized Species

Targeting and marketing underutilized species was mentioned repeatedly as a solution to both the environmental and economic crisis currently facing the groundfish fishery. However, current processing facilities lack the capacity to handle an increase in redfish, dogfish, and whiting landings. Financing to expand processing capacity could take the form of debt or equity, but grants for innovations in processing may also be appropriate.

Expanded Cold Storage

Several of the main New England ports lack cold storage facilities. Thus, processors are forced to truck fish hundreds of miles to a freezer with the capacity to hold their product during the time it is not being processed and hasn't yet been shipped to a buyer. Sometimes fish will make two round-trips to the freezer before it is finally sold: once after it's landed, and once again after processing. Grants, debt, or equity to build cold storage facilities in New England's main groundfish ports that currently lack them could reduce marginal costs for processors while also providing freezing capacity for other industry players (e.g., distributors, CSFs).

Assistance Tracking New Regulations

A number of port-based businesses mentioned having been levied huge fines for (unknowingly) failing to comply with new EPA or Coast Guard regulations. They suggested the creation of a service to track new laws, issue alerts about regulatory changes, and recommend compliance options. Where multiple businesses are required to meet new regulatory requirements, a shared compliance program could relieve small businesses from costly compliance plans. Grants would likely be sought to cover startup costs; depending on buy-in and the perceived value, operating costs could be covered in part or full by membership fees.



COMMUNITY-SPECIFIC FUNDING NEEDS

The diverse needs identified through our research reflected both fishery-wide challenges as well as challenges unique to particular ports. Given that any intervention to assist fishers and port-based businesses will require buy-in from stakeholders, one financing strategy could be to fund initiatives conceived within the communities and sectors themselves. Already, some New England fishing communities, sectors, and community-based

organizations are working to innovate around the most pressing problems posed by the groundfish crisis. A call for proposals would be effective at identifying what and where financing needs for discrete projects and programs exist. The NOAA's Saltonstall-Kennedy Grant Program is a good example of this type of initiative. Appendix D provides a sample of the types of grassroots initiatives that could benefit from financing, using Gloucester, MA, as a case study.

Chapter 4

Existing Sources of Financing

Due to the nature of the constraints identified in the New England groundfish value chain—and, in particular, the immaturity of the opportunities for intervention—we use an intentionally broad interpretation of “financing” and “investment” for the purpose of this report. Although traditional definitions of those terms do not include grant-based instruments, we incorporate grant-based opportunities on a selective basis into our analysis of existing sources of financing to the fishery, in addition to traditional debt and equity options. The identified sources (equity, debt, and grant) are outlined below, while Appendix E contains a representative list of specific financing options available to participants in or related to the New England groundfish value chain.

We sought to identify available financing through a process of online research and telephone and in-person interviews. In particular, we focused on:

- funding sources with missions that target financing in Northeast fisheries
- funding sources that value chain participants may be eligible to access operating in the Northeast but without a fishery focus;
- funding sources in other fisheries or regions.

We identified a range of instruments for fishers and port-based businesses in the New England groundfish value chain, including some specifically designed to address conservation and socioeconomic concerns. Characteristics of the three instruments are discussed broadly below with reference to experiences specific to the New England market. Utilization of each instrument is discussed in Chapter 5.

DEBT

Debt options are available throughout the region, with some institutions focusing on fairly small communities (such as Cape Cod), while other options, such as the NOAA Fisheries Finance program loans, are available to fishers operating anywhere within the Northeast fishery. Our research did not identify any region that is not served by some financial institution.

Most lenders required sufficient collateral to account for 100 percent of the loan value, with some lenders willing to lend at a loan-to-value ratio of up to 80 percent. Some accepted vessels as collateral; others accepted only more traditional collateral, providing the equivalent of a home equity line of credit. We found willingness to accept nontraditional collateral (in principle) more typical of those institutions with programs targeting the fishing industry. In general, most lenders were unwilling to accept only permits as collateral due to the perceived risk associated with the future of the groundfish stock. In the few cases where lenders were willing to use permits as collateral, they focused on specific species, such as scallops, which are sustainably harvested, have ample abundance, and have demonstrated a higher market value. It should also be noted that the scallop lease initiative is a very recent development.

State and federal options based on cash flow are also well represented. Whether the Farm Credit System or the Small Business Administration's various loan initiatives, there are a number of debt-based options available to this marketplace. For example, a concessionary Small Business Association disaster loan was announced in November 2013 for the groundfish fishery in Massachusetts and New Hampshire, which provides loans of up to \$2 million at 4 percent interest for up to 30 years. (Fishers in Maine are not currently eligible for this program because the state did not declare a disaster.)

Complementing those options are local community-development financial institutions (CDFIs) willing to lend on expected cash flow to startups and borrowers expanding into new markets, such as existing fishers expanding into aquaculture. Coastal Enterprises Institute (CEI) is a standout example of a progressive lender in Maine. In addition to working closely with the Gulf of Maine Research Institute (GMRI) and other partners to implement a gear change program, CEI is also implementing a small business-lending program in

collaboration with Goldman Sachs, which was announced in November 2013. This collaboration also included a grant to cover loan losses at CEI; however, even CEI is wary of accepting permits as collateral in the absence of other security.

For the purposes of this assessment, we considered permit-bank ACE leasing as a form of debt financing to the fisheries industry. These facilities typically provide access to species quota through leasing without incurring the cost of acquiring the permit for the fisher. The two state permit banks started with a federal grant from the National Marine Fisheries Service. Massachusetts started a revolving loan fund (RLF) with their NMFS grant. The state of New Hampshire started an RLF in 1994 with funds from the US Economic Development Agency.

While we found a few private (as opposed to corporate) investors, such lending was typically higher in the value chain—thus further from the resource—and targeted at supply-chain innovators, such as Fresh Source Capital's association with Red's Best, a wholesale seafood distributor based in Boston.

Finally, for the purpose of comparing lending terms, conditions, fund capitalization, and operating environment, we included four lending institutions servicing other fisheries outside New England: Wells Fargo (WF), the Alaska Commercial Fishing and Agricultural Bank (ACFAB), RSF Social Finance, and the California Fisheries Fund (CFF). While general terms are similar to those offered in New England, these institutions stand apart in their ability to lend to the fisheries market, as well as in their missions, capitalization, and borrower eligibility. WF is generally agnostic to sustainability or social impact concerns, focused on supporting lending to small businesses in general. CFF and ACFAB share core missions of supporting their regional fisheries, while RSF and CFF support only those organizations they judge to be sustainable with respect to the ecosystem. ACFAB, a cooperative lender, noted they received a loan from the state of Alaska at their inception, which they have since successfully paid back—one of the only borrowers from the state at that time to have repaid their loan.

We identified a distinct difference between the West Coast specialist lenders and New England lenders on the issue of investing in and/or lending against permits as collateral. In general, lenders on the West Coast were willing to use permits as collateral, due to the ongoing biomass recovery in

fisheries on the West Coast as well as the structure of the individual quota system.

The total amount of debt present or available in the fishery is difficult to quantify because of institutional privacy preferences; however, the general sentiment of the representatives of the financial institutions we spoke with is that they are eager to engage with the fishing industry, given appropriate conditions. Conditionality is a topic we address later.

EQUITY

Despite extensive inquiries into the banking, for-profit, non-profit, and NGO communities, we were unable to identify any active private equity investors interested in wild-capture fisheries investment in New England. While we did identify nascent interest in segments of the market (e.g., permit banks, aquaculture), none were specifically interested in groundfish or wild capture. Several parties indicated a general interest in exploring or developing a facility, but all agreed that “the time is not right.” In large part, we believe this hesitancy to invest is due to the uncertainty of the future of the industry as ACLs and landings continue to decline and equity flows out of the market space.

GRANTS

A range of grant opportunities exist for the New England groundfish industry. However, the majority of these are not focused on facilitating the transition to sector management at the enterprise level. They tend to focus on community and NGO needs, and are often designed to improve information sharing, research and development, technical assistance, community-based capacity building (e.g., community-supported fishery (CSF) programs), data management, and sharing of best practices.

While group programs exist for transitioning, we were unable to identify any grant-based programs given at the individual business level aimed at improving business practices and adapting to the new sector management regime. This represents a major gap in the market.

Some of the broader and more established grants are:

- Fisheries Innovation Fund at National Fish and Wildlife Foundation
- Saltonstall–Kennedy Grant Program

Numerous other federal, state, and private grant programs also exist (see Appendix E), but few if any address enterprise transition issues. During our interviews, the providers of these grants expressed a great deal of concern regarding private gain from public/philanthropic funds.

OTHER INSTRUMENTS

In our research, we also found programs that did not necessarily fit into the categories of debt, equity, or grants. The New Markets Tax Credit program is a federal government tax credit for individuals or corporate investors in community-development entities that are investing in certain fishery-related operations such as processing. Another program is a loan guarantee provided by the federal government through the USDA.

Chapter 5

Gap Analysis: Industry Needs, Existing Capital Resources, and Potential for Environmental Impact

When we compare available financing to fishery participant needs, opportunities for capital deployment appear throughout. However, whether or not capital is deployed is determined by the willingness of both the lender and the borrower to enter into an agreement. Each entity has significant concerns about the status of groundfish stocks and the ability of fishers to land sufficient volume to ensure positive cash flow. Considering the current uncertainty of stock levels and market conditions, the potential financing recipients are not typically positioned to accept any form of commercially available capital—debt or equity.

VALUE CHAIN CONSTRAINTS

In our research we were able to identify most, if not all, of the known and potential barriers to accessing capital for fisheries (see Financing Barriers sidebar). However, our assessment was that they were secondary to more severe value chain constraints.

Biomass decline, uncertainty about the status of groundfish stocks, and stock assessment variability all affect the ability of fishers to land sufficient volume and are significant barriers to offers and acceptance of financing. In fact, they are leading drivers to a self-reinforcing negative feedback loop constraining the value chain (see Figure 5.1, adapted from M. Odlin, 2013). Although there are many layers to the conditions in the New England groundfish fishery, we outline nine factors that perpetuate the negative feedback loop, causing stagnation of capital resources for value chain participants, particularly fishers.

FINANCING BARRIERS

A 2012 Environmental Defense Fund report documented some of the known and potential barriers to accessing capital for fisheries (see Financing Barriers sidebar):

- a disconnect between traditional loan terms and structure and the characteristics of the fishing industry;
- a shortage of specialized knowledge in traditional lending institutions to understand and assess risks of the fishing industry (and to resolve terms and structure);
- a limited ability of mission- and community development-related funds to directly address fishing industry needs for transitional financing in catch shares fisheries; and
- a lack of information and/or requirements by some fishers for traditional and nontraditional lending sources.

The report goes on to provide additional detail on each of the barriers:

- Characteristics of the fishing industry are not always amenable to traditional loan terms and structure:
 - › fluctuating demand and resource availability results in variable and unpredictable income;
 - › regulations may create complexity or barriers for lenders—for example, lenders may have to comply with quota-ownership concentration limits; and
 - › variable price of quota or licenses reduces their value as collateral.
- Structuring fishing-specific loans can require specialized knowledge and loan structures to address unique characteristics of fishing businesses (and reduce lender risks):
 - › some institutions lack previous experience with the industry from which to develop knowledge; and
 - › some institutions have not encountered sufficient demand to justify the effort to become familiar with the industry.
- Niches of traditional, mission related, and community development funds may not address needs of fishers:
 - › some fishing businesses, particularly small and new businesses, lack sufficient credit history or have poor credit history;
 - › some lending institutions focus on large loans, which limits the applicability of their services to small businesses; and
 - › mission-related funds indirectly target needs of catch-share fishers, and fishers may not find a way to connect with the mission.
- Some fishers may lack information or requirements to find and be approved by most lending institutions:
 - › some fishing businesses lack knowledge of the availability of loans.
 - › many lenders work solely with established businesses, so new fishery entrants may not qualify for their loan programs.;
 - › some fishers lack sufficient funds for a down payment;
 - › some fishers lack business-planning skills, limiting their ability to articulate the revenue impact of the investment they want to make;
 - › some fishers may be unwilling to take on the risk associated with loans;
 - › fishing businesses may lack sufficient collateral, and some fishers may be unwilling to use their personal assets (such as their homes) as collateral for business loans; and
 - › fishers may not find a way to connect meet or connect with mission-related lending institutions.

Figure 5.1. Negative feedback loop constraining the value chain.



Credit: adapted from Odlin, 2013

Those factors are:

Leading Drivers

Biomass decline and stock health uncertainty. Diminishing populations of certain species and uncertainty about the future health of groundfish stocks remain high in the system, making business planning difficult, if not impossible.

Stock assessment variability. The variability of the stock assessment process, which determines annual quotas, is a key driver of business uncertainty, but also influences stock recovery (if quotas are set too high or too low).

The signals generated by these two elements have created a crisis of confidence in the business community, which is evidenced by a high degree of business uncertainty, especially for those most reliant on the resource.

Lagging Indicators

Business uncertainty. Given the challenges with declining biomass and accessing stocks, both fishers and groundfish-related businesses are uncertain about their abilities to generate sufficient volumes to even remain in business, let alone repay any investments. Business uncertainty, due to the leading drivers, is a key element that perpetuates the feedback loop.

Reluctance to pursue financing. Borrowers or potential borrowers, concerned about the business uncertainty generated by the leading drivers, cannot be confident of a positive cash flow from fishing. Because of previously pledged collateral as well as a conservative approach to financing, most fishers are either unwilling to apply for financing or unable to qualify.

Excess and unimproved vessels. The current trend of fleet consolidation and contraction, and de facto capital flight, is expected to continue, and the inventory of inactive vessels for sale has reduced resale prices, depressing the collateral value of active vessels for fishers seeking financing. This depression, along with business uncertainty, means vessel owners are very cautious about investing in vessel upgrades.

Obsolete handling techniques and equipment. Because vessel owners are not investing in vessel or fleet improvements, their equipment and handling techniques have not kept pace with international competition or with sustainability practices.

Inconsistent quality and short shelf life. Older vessels utilizing obsolete techniques and outdated on-board equipment compromise the quality of local, fresh seafood products, placing them at a disadvantage in the local market, where they are considered a commodity. Processors are able to import higher-quality frozen products instead.

Reduced market share. When higher-quality substitutes are available in the market at lower prices, demand declines for the local, higher-priced product and shrinks market share. On a related note, over time the diminishing production of New England fishers reduces their influence on players higher in the value chain, making it harder to negotiate for either market share or better price when quality improves.

Reduced prices and revenues. With the exception of CSFs and specialty distributors operating in the “high value” channel of the value chain, no quantifiable demand currently exists for a differentiated fish product from the Northeast multispecies fishery, which makes imports ready substitutes for the majority of the market. Landing fish at a cost greater than their value on the market naturally leads to lower revenues and profits.

Inability to qualify for financing. For many fishers, the existing constraints combine to make accessing financing impossible. Risk assessments of their businesses by any financial institution would highlight the preceding factors, and make them ineligible for a loan or equity investment.

FINANCING RISK

We also detected that the applicant’s location within the value chain determined the perceived risk associated with making a traditional investment (whether debt or equity). In general, vessel owners were considered riskier than shore-based businesses. Furthermore, smaller vessels were considered higher risks than some of the larger vessels.

That risk assessment is largely associated with the ability to access fish stocks. While vessel owners are all subject to changes in biomass, weather, and quota, most port-based businesses (with the exception of those directly servicing vessels) are able to insulate themselves from this risk.

Debt

Most debt instruments we assessed required either proof of current- or future positive cash flow for the business, as well as adequate collateral—a difficult task for most value-chain participants.

Smaller vessels. When we interviewed financial institutions, they stated a lower-than-expected application rate for small-vessel fishers. For those fishers, evidence of current positive cash flow, much less future positive cash flow, is difficult to establish. Small-vessel fishers are unable to access debt at rates with which they feel comfortable, even given programs that offer flexible payment schedules and subsidized rates.

Larger vessels. To compete on the commodity market, larger-vessel fishers rely on catch volumes to offset costs. Some expressed a need for more efficient engines to reduce fuel costs, as well as for on-board icing equipment that preserves quality. Those upgrades are difficult to acquire at the going

Case Study: Cape Pond Ice (CPI), Gloucester, MA

The industrial, white, 1947 Cape Pond Ice building is an iconic landmark on Gloucester's working waterfront. In 1983, it supplied up to 40,000 tons of ice to the fishing industry, for gross sales of nearly \$875,000 (over \$2 million when adjusted for inflation). In 2013, sales totaled less than 2,000 tons at the 300-ton capacity plant, a 53 percent (\$205,000) fishing industry-related reduction. The plant is now 60 percent vacant. As of 2012, less than 26 percent of sales were related to the fishing industry. Market expansion includes packaged ice, concrete ice, sculpture ice, dry ice, T-shirt sales, and historic ice tours.

At least four local fish processors have installed smaller-capacity ice machines. Larger vessels have installed on-board systems. CPI's bagged ice business cannot compete with more centrally located, automated plants. High water rates and requirements for pretreatment installations for wastewater have also driven up costs.

CPI has petitioned the state to be freed from the Designated Port Area restrictions in order to repurpose and lease the space for nonindustrial use, while relocating the 900-ton ammonia refrigeration system to a smaller footprint to continue to provide ice to the community. Funding for such a project is the main barrier.

CPI trade payables are close to \$200,000. Receivables are roughly \$150,000, but some are worthless, as some fishers cannot pay. CPI was denied a SBA Disaster Loan because CPI's "minimal negative cash flow" cannot support the debt. The officer calculated that direct economic injury from the fishing-related disaster was only \$40,000 because CPI had recently diversified.

Currently, the first mortgage is held by the National Marine Fisheries Service (NMFS). CPI has asked for payment deferrals. TD Bank has the second mortgage with a balance of \$100,000 and has frozen the \$250,000 revolving credit line, also secured by personal real estate. Owner Scott Memhard wrote that after 30 years of excellent relationships with lenders, TD Bank and their SBA Asset Recovery officers did not give "reasonable civilized warning before sending the RE & M&E appraisers, freezing our credit line, and basically preparing to force us into default and distressed liquidation" (personal communication).

CPI is waiting to hear if MassDevelopment, a state finance agency, will refinance the \$750,000 TD Bank and NMFS debt and mortgage over a new 25-year amortization, with repaid interest-only payments for the winter season. This would ease cash flow and reduce monthly debt service expense by half, to \$6,000.

rates and terms, which reflect the market's uncertainty and the perceived ability of the vessel owners to repay. Essentially, to maintain cash flow, fishers need loan rates lower than currently exist.

Port-based businesses. While some port-based businesses (e.g., processors) have shifted their revenue models to focus on imported seafood, others that are dependent on consistent local landings or an active local fleet—are struggling. When landings evaporate and the fleet disappears, those establishments can no longer make a business case for financing, and many are forced to close. Even those with the potential to diversify away from local groundfish may be unable to acquire financing for their new business models.

Equity

Equity financing is a difficult sell for both outside investors and most value chain players, given the state of the industry. As the industry continues to experience declines in capital investment (e.g., fleet contraction, port-based business closures), the equity opportunity is shrinking. Although equity investors can offer more flexible repayment schedules and more patience than most debt financing, expectations on returns are higher. Currently, high returns are unlikely for the majority of groundfish value chain participants, particularly for those closest to the resource.

Grants

Given the challenges with debt and equity as poor fits for the fishery, grants remain valuable tools for helping the New England groundfish fishery continue to adjust to sector management, at least for the next several years. Grants can be used to streamline and enhance policies to build more efficient market structures and regulation; support the development of new, innovative, early-stage development opportunities and the establishment of potentially scalable business models; and facilitate the transition to effective quota management at the fisher level. All those outcomes are critical to build opportunities for later capital placement, and are suitable for projects that will benefit multiple stakeholders. For example, the Fisheries Innovation Fund, while it does not directly support businesses, stimulates innovation in the broader marketplace and in resource management.

EXISTING CAPITAL RESOURCE USE AND EFFECTIVENESS

In general, we found nongrant capital resource use fairly stagnant due to (a) the overall state of the groundfish fishery, (b) the existing barriers experienced by the lenders, (c) the unwillingness of the fishing community to take on more debt, and (d) the negative feedback loop in the value chain. Gauging the success or effectiveness of capital resources is complicated by dynamic market conditions and temporal changes: what was well designed for the fishery as it existed two years ago may not be appropriate today. We believe there is a strong opportunity to work with financial institutions in New England to address many of the identified constraints.

Debt

Debt issuers often use the “five C’s of credit” to determine the financial capacity of a borrower to repay a loan and associated interest: cash flow, collateral, capacity, character, and condition. Particularly of note in this fishery are cash flow and collateral—cash flow because of the declining revenues, and collateral as it pertains to permits. As stated previously, groundfish permits are not typically accepted as collateral in New England.

From our interviews with fishers and financial institutions, we found that the majority of vessel owners are not actively seeking additional debt at this time; correspondingly, financial institutions are receiving very few applications and making very few loans. We did not interview any financial institutions that were making more than a few loans each year to the fishing industry, with the exception of permit banks.

Despite these difficulties, we were able to identify a number of existing capital resources specifically targeted at the fishing community, which are designed with the rather unique concerns of the fishery in mind (see sidebar). The structure and utilization of these programs provide further insight into the conditions in the market. It should be noted, however, that each initiative has benefited from extensive grant support in one form or another.

Grants

In the course of our research, we spoke with directors of numerous programs working directly with fishers, which have benefited from public and/or private grants. To date, grants

have been indirect investments in the value chain, as it is the programs receiving the grants that are carrying the investment into the marketplace. Therefore, the success of a grant

Existing Capital Resource Programs Targeting the Fishing Community

Cape Cod Fisheries Trust (CCFT) Scallop Quota Lease-to-Buy Loan Program

Established in 2013 by the CCFT in collaboration with Community Development Partners (CDP), this initiative seeks to provide an affordable tool to existing scallop fishers in Cape Cod to acquire additional scallop quota. The scallop fishery is flourishing in New England, and quota prices reflect this.

Prequalified fishers may borrow up to \$100,000 with a 20 percent down payment for the purchase of scallop quota at an interest rate of prime plus 3 percent (variable) for up to three years. The fund has up to \$350,000 available for deployment, consisting of \$100,000 from CDP and \$250,000 from Massachusetts Growth Capital. At the time of writing, this new program had not made any loans; however, three applicants were being reviewed for a potential loan.

We believe this program is well designed, as it helps scallop fishers grow their business while reducing their personal risk exposure. This should help to increase application rates for the program. Additionally, by having input from a fishery organization and financing organization, the shared expertise should result in loans that are better suited to fishers.

Low-Impact Semi-Pelagic (LISP) Initiative

The collaborative LISP gear loan program was established in 2012 through Gulf of Maine Research Institute (GMRI), Coastal Enterprise Incorporated (CEI), the Alex C. Walker Foundation, and GEARNET (a conservation

engineering network). This initiative ties together conservation, cost savings, and financing by facilitating the purchase and deployment of semi-pelagic trawl doors in combination with a fuel-flow meter to reduce seabed impact and fuel costs.

Qualified fishers may borrow up to \$25,000 to cover the costs of the semi-pelagic trawl doors, a fuel flow meter, and the installation. An additional amount of up to \$40,000 is available for the purchase of acoustic monitoring equipment if needed. Fishers may borrow the funds at between 5 to 6 percent fixed interest for up to five years. Repayment amounts are calculated based on the anticipated fuel savings, which are expected to be at least 10 percent per year, making repayment of the loan within a year possible. Furthermore, once the equipment is installed, fishers are eligible for a \$2,000 subsidy from the Alex C. Walker Foundation to offset loan payments or other fishing costs. At the time of writing, this program had made three loans, with a fourth loan under review.

For a loan that essentially pays itself back, the low up-take rate is surprising, but our interviews demonstrate a general hesitancy of fishers to accept more debt with the current conditions in the fishery.

Permit Banks

In 2011, the State of Maine had permits enrolled in a sector, and by 2012 both Maine and New Hampshire were distributing ACE through permit banks. Existing regulations define state permit banks, but do not distinguish between nonprofit-operated permit banks and commercial businesses leasing ACE. Without a definition, there is no official count of nonstate-run permit banks. Currently, NEFSC recognizes seven nonprofit-operated permit banks; all started between 2007 and 2011.

The nine permit banks own more than 95 federal Northeast multispecies groundfish permits. However, the distribution of the permits is not evenly shared; one permit bank owns 49, and six own four or fewer. The Maine and New Hampshire state permit banks are not required to have their 15 permits enrolled in specific sectors and so can readily distribute ACE throughout their respective states. In New Hampshire, ACE is distributed to the two New Hampshire sectors at no cost, and is then distributed evenly to all sector fishers, again at no cost. Maine leases ACE well below market rates, with the exception of high-value species, which are priced at just enough of a premium to recoup operating costs. The Nature Conservancy (TNC) and Island Institute lease ACE in tiers related to research collaboration efforts (fishers participating at the highest level receive ACE at no cost and at 80 to 90 percent of market rate at the lowest levels). Other permit banks have other distribution methods related to gear type and port, and ACE is not distributed solely to members of a particular sector.

Permit banks reported leasing ACE to at least 185 sector vessels in 2012, although some double counting may have occurred. Permit banks that tracked landings showed that lease rates and landing rate trends matched the fishery-wide trends, in that valuable stocks like Gulf of Maine cod, haddock, and hake were generally leased at the highest rates and were landed at the highest rates, usually greater than 90 percent.

Permit banks seem to be successful at meeting their respective missions to the extent possible, but the majority relies on funding from sources other than lease proceeds to cover costs, essentially operating as charities.

in the fishery is in the design and implementation of the program it funds. Given the uncertain conditions in this value chain—where the participants closest to the resource are still in transition—grants will certainly continue to play an important role.

All the debt examples we have listed are the result of a grant-based approach. The existence of those innovative pilots would be in doubt were it not for the initial grants that made them

Revolving Loan Funds (RLF)

The Commonwealth of Massachusetts put the \$1 million they received from NMFS into an RLF (whereas Maine and New Hampshire used their NMFS funds to purchase permits and establish permit banks). The state had industry support to establish the RLF and had various reasons not to establish a permit bank, including legal concerns regarding the state receiving payments and holding permits.

The Massachusetts RLF is currently facilitated by the CDP and provides a line of credit up to \$50,000 at 2 percent interest, with no fees for ACE leasing, for no more than twelve months, and within one fishing season. For the 2012 fishing season, \$250,000 was made available, but no one applied for the program. At the time of writing, CDP and the state are in the process of trying to open the loan to other fishing-related expenses, such as vessel and gear upgrades.

In 1994, New Hampshire received \$810,000 from the US Economic Development Administration (EDA), which was put into an RLF now valued at approximately \$1 million. The RLF has made roughly 80 loans for various purposes, including upgrading boats, diversifying incomes for fishers, and gear upgrades. Approximately 90 percent of the fund is currently loaned. New Hampshire funds are loaned at 4 percent interest for the first 75 percent of the loan, funded by the RLF and approved by a committee. The remaining 25 percent is approved independently by Provident Bank at 2 percent above prime. Interest from the loans is used to cover the costs of operating the RLF and also goes back to recapitalizing the fund.

possible. Whether or not any of them will be commercially viable remains in question, but they are driving innovation and helping to change business practices.

One of the constraints observed is that these are principally debt-based innovations. There are no equity-based innovations, which represents an opportunity when considering future interventions in this fishery.

APPLICABILITY OF VALUE CHAIN-BASED INVESTMENTS

Traditional forms of value chain-based investments have included short-term inventory or contracting finance (typically under 12 months), and longer-term cash flow finance (typically up to 5 years). These are normally negotiated with liens against inventory or fixed assets. Our research indicates that these broad categories are available in this market from a range of lenders. More specifically, each of the services listed below is available (with an unintentional bias) to port-based businesses by lenders due to the condition of the groundfish fishery and the relatively recent transition to a quota-based system. The challenge in most cases lies with the vessels rather than the port-based businesses, due to the perishable nature of the fish itself prior to processing or freezing. However, lenders interviewed agreed that each service is available in the market for the qualified applicant to a greater or lesser degree.

Factoring Short-Term Inventory Finance (Less than 1 Year)

Vessels: Under current market conditions, none of the lenders interviewed were willing to lend against the value of fresh fish—landed or not, contracted or not. Product perishability was perceived as a significantly high risk.

Processors: Both processors and lenders concurred that it is possible to lend against product once fresh fish is processed or frozen. That market does exist and is functioning. Typical debt-to-value ratios were 60 percent, with one processor reporting to have secured 70 percent. This, in effect, means the processors are ordinarily unable to finance 40 percent of the value of their inventory, which must come from equity or other sources.

Unlike other value chains, where short-term financing is made available to producers or harvesters, it would appear that this is not an option in this marketplace. This, therefore, excludes the vessel owner and/or operators from accessing this financing.

Contract Prefinancing

Vessels: Generally speaking, entering into a contract is considered an “innovation” for most vessel owners, given the historical reliance on the auction system. While the more commercially astute vessel owners seek to bypass the auction system by entering into direct agreements with either processors or retail outlets such as supermarkets, this does not yet appear to be the market norm. Further, it was reported that agreements between vessel owners and buyers tend to be informal agreements, with little paperwork beyond a purchase order in some cases. In the absence of more formal documentation, it is difficult for lenders to participate in these transactions.

Processors: Processors indicated that they were able to secure short-term financing through their existing relationships against inventory, and did not negotiate separate facilities against contracts. Similar approaches were shared by lenders who preferred to secure inventory versus an agreement, which was seen as risky.

Unlike other value chains, where short-term financing is made available to producers or harvesters, it would appear that this is not an option in this marketplace.

Cash Flow Finance (1 –5 years) and Fixed Asset Leasing

Interviews with both lenders and potential applicants revealed significant presence of these services in the New England

market. However, lenders reported low numbers of applicants in general from the seafood industry, with a preference for port-based enterprises due to the risks associated with vessels under the current groundfish conditions.

BARRIERS TO THE ECONOMIC VIABILITY OF GROUND FISH FISHERIES MANAGEMENT

The issues hindering the economic viability of groundfish fisheries management in New England are not wholly due to the lack of effective traditional financing. Rather, the challenges and constraints identified in this value chain are the key drivers related to the economic viability of the fishery. That said, some appropriately structured finance interventions could ease the economic trends, as we detail in subsequent sections.

ENVIRONMENTAL CONSEQUENCES OF UNMET CAPITAL NEEDS

In the ideal situation, vessels and gear would be updated regularly to reflect best practices, which would both reduce operating costs and increase efficiency. Under the current conditions, we can assume that failure to invest in new vessels, vessel upgrades, and more selective fishing gear is leading to unintended detrimental environmental consequences. While overall fishing pressure has significantly declined because of sector management and the continued reduction in active fishing vessels, those vessels that remain are typically 20 to 30 years old and use obsolete equipment. Given the identified lack of investment in the fleet—as well as the unwillingness of both vessel owners and financial institutions to invest in the fleet—the following consequences were reported:

Fuel inefficiency. Older vessels with older engines are less fuel-efficient and, thus, more costly to operate. More important, they emit higher levels of greenhouse gases than newer or upgraded vessels. Newer vessels are more fuel-efficient due to their hull shape, which has evolved from narrower and

rounder to wider and flatter. Newer vessels also operate with newer engines. Additionally, older boats typically operate with only two reels, requiring them to travel back to port to change fishing gear in the event of a change in target species or higher-than-expected bycatch. Newer boats have up to four reels for such eventualities.

Limited fish handling and storage. Older vessels with narrower and/or rounder hulls are unable to install some of the improved fish-handling and refrigeration equipment that directly influences product quality. Older fish-handling equipment results in more wasted fish due to poor refrigeration as well as practices such as gaffing. Newer equipment utilizes conveyor belts and improved icing techniques to minimize product spoilage and damage.

Damaging gear. Compared with newer fishing gear, older bottom-trawling gear is less fuel-efficient, less selective, and more damaging to marine ecosystems. Significant progress has been made to develop off-bottom gear that creates less drag on the seabed, while also improving selectiveness to reduce bycatch. However, this equipment is costly and requires the adoption of new practices. Newer catch equipment often necessitates that trawlers use three or four reels, which is not possible for some of the older vessels with only two reels. Based on interviews, fishers seem to be open to gear upgrades or switches, but are hindered by cost and risk. They are wary of taking on debt under the current conditions.

CAPITAL PROVISIONS INFLUENCING ENVIRONMENTAL CONSIDERATIONS

With the exception of the LISP initiative, our research was unable to identify any financial institutions that directly required or integrated environmental considerations into their financing programs available in New England. Along with the low desire by both lenders and vessel owners to take on additional debt, it is difficult to determine whether or not the presence or the lack of these conditions would influence environmental considerations.

While the LISP initiative—which specifically seeks to improve bycatch issues as well as fuel efficiency—is a good example of

what is possible, it has suffered from a low adoption rate. As mentioned previously, this is partly due to the unwillingness of vessel owners to commit to a debt instrument at a time of great uncertainty. Another factor is the inherent risk of fishing: a \$25,000 gear upgrade could become a write-off at the bottom of the ocean if it is lost while working, but the fisher would still be liable for paying off the debt.

In short, we found that there are almost no capital provisions directly influencing environmental considerations in the New England groundfish fishery at this time. In the following section we analyze whether and how effective financing mechanisms could incorporate sustainability.

FINANCING MECHANISMS' ABILITY TO PROMOTE SUSTAINABILITY

Central to the constraints in the New England groundfish fishery is the status of the fish stocks. Additional financing mechanisms will not, in and of themselves, promote a more sustainable fishery. However, now is an opportune time to engage the industry and the financial community on the issue of sustainable practices, and to work with locally respected financial organizations to design appropriate instruments. A number of the vessel owners realize that their current situation is unsustainable, and that they will need to refinance their businesses in order to survive the transition to sector management. In the same vein, a number of financial institutions, such as Community Development Partnership and Fresh Source Capital, would like to support these local businesses through the transition.

We know that impact-lending organizations in other markets have demonstrated that appropriately structured instruments can positively influence sustainability practices. Such organizations include the California Fisheries Fund and Conservation International's Verde Ventures Fund, which utilize a proactive environmental screen to identify traditional investment opportunities that support positive environmental outcomes. In the case of the Verde Ventures Fund, sustainable practices were integrated into term sheets and as conditions in loan documents. In the event of a borrower failing to adhere to the agreed environmental conditions, the lender was within rights to recall the note.

Verde Venture's experiences with small and medium-sized businesses demonstrated a range of environmental and social impacts could be achieved based on how the contracts were structured. These included:

- employment as an alternative to poaching leatherback turtles at Playa Viva in Mexico
- alternative incomes as alternatives to deforestation in Peru, Mexico and Madagascar
- adoption of sustainable practices and skills in coffee, cocoa, and vanilla harvests
- value addition for sustainably harvested lobster in Mexico

Permit banks provide another mechanism for influencing environmental practices, which has achieved some success. These programs have typically been restricted to small-vessel owners. The Cape Cod Fisheries Trust permit bank includes conservation measures as one of their impact assessment targets with the goal of determining concrete, attainable results. Similarly, The Nature Conservancy/Island Institute permit bank uses conservation goals to guide their research programs. Both programs include social and economic goals as well as conservation.

Chapter 6

Opportunity Areas and Next Steps

SUMMARY OF KEY FINDINGS AND INSIGHTS

As with many conservation-oriented markets, a sustainable model of the New England groundfish value chain is still nascent, and significant constraints remain. Some of those constraints relate to policy and regulation; others hinder the ability of current value chain participants to adapt to changing environmental, regulatory, and market conditions; and yet others pertain to the need to turn innovative pilots and proof-of-concept initiatives into established business models. Our main findings and insights into the New England groundfish value chain are summarized below.

Uncertainty Paralyzes the Value Chain

The number of unknowns—from actual stock health to the validity of stock assessments, to ACL, to landings, to prices—impedes the success of the fishery on multiple levels. Fishers cannot predict how much fish they will catch; they don't know if and when to lease quota, how much to lease, or what the price for their fish will be until after it's been sold. Optimism that the fish will come back has waned. Already saddled with debt from previous business investments, many fishers are unwilling or unable to take out new loans. The uncertainty and instability of the fishery, in turn, is too risky for most lenders to offer debt or equity financing to groundfish businesses. Many local processors and others higher in the value chain have chosen to reduce reliance on New England groundfish and turn instead to imports, which promise consistency in volume, price, and quality.

Fishers' Perspective: Sectors Aren't Popular, but They're Not the Worst Option

Few fishers are thriving under sector management, but many believe a different regime wouldn't necessarily be better. Most fishers we spoke with look at their businesses within the context of days-at-sea (DAS) and recognize that even if the policy regime had not shifted to sectors, they would still be in the same position today because trip limits would have been severely slashed under the current season's reductions. Some mentioned that sectors were the most bearable of a list of unbearable options. Many fishers purchased additional permits during the final years of DAS, but few intuited that catch allocations under sector management would come to be based on landings histories. Those who have truly lost out in the switch to sectors have been fishers whose permits have such little allocation that they're effectively no longer able to fish for a living. Those fishers—and the ports that depend on them—are embittered toward catch shares and blame the powers that encouraged the adoption of sector management for the current crisis.

A Conversation about Consolidation is a Conversation about Values

While consolidation to some degree is inevitable, there is much debate over how, to what extent, and to what end consolidation should be allowed to occur, and what can be done about it. On one hand, a small, modernized fleet with efficient engines and state-of-the-art freezing technology could improve quality for certain products, increase profitability, and make New England groundfish more competitive with imports. However, it is likely that this level of consolidation would eliminate the industry advantages offered by fleet and port diversity, namely being able to adapt to changing ecological and managerial conditions; consolidation would also come at the expense of thousands of individuals and communities dependent on the fishery for economic survival. On the other hand, while measured consolidation that intentionally maintains a diverse and more numerous fishing fleet—in terms of vessel size, gear type, home port, and target species—may not be the most financially profitable strategy for the industry, it may provide the most social benefit, especially with respect to preserving the fishing communities and waterfront economies that are core to the fabric of New England's

cultural heritage. Initiatives and policies related to consolidation require honest discussions about the full range of drivers, costs, and benefits associated with different variants of fleet composition, and an understanding of the options available to fishery participants. Further, any efforts to maintain a diverse fleet must go hand-in-hand with interventions to increase the profitability and sustainability of the industry.

Shifting Mindsets Is Challenging

Adjusting to sector management requires a shift in practice as well as mindset. Fishing has always been a business based on high volume, low quality, low price. Many fishers have admitted that altering the business mentality to accommodate more markets that rely on low volume, high quality, high price is a slow, personal psychological shift as well.

Product Differentiation Is Key

In order to improve pricing and sustainability, New England groundfish needs to be disassociated from the global commodity market and differentiated. While exceedingly difficult, this is possibly one of the few ways in which sustainability of the natural resource and a smaller fishing industry can be secured.

Permits Are Not Typically Considered Legitimate Collateral

Debt financing is widely available in the region. However, given the perceived risks, typical debt-based financing requires proof of positive cash flow in addition to 100 percent collateral, which is a difficult proposition for most value-chain participants. While the majority of institutions we spoke with accept a variety of collateral, few are able to accept permits, or do so at steeply discounted values. (Financial institutions lending in other US fisheries are generally willing to use permits as collateral.) That reluctance in New England is, in large part, due to a combination of biomass uncertainty, lack of legal information about permits as collateral, and the lack of transparent information on both the lease value of quota and product price variability. Those factors combined make present and future valuation of permits difficult. The

legality of placing liens against permits is also unclear in the New England banking community.

Grants Remain Key Sources of Funding

Although opportunities for debt and equity investment exist, concern about the status of groundfish stocks and ability of fishers to land sufficient volume to operate their enterprises is a significant barrier to deployment and acceptance of financing. Thus, we found that grants remain a valuable tool for helping with the ongoing adjustment to sector management, particularly projects that benefit multiple stakeholders. Grants also seem to be an important indirect, initial investment that can lead to other types of financing, such as the debt market.

OPPORTUNITY AREAS

Based on our assessments of the New England groundfish value chain, the needs expressed by fishers, port-based businesses and financial institutions, and the types of financing available, we have identified eight opportunity areas that represent potential solutions to the systemic issues in the value chain, and that target specific challenges in the negative feedback loop. They are focused on three overarching goals:

- Facilitate the transition to effective quota management at the fisher level.
- Streamline and enhance policies to build more efficient market structures and regulation.
- Support the development of new, innovative, early-stage development opportunities and the establishment of potentially scalable business models.

Opportunity 1: Improve Stock Assessment Methodology

The inability of the current stock assessment process to accurately project groundfish species abundance from year to year is a key driver of uncertainty for members of the fishery, as well as for financial institutions in their calculations of risk. Not only have the models used to estimate stock health

resulted in highly variable catch limits, but they have also failed in their goal of rebuilding overfished stocks according to established timelines, even though fishers report fishing within set quotas. Efforts to develop and implement new stock assessment methodology should employ active fishers, who have unique knowledge of fish behavior and trends in abundance at different locations over time. Also essential is financial support for the science needed to transition to ecosystem-based management.

Investment Options: Stock assessments are conducted by the National Marine Fisheries Service, which is funded through the Federal government. The development and piloting of new approaches is most appropriate for grant funding.

Potential Impact: Once a new, accurate stock assessment methodology is established, catch limits should stabilize and the uncertainty currently paralyzing the value chain should be tempered. Accurate stock assessments should also bring more clarity to the true health of current fish populations and result in more successful rebuilding strategies. Rebuilt fish stocks are the foundation of a thriving, sustainable fishery.

Value Chain Players Affected: Frustrated fishers are befuddled by the stock survey approach, and have no faith in the accuracy of the assessment process. Efforts to better explain the rationale of the methodology to fishers, as well as allow them to participate in the process in a more tangible way (utilizing their knowledge as opposed to just hiring their vessels), would go a long way toward earning the trust of fishers, and providing temporary skilled work and income for those currently unable to fish for a living. The increased certainty in landings from stable catch limits would give fishers and value chain players the security necessary to begin investing again in their businesses, which should stimulate the economies of fishing towns and beyond.

Potential Participants: A consortium of fishers, academic institutions and NGOs, fishery scientists, NOAA, New England Fishery Management Council.

To Be Clarified: There is no dispute among fishers, processors, distributors, NGOs, or fishery scientists that the current methodology is flawed and must be improved in order for the fishery to eventually thrive again. Opinions on how to

change the methodology, however, vary widely. If a research team experimenting with new survey techniques and data modeling were to develop a superior assessment method to what currently exists, would National Marine Fisheries Service accept it? More work needs to be done to engage with the different players—specifically, those currently in charge of stock assessments—to determine the level of openness to this type of change.

Opportunity 2: Promote Transparent Permit Transfer and Quota Leasing Mechanisms

The opaque nature of permit transfers and quota leasing prevents financial institutions from accepting permits as a form of security, which, in turn, denies fishers access to capital. Currently, because there is no permit registry that records ownership, liens, and transfer history, a financial institution runs the risk of a permit owner transferring a permit without first paying the loan. The lack of quota lease information makes it difficult to calculate a capitalization rate to determine asset value.

Investment Options: Initial efforts may focus on engaging the relevant financial institutions in identifying and addressing constraints to financing permits and in promoting a transparent leasing market through grant-based opportunities. This would ideally support the involvement of a network of brokers in the region. The development of a system of supporting services to facilitate quota transfers (similar to those that exist on the West Coast) or eventually the creation of a central online trading forum could be financed through grants or debt, with loan payments covered by revenue earned from transactions.

Potential impact: A transparent permit transfer and quota lease market would build awareness of price fluctuations over the long-term, enabling fishers to plan purchases and manage their business practices more efficiently. Permit and quota price trend information would also be valuable to financing institutions seeking either to collateralize permits or to invest in the fishery.

Examples: The Sustainable Harvest Sector posts quota lease packages (asking prices and quantities) to its website, although actual trades are not disclosed.

Value Chain Players Affected: A transparent market for purchasing and leasing quota should offer greater efficiency in meeting supply and demand, reduce leasing costs for fishers, improve access to finance, and result in wins for lessors and lessees alike. A better alignment of quota supply and demand should also result in less quota being left unfished at the end of the season, which benefits both fishers and port-based businesses.

Potential Participants: Several fishers pointed out the need for a better system of quota leasing, and a number of sector managers also noted the benefits of improved lease mechanisms. As potential participants, those individuals (along with permit bank managers and financial institutions) are interested in facilitating a marketplace that responds to fishers' needs.

To Be Clarified: Given the relatively nascent sector management system and the unique regional conditions, early involvement of a qualified legal firm alongside the relevant financial institutions is critical in addressing this challenge. For example, unlike the West Coast individual fishing quota (IFQ) management structures, groundfish quota in New England is not owned by individual fishers, but rather by the sectors. Thus, within-sector trades would need to be accounted for differently, and all between-sector transactions would still need sector management approval. Further, unless mandated by the Fishery Management Council, the quota leasing market would need significant buy-in from voluntary participants in order to be effective fishery-wide. An online quota transaction market was proposed in the first year of sector management, but was rejected by the industry. Some fishers and sector managers believe that fishery participants would be more open to the idea now. Finally, supporting services on the West Coast include brokers, quota managers, and information-sharing services. Currently, those functions tend to be provided by the sectors in New England as many brokers are leaving the market. Developing them as a business opportunity may also present sectors with a potential business model.

Opportunity 3: Recapitalize Permit Banks

Permit banks typically offer predictable, subsidized quota lease prices for qualified fishers who need access to affordable quota—specifically of choke species, which limit the ability to

catch more abundant stocks. However, low ACLs prevent most permit banks from making significant volumes of quota available. The result is that some fishers who lack their own quota and rely heavily on subsidized quota from permit banks cannot fish. The ensuing reduction in landings affects the profitability of both fishers and port-based businesses.

Investment Options: Grants or low-interest loans (with permits serving as collateral) would be needed to purchase additional permits and/or help permit banks develop new models of quota acquisition and transfer. Cash flow from leased quota would cover loan payments and overhead. Ideally, this cash flow would also eventually cover more permits or monitoring expenses, as appropriate.

Potential Impact: Expanding permit bank capacity through the purchase of additional permits or by setting up an exchange to reallocate unused quota is one way to improve access to affordable quota, increase landings, and raise revenues throughout the local value chain. Permit banks with strong social missions can further benefit fishers in particular communities, help maintain fleet diversity and hedge consolidation. Others that make quota available only to fishers participating in research, or to those fishing with certain ecologically friendly types of gear can, potentially, positively impact stock health.

Examples: Existing permit banks in Maine, New Hampshire, and Massachusetts, as well as through nonprofit entities such as The Nature Conservancy, are testing new models that allow long-term access to quota, encourage the adoption of environmentally sustainable practices, support local fishing efforts, and potentially provide a source of financing for monitoring.

Value Chain Players Affected: Permit bank-eligible fishers and the ports where they land their catches would benefit from more quota available at subsidized rates. If quota were aggregated by permit banks, it's possible that permit banks could create a more transparent and thus equitable market for leasing.

Potential Participants: All existing permit banks, as well as other sectors interested in banking permits for their members.

To Be Clarified: Analysis is needed of permit banks' capital structure, as well as the permit and quota leasing markets (supply and pricing), to determine the optimum capital size and the expected cash flow from leasing operations. The funding of permit banks to further aggregate quota is a sensitive issue, and some fishers' resistance to the idea should be better understood and/or addressed. While permit bank "funds" may be considered, close attention should be paid to ensure alignment between the investors and the environmental and social impact outcomes of these funds in both the short and the long term.

Opportunity 4: Help Fishers Diversify

Stock uncertainty, wildly variable ACLs, and insufficient quota allocation make exclusive reliance on the groundfish fishery a risky business model for many fishers. One way to generate smoother, more stable incomes over the short- and long term is through revenue diversification. Diversifying could take the form of continuing to fish, but targeting other species; continuing to captain a vessel, but for purposes other than fishing; or pursuing a new career activity altogether.

Investment Options: Organizations such as Coastal Enterprise Incorporated (CEI) and Maine Technology Institute provide grants, debt, and limited equity to individuals and firms seeking to diversify under a range of different conditions. In cases where fishers are considered too risky by the traditional banking community, or are unwilling to take on debt given the uncertainty of a new venture, philanthropic capital may be appropriate for guaranteeing loans or otherwise providing transitional support. Community-development financial institutions typically do not require current cash flow from projects, making them attractive lenders for enterprises seeking to diversify. Proactive structures and mechanisms also exist in New England to support business development, including the Small Business Administration at the federal level, to various state initiatives.

Potential Impact: Diversification could benefit fishers by creating more consistent and predictable income while also alleviating the chronic stress associated with the uncertainty of the fishery. Where new businesses are formed, communities may profit from increased economic activity and employment opportunities.

Examples: Some groundfish fishers have already diversified, by either targeting more abundant species (e.g., pollock), shifting to non-groundfish stocks (e.g., shrimp, scallops, lobster, dogfish), vertically integrating through processing and marketing, or providing charter trips to tourists and recreational fishers. Other potential options include aquaculture (specifically kelp and shellfish) and repurposing vessels for research.

Value Chain Players Affected: Fishers are the most directly affected by diversification strategies. However, if fishers ultimately catch more or less volume by diversifying, other value chain entities may benefit or suffer indirectly as a result.

Potential Participants: Several fishers we interviewed expressed interest in diversifying, and a number of financial institutions are supportive of helping fishing-related businesses diversify or transition to other industries. At the community level, Gloucester has proposed several initiatives, including a harbor-based marine innovation center/business incubator that would create opportunities for diversification.

To Be Clarified: A wide range of diversification options are available to fishers, but the degree to which some options are more appropriate than others needs to be further explored. Given that any strategy must align with a fisherman's skill set, interests, and ability to receive capital investment—and also be appropriate geographically and with respect to the market and stock health—it is possible that participants in a diversification assistance program will require customized solutions. More research is needed to better understand how this opportunity can be implemented effectively. Similarly, because of the range of options, the capital requirements and associated terms and conditions would require further discussions with providers in order to design suitable interventions.

Opportunity 5: Improve Gear and Fish Handling, and Reinvest in Vessels

Gear and fish-handling improvements and vessel reinvestment would serve directly to increase fuel efficiency, species selectivity, and fish quality—factors that are essential for reestablishing financial sustainability and market competitiveness (specifically with imports) within the fishery. The

creation of finance vehicles to make these changes possible would mitigate the risks currently associated with capital deployment (on the parts of both lenders and loan recipients) in the current climate of uncertainty.

Investment Options: Appropriately structured risk mitigation mechanisms—such as irrevocable letters of credit, guarantees (through philanthropic funds), loan loss reserve provisions, and insurance options—could put these changes within reach of fishers and financial institutions, and could allow for terms that both would find acceptable. A number of fishers could also benefit from working capital, bridge loans, lines of credit, refinancing of existing loans, and debt restructuring.

Potential Impact: Investments in gear, handling, and vessel upgrades are likely to reduce the fishery's carbon footprint, and result in less bycatch and wasted fish. Greater fuel efficiency means lower fuel costs and less pollution, while greater species selectivity means lower costs for discards. Higher-quality fish brought to port could open up new markets and better prices for fishers.

Examples: The Low-Impact Semi-Pelagic (LISP) initiative encourages gear changes that promote conservation and reduce operating costs for fishers. A good example of the use of capital for increased lending paired with grant support is the recently announced CEI/Goldman Sachs (GS) partnership. GS is providing \$5 million in lending capital, \$250,000 in loan loss reserves (assuming a 5 percent loss), and \$250,000 in grant funding for outreach and due diligence. This arrangement provides CEI with the resources it requires to increase its reach to small businesses, along with a risk mitigation mechanism to ensure that the additional lending does not impact their balance sheet unnecessarily. The exact terms of the facility are not known at this time.

Value Chain Players Affected: Fishers would be most affected by the ability to make necessary gear, handling, and vessel improvements. Where these improvements are related to safety, they could be lifesaving.

Potential Participants: Based on feedback from fishers and organizations like CEI, GMRI, and CDP, with philanthropic support we think there is sufficient interest in improvements and upgrades to warrant further exploration

of this opportunity. Anecdotal evidence from other fisheries suggests that fishers will switch practices to obtain higher quality if they can secure higher prices for doing so.

To Be Clarified: As with other opportunities in the fishery, the willingness of vessel owners, financial institutions, and philanthropic investors to engage in such ventures is not completely known and should be assessed before formulating a program. A proper assessment of the level of risk that parties are willing to assume would need to be conducted; likewise, the willingness of the philanthropic community to underwrite a portion of the risk is a key component of this transition-related intervention.

Opportunity 6: Support Market Development and Differentiation

Market-development support addresses challenges associated with the commoditization of groundfish, including price volatility, lack of demand for local products (specifically underutilized species), and inability to compete with high quality imports.

Investment Options: Grants could help establish a program or organization to assist with the development of markets or product branding to effectively differentiate the New England groundfish industry from the global commodity supply chain. Once established, debt or equity may help businesses grow their brands or market share.

Potential Impact: The development of markets for locally landed groundfish would help fishers garner better, more stable prices, and could result in increased volumes landed at local ports if demand rose for underutilized species. If accompanied by increased quality, then branded, storied fish could gain competitive advantage over imports.

Examples: Several fishers have taken entrepreneurial approaches to fishing, successfully building thriving family-owned businesses, distinct marketing channels, or branding strategies. Several CSFs similarly work to develop markets for underappreciated species while connecting consumers with high quality, locally sourced fish. Red's Best is a New England distributor that aggregates catch from day-boat fishers and sells fish and their stories via the high-end wholesale market. The Gulf of Maine Research Institute

(GMRI) recently established a brand called Gulf of Maine Responsibly Harvested for seafood products that meet certain sustainability and traceability criteria.

Value Chain Players Affected: Fishers may need to adjust their fishing strategies in order to satisfy demand in a newly developed market. That may mean changing gear, targeting different species, or adopting new handling techniques. Port-based businesses, likewise, may require capital improvements to effectively process (and preserve the quality of) an influx of new or high-value species. In areas where local processing plants have shut down, new capacity may need to be built. Increased landings and higher marginal prices should result in increased profitability and financial stability throughout the value chain involved in the new market.

Potential Participants: Fishers, processors, distributors, NGOs, and sales outlets are all eligible beneficiaries of market development support, as are some states. A recent bill in the Massachusetts State House has called for the establishment of a Massachusetts Seafood Marketing Program within the state's Division of Marine Fisheries, which would be tasked with raising awareness of seafood's health benefits; building brand recognition and demand for Massachusetts-caught seafood; developing strategies for bolstering consumer confidence; and pursuing funding sources to increase outreach. Gloucester is exploring ideas around a seafood hub that would involve aggregation of small catches, branding, and a test kitchen.

To Be Clarified: Exploration is needed into the business models that would work for this fishery and the New England region. What is the customer base for "local" fish? More information is also needed about the requirements, risks, and challenges of breaking away from the traditional value chain and doing direct-to-market sales. What is the appetite of fishers to spend the time and effort to find buyers and develop markets? Is the processing and distribution infrastructure in place to make this strategy economically feasible? How much consumer and/or buyer education is required? What is the level of demand for different segments of the market?

Opportunity 7: Facilitate Forward Contracting Marketplaces

Current uncertainty over landing prices and volumes is creating a level of market volatility that makes it difficult for anyone in the industry to plan their businesses. Today, most fishers are forced to accept whatever price is offered at the auctions or based on an international commodity price, which sometimes isn't enough to cover costs they've already incurred. Similarly, seafood buyers will typically buy from the cheapest provider, but pay whatever the market warrants based on supply. With forward contracts, fishers and seafood buyers agree in advance on price, quality, and volumes of fish to be delivered on specific dates. Facilitating the development of forward contracting marketplaces would offer fishers the ability to plan their catches based on market demand from seafood buyers, targeting certain species at prearranged prices. That stability means fishers can decide when to fish, how long to fish, and what to catch before they leave the dock.

Investment Options: Capital requirements include debt and risk equity to grow the business of the forward contracting marketplace, and short-term debt to prefinance product purchases from fishers. Due to the nascent nature of the opportunity, this is a high-risk investment and attracting traditional financing may be challenging. Philanthropic capital could be instrumental in providing startup grants, loan guarantees, or program related investments (PRI), any of which could be tied to sustainability or impact criteria.

Potential Impact: Forward contracting marketplaces, by mitigating the current risks associated with market volatility, would result in positive social and environmental outcomes for the New England groundfish fishery. Forward contracts would match supply and demand in a way that minimizes waste, garners fair prices for fishers, meets price points for buyers, and utilizes port-based business services (e.g., vessel services, processing). With respect to stock health, forward contracts could be designed to allow for substitution when certain species are more or less abundant, which would keep volumes of fish consistently flowing through the value chain while allowing depleted stocks to recover.

Example: Open Ocean Trading is a forward contract-exchange marketplace for fresh caught seafood. Their FYSH-X online trading platform allows fishers and seafood

buyers to post, negotiate, and transact orders for numerous species of commercially harvested and farmed seafood. It also arranges for midsupply chain activities (e.g., processing, distribution) to be bid on and secured as part of the transaction, so that all value chain players are in place upon executing a contract.

Value Chain Players Affected: Forward contracts would create much-needed market stability by reducing price volatility and smoothing volumes for fishers and seafood buyers alike. By shifting the governance of the supply chain away from the processors and auction buyers to the fishers and sales outlets, the value chain power dynamic is completely flipped. Buyers who want to buy local fish, but who tend to require consistent volumes and predictable prices, would benefit from the security offered by forward contracts. Shoreside businesses and midsupply chain players would still provide essential value-added activities—aggregating catch, processing, packaging, transporting, and so on—but would do so on a fee-for-service basis.

Potential Participants: Players at multiple levels of the value chain must be recruited to build these systems.

To Be Clarified: Although many fishers expressed interest in how they might benefit from forward contracts (some believed it was the way of the future), most were concerned about severing or damaging existing long-standing relationships with auctions or processors. Those entities see forward contracts as a challenge to their traditional business models, which are based on buy-sell margins. More work is needed to inform value chain participants of their roles (including costs and benefits) under a system of forward contracts. What are the true risks and rewards to each player involved? What is the effect on the auctions and exchanges, and can they adjust their business models to survive? With respect to the current climate of uncertainty over stock assessments, the effect of fluctuating catch limits on forward contracts also needs to be better understood. For example, what types of terms or guarantees need to be in place to prevent the marketplace from collapsing under unforeseen declines in landings of certain species? To what degree can forward contracts help stabilize prices in the quota lease market, if at all?

Opportunity 8: Build Business Ecosystems

“Business ecosystem” refers to the network of value-chain players involved in the delivery of a product through competition and/or collaboration. In New England, new business ecosystems could successfully address some of the current problems in the Northeast groundfish fishery by expanding more equitable marketing channels for value chain participants or by shifting existing inequitable supply chains to more equitable relationships. Embracing forward contracts, securing a differentiated market for local fish, creating a market for underutilized species, etc., would all be potential opportunities to create new or expanded marketing channels.

Investment Options: As business ecosystem development requires the coordination of multiple entities, the convening, design, and collaboration of interested players would be accelerated by grant support. Once collaborations are established and initiatives undertaken by the businesses within the ecosystem, the ability to deploy equity or debt into these organizations can be realized.

Potential Impact: Fishers and port-based businesses, as well as fishing communities, would benefit economically from the revitalized infrastructure and marketing efforts associated with the formation of a business ecosystem committed to promoting and sustaining the local groundfish industry. Building partnerships offers greater potential and competitive power to alter the existing commodity market than if all players acted alone. If such business ecosystems were built with sustainability criteria and traceability, incentives could be also aligned to conservation behavior.

Examples: Future of Fish is developing several business ecosystems of like-minded value chain players to expand alternative marketing channels, such as CSFs, specialty distributors, and forward contracts, all of which can deliver storied, traceable fish to the market.

Value Chain Players Affected: Business ecosystem development involves players across the value chain working together to create a more efficient, more profitable, and more equitable industry. It also relies on technology to facilitate the capture and transfer of traceability information essential for market differentiation.

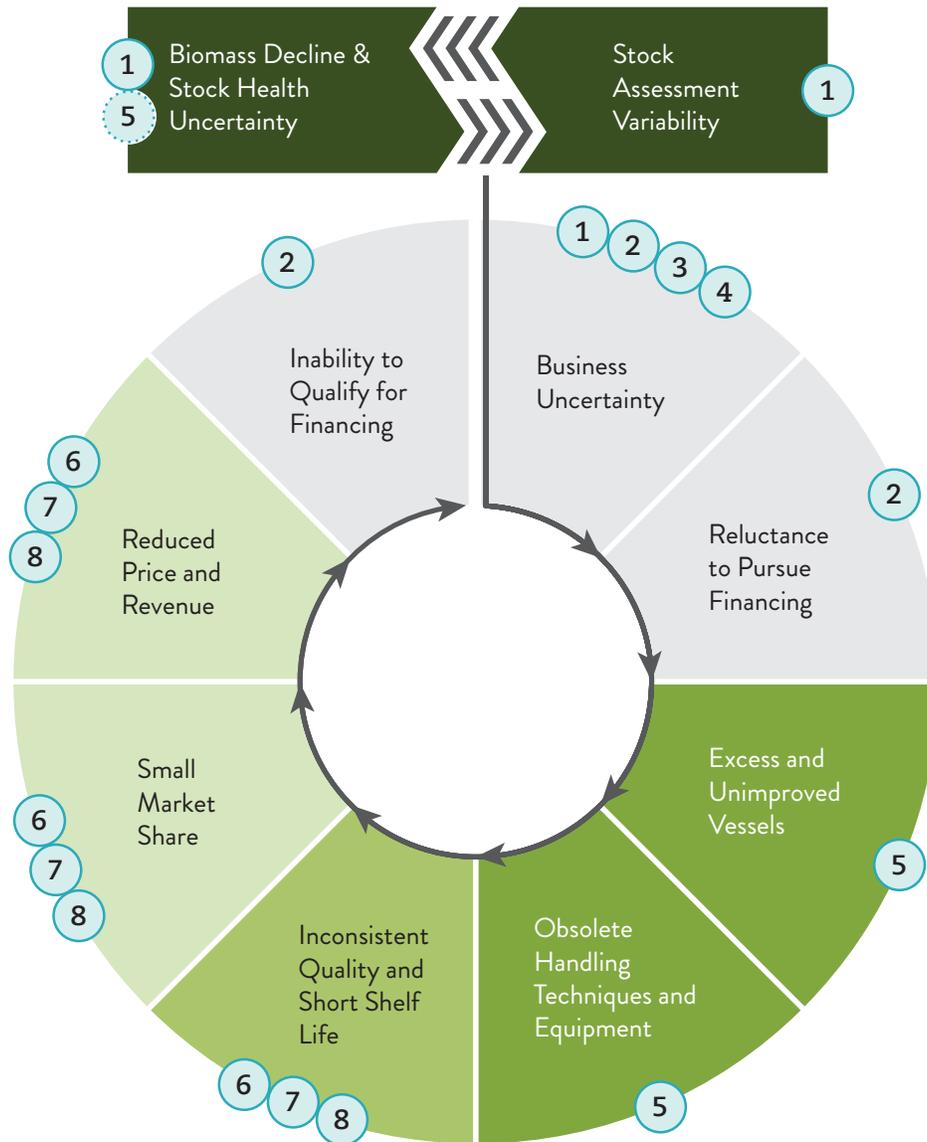
Potential Participants: Anyone in the value chain is a potential participant. However, engaging the middle of the chain to support fishers and develop markets for differentiated products offers the greatest opportunity to drive change. Facilitation by a third party who can provide the backbone to convene, direct, and manage the development process of the business ecosystem has traditionally proved to be the most expedient way of creating the desired systems change.

To Be Clarified: Specific pilot projects need to be identified, and businesses need to be aligned to work together. Due to the complexity involved with coordinating agreements among multiple players as well as the need for a mix of finance vehicles, it is critical to obtain commitments from the value chain as well as from potential funders. While the idea of a business ecosystem may be the most complicated opportunity presented here, there is real potential for system-level change when partners are aligned to trigger market mechanisms that can help the industry more fully transition to sector management, and also build the systems and infrastructure necessary for economic sustainability.

MULTIPLE, SIMULTANEOUS INTERVENTIONS ARE NEEDED

The opportunity areas presented target specific value-chain challenges identified in the negative feedback loop described in Chapter 5 (see Figure 6.1). However, because those challenges are interdependent, they are difficult to fix by intervening at just one level; fixing one problem in the negative feedback loop will not cause a ripple effect through the chain. For example, better quota structures or leasing markets do not solve the lack of icehouse capacity; better handling techniques that increase fish quality won't alone stop local fish from competing on the commodity market nor achieve higher prices. A concerted effort is necessary to intervene at multiple levels simultaneously to allow all players in the value chain to make different choices. An approach in which players at are recruited to collaborate on a multipoint change strategy is thus a useful framework.

Figure 6.1. Negative feedback loop constraining the value chain, with intervention opportunities.



Intervention Opportunities

- 1. Improve stock assessment methodology.
- 2. Promote transparent permit transfer and quota leasing mechanisms.
- 3. Recapitalize permit banks.
- 4. Help fishers diversify.
- 5. Improve gear and fish handling, and reinvest in vessels.
- 6. Support market development and differentiation.
- 7. Facilitate forward contracting marketplaces.
- 8. Build business ecosystems.

Credit: adapted from Odlin, 2013



NEXT STEPS

Given the diversity of the challenges and capabilities of particular fishers, sectors, and ports, we do not expect that every opportunity area outlined will be applicable or feasible for every person or business involved in the fishery. Rather, the opportunity areas are starting points for dialog and for the development of solutions that can be customized to meet specific needs and circumstances. As they stand, the opportunities require further refinement—potentially through convening stakeholders and launching pilot programs—before full pursuit.

A concerted effort is necessary to intervene at multiple levels simultaneously to allow all players in the value chain to make different choices.

As a general principle, we encourage pursuing opportunities that could involve private-sector actors in the next phase of building a sustainable New England groundfish value chain, including:

- designing and implementing solutions that could become viable, scalable business models with triple-bottom-line outcomes,
- identifying pilot or experimental projects already in the marketplace, and
- working with innovators to develop those projects into scalable business models.

Importantly, if the opportunities are to move from proof-of-concept to established business models capable of scaling (and thereby attracting private capital), they will require grant

support. They will also require a level of collaboration between investors and meticulous deal structuring that has not yet taken place in the New England groundfish industry. It is important that the parties involved are able to draw upon lessons from other industries that have successfully developed sustainable value chains, understand the expectations of financial institutions, and develop opportunities with the rigor expected by those institutions when considering investment.

Any future engagement aiming for long-term impact will need to recruit stakeholders on both sides of the investment equation. Investors will need to be convened, both to educate and to build the relationships and necessary partnerships to invent new paths to deploy capital. Potential recipients will need to be assessed for investment potential, supported with technical assistance, and provided with partner recruitment services that could make deals more viable.

While the outcomes of the opportunity areas presented will be affected by the future status of groundfish stocks, they offer systemic resolutions that will only be magnified in a recovery. Thus, efforts should be made to engage relevant parties proactively in the interim.

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Appendix A

Historical and Regulatory Highlights of the New England Groundfish Fishery

The current state of New England’s groundfish fishery is best understood in the context of its historical importance to the region, as well as in how the industry has responded to the evolving regulatory environment. Groundfish have long represented a focal point for New England’s coastal economy and culture, dating back to the 17th-century arrival of the first settlers. Early European traders fished for cod and haddock, much of which found its way back to European markets, while fueling growth and expansion in the New World. Shortly after arriving in Massachusetts Bay in 1629, Reverend Francis Higginson, the first Puritan minister in Salem, wrote, “The abundance of sea-fish is almost beyond believing, and sure I should scarce have believed it except I had seen it with mine own eyes . . . such abundance of mackerels that it would astonish one to behold, likewise codfish abundant on the coast, and in their season are plentifully taken” (The Winthrop Society).

But by as early as 1651, reports of cod and mackerel scarcities surfaced, and in 1668 conservation measures were ordered to keep the fish stock healthy; the commercial harvest of cod, hake, haddock, and pollock during spawning season was prohibited. By the mid- to late 18th century, fishing employed an estimated 4,000 colonists, and customs officers tracked catch and tonnage, hired fish inspectors to investigate practices, and established more extensive licensing protocols. Around the time of the writing of the Constitution, Secretary of State Thomas Jefferson called for subsidies to keep the industry viable, after more than 20 percent of the fleet had been destroyed in the war.

Summary of Recent US Fisheries Policy and Regulation

Although fisheries regulation and reporting requirements have been around for centuries, formal fisheries policy in the US is relatively new. Until 1970, US fisheries

management involved little more than individual states overseeing coastal fishing up to three miles from shore—the range of a cannon shot. Beyond that was international waters, where fishing occurred without limits or oversight. After World War II, the fishing technology used by foreign fleets began to threaten US coastal fish stocks and the domestic industry.

In 1970, Nixon created the National Oceanic and Atmospheric Administration (NOAA), which established federal fisheries management under the National Marine Fisheries Service (NMFS). Although region-specific restrictions on foreign fishing were implemented around this time, substantial regulations did not occur until Congress passed the Fishery Conservation and Management Act (later called the Magnuson-Stevens Act) in 1976.

The Act expanded American jurisdiction of fisheries to an exclusive economic zone (EEZ) that extended 200 miles offshore. It also established eight Regional Fishery Management Councils to manage fisheries and encourage conservation. Despite this charge, the main objectives were to banish the foreign fleets and drive efficiency and economic growth within the domestic fishing industry.

In the late 1970s and early 1980s, substantial government resources were spent “Americanizing” US fisheries through subsidies and other incentives. People began leaving their careers—whether they were lawyers or taxi drivers—to become fishers. Overcapacity resulted, and by the late 1980s, some of the nation’s most iconic fisheries, including New England cod and summer flounder, were on the brink of collapse. By the 1990s, fishers themselves began arguing for better fisheries management.

Twenty years after its inception, the Magnuson-Stevens Act was amended. Called the Sustainable Fisheries Act of 1996, the amendment shifted the focus from promoting fishing to rebuilding overfished species. Despite this charge, overfishing continued, and stock health declined further.

A decade later, in 2007, the Magnuson-Stevens Act was amended again. This time, it emphatically called on Regional Fisheries Management Councils to immediately end overfishing. It mandated science-based annual catch limits for all US fish stocks and required the councils to develop and implement stricter regulations, specifically recommending the use of individual transferable quotas and other limited-access privilege programs.

New England Groundfish Modern Regulatory Overview

Fisheries regulation in New England has been tumultuous for over three decades. In 1977 the New England Fishery Management Council (NEFMC), established the year prior by the Fishery Conservation and Management Act, initiated a quota-based plan that included only three groundfish stocks: cod, haddock, and yellowtail flounder. In the early 1980s, the quota system was abandoned in favor of establishing minimum net mesh sizes and fish sizes to protect juvenile fish.

The Northeast Multispecies Fishery Management Plan, established in 1986, was the first of its kind to specify biological targets that could be achieved through formulation of a maximum spawning potential (%MSP). Under the New England Multispecies Fishery Management Plan (FMP), the council incorporated nine other species. Groundfish management under this system relied on input measures that included area closures, seasonal closures, gear restrictions, size limits, and effort restrictions.

The next significant change to the Multispecies FMP (Amendment 5) aimed to reduce overfishing of cod, haddock, and yellowtail flounder through a moratorium on vessel permits, and instituted a system of effort control known as days-at-sea (DAS). DAS required vessels to spend one day at the dock per day spent fishing each calendar year. It also established daily catch limits on certain species, while maintaining closed areas and gear, size, and effort restrictions. Under DAS, fishers were fined if they exceeded daily catch limits, resulting in thousands of pounds of perfectly saleable fish being discarded at sea. The number of DAS allowed was linked to fishing permits. As DAS were repeatedly reduced in an attempt to ease pressure on rapidly depleting stocks, many fishers went into debt to purchase additional permits from those exiting the industry in order to increase their number of allotted fishing days. Participation in the fishery dropped by more than 50 percent (mostly through government-funded vessel buyback programs), revenues dropped by more than 50 percent, and whole-scale communities were taken out of the fishery. DAS remained the dominant regulatory mechanism for controlling fishing effort from 1996 to 2010.

In response to a series of court orders that declared the Multispecies FMP out of compliance with the MSA, the council developed Amendment 13, which revised input controls, enabled the leasing of DAS, and set up the George's Bank Hook Sector, a voluntary group of fishers who received a portion of the George's Bank cod total annual catch (TAC) in order to pilot the idea of sector management.

Under court pressure to bring the Multispecies FMP into compliance with the 2006 reauthorization of the MSA, policy makers developed, over the course of three years, Amendment 16. This amendment contained a set of provisions for halting overfishing according to the MSA's controversial stock-rebuilding timeline of 10 years. In addition, it expanded the experimental sector program across the entire fleet, creating seventeen new sectors, each of which consisted of a voluntarily formed group of three or more federal groundfish permit holders.

Fishing has traditionally been considered within the framework of Hardin's "tragedy of the commons," in which users of the public resource competitively strain the stock for short-term gain. By granting fishers quota through the sector program, policy makers hoped that the semiprivatization of the commons would compel individuals toward better stewardship and remove incentives that drove fleets to "derby fish" — a zero-sum strategy based on the belief that a fish left in the sea will become fodder for another fisher's success.



Now, after three full years under sector management, the decade-long concerns over excessive consolidation and lack of diversity in the groundfish fleet are reaching their peaks. In January 2011, NEFMC began considering Amendment 18 to address those issues.

Appendix B

Recent Trends Related to Fleet Consolidation

Indicators of New England groundfish fishery fleet consolidation include: fewer active vessels; reduced diversity in vessel size and gear type; concentration of quota, landings, and revenue; and fewer landing ports.

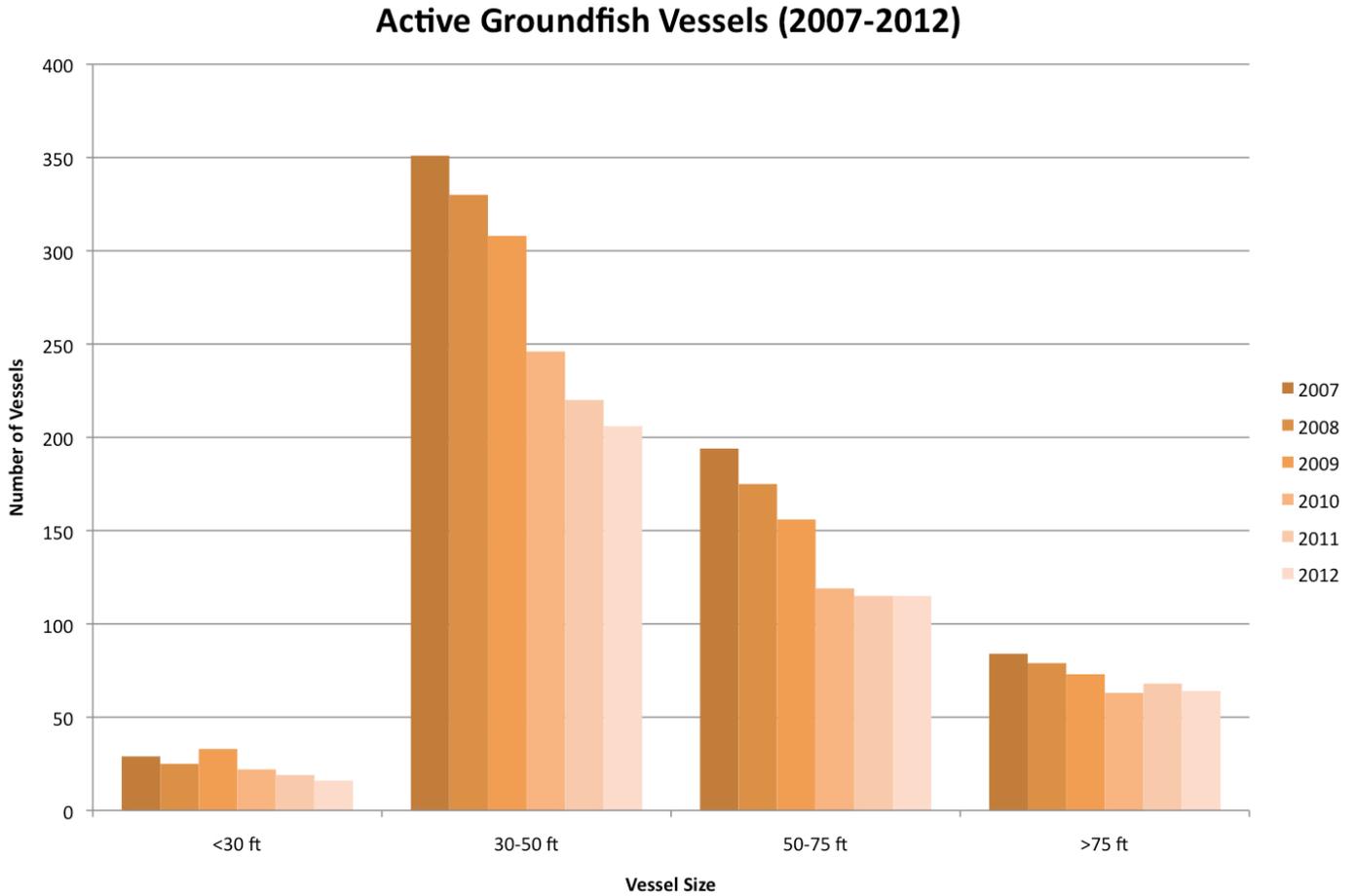
Number of Active Vessels

In the three years leading up to sector management, the number of active vessels declined by roughly 13 percent, and from 2009 to 2012, the fleet contracted by nearly 30 percent. The largest drop occurred in the first year of the program, and since then the fleet size has declined at a slower rate. From 2007 to 2012, the total number of active groundfish vessels declined from 658 to 401.

Reduced Diversity in Vessel Size

Figure B.1 shows active groundfish vessels from 2007 to 2012 by vessel size. During that time, 224 vessels (41 percent) within the two most numerous size classes (30'-50' and 50'-75') exited the fishery. By contrast, the largest vessel-size class (>75') declined by just 20 vessels (24 percent). Those changes resulted in a less diverse fishing fleet in terms of vessel size, with the largest vessels increasing in prominence.

Figure B.1. Active groundfish vessels, 2007–2012.



Note: The definition of an active groundfish vessel is one that earned groundfish revenues on at least one trip during the year. Sources: Murphy et al. 2014, NOAA 2011, and NOAA Fisheries 2012. Where discrepancies occurred between the data sets, the most recent figures were used.

Concentration of Quota and Landings

Table B.1 displays the allocation of quota and total landings across vessel-size categories from 2010 to 2012. Note that most vessels in the <30-foot size category are nonseaworthy skiffs and serve only to hold a permit. ACE allocation from these small vessels is typically transferred to another vessel owned by the permit holder, or is leased out to other fishers. While very little changed between 2010 and 2012 with respect to division of quota and landings among vessel-size classes, a concentration of quota and landings is observed among the relatively few vessels in the largest size category (>75'). That is, the largest vessels make up just 16 percent of the fleet, but hold 37 percent of the quota and land over 50 percent of the catch.

Table B.1. Total ACE allocation and landings by vessel-size category, 2010–2012.

Vessel Size	ACE Allocation						Landings					
	2010		2011		2012		2010		2011		2012	
	Pounds (M)	% of Total	Pounds (M)	% of total	Pounds (M)	% of Total	Pounds (M)	% of Total	Pounds (M)	% of Total	Pounds (M)	% of Total
<30'	42.17	24%	40.23	25%	39.13	26%	0.07	<1%	0.33	<1%	.043	<1%
30'–50'	24.93	14%	24.08	15%	21.69	14%	11.52	18%	13.82	20%	9.02	17%
50'–75'	38.61	22%	37.95	24%	34.92	23%	19.33	29%	21.76	31%	16.70	31%
>75'	66.41	39%	59.04	37%	56.5	37%	34.68	53%	34.37	49%	27.05	51%

Source: Murphy et al. 2014.

Concentration of Revenue

Table B.2 shows average revenues from all species and average revenues from groundfish according to vessel size. Revenues rose steadily from 2007 to 2011, and then fell dramatically (8–30 percent) across all vessel sizes in 2012, presumably because of steep cuts in landings. Total revenues were, on average, more than twice the revenues from groundfish, indicating that species diversification was a business strategy for groundfish fishers even prior to recent years' cuts. Average annual revenues are highly correlated with vessel size, with the largest vessels (>75') earning more than twice as much per year per vessel as the next largest vessel-size class (50'–75'), which is not surprising given the ability of larger vessels to catch more volume, to fish offshore, and to fish through the winter. However, it must be noted that larger vessels also have higher costs (e.g., fuel), so revenues do not reflect actual profits.

Table B.2. Average revenues by vessel size for vessels with multispecies permits, 2007–2012.

	Vessel Size	2007	2008	2009	2010	2011	2012	% Change 2010–2012
Average All Species Revenue per Vessel	<30'	\$13,927	\$13,881	\$12,332	\$28,329	\$69,366	\$31,101	9.8%
	30'–50'	\$137,040	\$141,382	\$137,995	\$174,790	\$196,460	\$176,933	1.2%
	50'–75'	\$362,439	\$376,895	\$392,449	\$524,231	\$643,314	\$537,408	2.5%
	>75'	\$825,786	\$822,356	\$801,758	\$1,181,928	\$1,316,712	\$1,212,383	2.6%
Average Groundfish Revenue per Vessel on Groundfish Trips	<30'	\$3,608	\$2,711	\$6,030	\$4,651	\$10,243	\$4,188	-10.0%
	30'–50'	\$73,212	\$86,507	\$97,339	\$113,799	\$137,037	\$99,121	-12.9%
	50'–75'	\$138,881	\$146,447	\$161,768	\$273,450	\$303,284	\$228,526	-16.4%
	>75'	\$326,914	\$333,352	\$349,940	\$587,876	\$639,142	\$500,489	-14.9%

Note: From 2007 to 2009, averages pertain to all vessels. From 2010 to 2012, averages pertain to sector vessels only. Sources: NOAA 2011 and NOAA Fisheries 2012. . Where discrepancies occurred between the two data sets, the most recent figures were used.

Table B.3 shows the percentage of the fleet that accounted for each cumulative revenue quartile from 2007 to 2012. In 2007, of all groundfish revenue earned, 75 percent was earned by 25.3 percent of the fleet, and 3.4 percent of vessels were responsible for the top quartile. From 2007 through 2012, although the fleet declined, the level of revenue concentration per quartile stayed fairly constant.

Table B.3. Percentage of fleet with revenue from groundfish by cumulative quartiles, 2007–2012.

Percent of Groundfish Revenue	2007	2008	2009	2010	2011	2012
Top 25%	24 (3.4%)	23 (3.5%)	21 (3.8%)	14 (3.2%)	15 (3.6%)	14 (3.5%)
Top 50%	83 (11.5%)	73 (11.0%)	65 (11.7%)	39 (9.0%)	40 (9.6%)	38 (9.4%)
Top 75%	180 (25.3%)	160 (24.2%)	146 (26.3%)	84 (19.4%)	80 (19.2%)	78 (19.4%)
100%	711 (100%)	662 (100%)	555 (100%)	434 (100%)	417 (100%)	403 (100%)

Sources: NOAA 2011 and NOAA Fisheries 2012. Where discrepancies occurred between the two data sets, the most recent figures were used.

Value of Groundfish Fishery to Local Economies

The value of groundfish to portside communities can be verified by landings data and fleet size, both of which fuel waterfront economies and support port-based supply chains. Table B.4 shows the value of landings to key New England ports from 2007 to 2012. For all species landings, revenues increased by nearly 20 percent for both Boston and New Bedford, while declining by 13–70 percent for Gloucester, Chatham, and Portland. Increased total revenues to New Bedford were likely because of the recently rebuilt and thriving scallop fishery. Increased total revenues to Boston

were driven by groundfish landings, which increased substantially after the introduction of sector management in 2010. At this time, increased numbers of fishers began offloading their catches in Boston, where port-based infrastructure was more robust and fuel prices relatively lower than at some of the smaller ports. Groundfish revenues at all other ports declined between 2007 and 2012, with losses of up to 30 percent in 2012 compared to 2011 for both Gloucester and New Bedford.

Table B.4. Value of landings to key New England ports, 2007–2012 (in millions of dollars).

	2007	2008	2009	2010	2011	2012	Change 2007–2012	
Nominal Value of Landings of All Species by Key Landing Port	Boston	11.36	11.36	10.58	14.21	15.11	20.7%	
	Chatham	9.68	9.45	7.87	7.43	9.26	7.40	-23.5%
	Gloucester	38.64	37.55	39.36	39.74	42.79	32.17	-16.7%
	New Bedford	88.76	81.04	84.33	95.74	108.91	104.72	18.0%
	Portland	11.98	12.59	6.99	6.33	7.61	8.44	-29.6%
	Point Judith	23.38	27.14	19.27	22.04	28.31	24.83	6.2%
Nominal Value of Groundfish Landings by Key Landing Port	Boston	8.34	8.86	8.47	11.75	12.41	11.65	39.7%
	Chatham	3.36	3.56	3.15	2.16	2.41	1.00	-70.3%
	Gloucester	24.26	27.32	29.97	27.71	29.78	21.10	-13.0%
	New Bedford	26.63	26.37	24.01	29.35	30.21	21.70	-18.5%
	Portland	8.86	10.19	4.56	3.46	4.87	5.74	-35.1%
	Point Judith	4.61	2.76	1.80	1.53	1.94	1.75	-62.0%

Note: Variations from year to year are not reflected in the percent change from 2007–2012. Sources: NOAA 2011 and NOAA Fisheries 2012. Where discrepancies occurred between the two data sets, the most recent figures were used.

In addition to revenue reductions, ports across New England have seen fleets contract substantially in the past several years (see Table B.5). Most of the vessel reduction occurred between 2009 and 2010, presumably as a result of the

introduction of sector management, which incentivized many fishermen to sell their permits. The most significant fleet declines have been seen in Boston, New Bedford, and Gloucester.

Table B.5. Groundfish fleet at key New England ports, 2007–2012.

	2007	2008	2009	2010	2011	2012	Change 2007–2012	
Number of Active Vessels by Key Landing Port	Boston	80	69	62	52	49	47	-41.3%
	Chatham	46	41	42	43	39	38	-17.4%
	Gloucester	124	116	110	105	91	92	-25.8%
	New Bedford	93	91	86	69	70	69	-25.8%
	Portland	22	18	17	17	16	18	-18.2%
	Point Judith	58	54	48	45	44	44	-24.1%
Number of Active Groundfish Vessels by Key Landing Port	Boston	54	49	46	35	34	28	-48.1%
	Chatham	26	27	28	26	26	23	-11.5%
	Gloucester	95	88	97	74	70	61	-35.8%
	New Bedford	60	62	51	33	37	36	-40.0%
	Portland	20	16	15	15	15	16	-20.0%
	Point Judith	43	36	33	31	28	33	-23.3%

Note. From 2010–2012, the number of active vessels depicted is total vessels (both sector vessels and common pool vessels). An active groundfish vessel is one that received revenue from at least one groundfish trip. Variations from year to year are not reflected in the percent change from 2007–2012. Sources: NOAA 2011 and NOAA Fisheries 2012. Where discrepancies occurred between the two data sets, the most recent figures were used.

With the exception of ports that have done better (e.g., Boston and New Bedford), the rapid loss of both vessels and substantial landings revenue has created a domino effect through port economies, as the interdependencies built into the local supply chain begin to unravel. Essential services such as icehouses, fuel depots, engine mechanics, processing plants, transportation, and cold storage facilities are especially vulnerable to fleet changes, as they are least able to diversify into other industries or tap into new markets.

When shoreside businesses begin to disappear, the port infrastructure disappears as well, taking away jobs, tax revenue, and other contributors to the local economy. The closure of essential services at some ports has concentrated the remaining vessels in the ports that can accommodate them. Table B.6 highlights the current conditions at some key New England ports, with a focus on 2012 groundfish revenue, fleet composition, and shoreside infrastructure.



Table B.6. Landings revenue and numbers of vessels by size in 2012, and current status of infrastructure relevant to the groundfish fishery for main ports landing New England groundfish.

Port	2012 Groundfish Revenue	2012 Total Vessels			Current Portside Infrastructure Status
		<50'	50'-70'	>70'	
Port Clyde, ME	\$261,971	19	2	0	Port Clyde is a small community at the tip of Maine’s St. George Peninsula in the midcoast region. Its inshore fleet fishes for groundfish and tends to land catches either in Port Clyde or Portland. The town recently lost its ice plant, and the O’Hara ice facility in Rockland closed down as well. Fishers now need to go to Portland for bulk ice. Fishers ship fish via the last remaining truck driver in town. Port Clyde Fresh Catch is a fishers’ co-op that sells fresh fish and shrimp, caught using environmentally conscious methods, through a CSF (community-supported fishery) and direct to restaurants and retailers.
Boothbay Harbor, ME	\$40,055	39	0	0	Boothbay Harbor has lost most of its shoreside infrastructure. As the fleet narrowed from four vessels to one active vessel, the icehouse, marine hardware, and transportation service declined.
Portland, ME	\$8,441,214	69	6	8	The Portland Fish Exchange serves as the city’s main conduit for seafood supply, despite that business has fallen precipitously due to smaller landings. The wharf has in recent years lost a marine gear repair shop that used to work on trawling equipment. Portland retains its port-based infrastructure including 10 local processors and vessel services that supply ice and fuel.
Portsmouth, NH	\$1,495,887	35	7	0	Portsmouth is a community based port that serves an inshore fleet. The Portsmouth Fishermen’s Co-Op shut down several years ago, leaving the port without the facilities for unloading fish. Vessels now go to either Gloucester, Seabrook, or Portland. If they do unload in Portsmouth, they need to truck their catch to a facility. The city does have a growing CSF called New Hampshire Community Seafood that is providing a local outlet for day-boat fishermen to market their catch.



Port	2012 Groundfish Revenue	2012 Total Vessels			Current Portside Infrastructure Status
		<50'	50'-70'	>70'	
Seabrook, NH	\$1,014,122	20	2	0	Yankee Fishermen’s Co-Op, located in Seabrook, is a landing port for many in New Hampshire’s fleet. Seabrook itself is a seasonal town, but the co-Op buys and sells fish throughout the year.
Boston, MA	\$11,648,886	28	7	8	Two main wharves—the Boston Fish Pier and the Cardinal Medeiros Pier—serve the city’s commercial fishery. Boston has long been the major transnational distribution hub for New England seafood and at one time supported 88 processing companies.
Gloucester, MA	\$21,704,387	237	20	18	Gloucester is the nation’s oldest seaport and is still highly dependent on the groundfish fishery. Vessels offload their catch at either the Cape Ann Seafood Exchange (CASE) display auction, the Buyers and Sellers Exchange (BASE), or the dock of local processors. BASE aggregates Gloucester, New Bedford, and Boston landings and is affiliated with the auction in New Bedford. Both BASE and CASE use computer systems that deliver real-time information on bids and pricing. There are two vessel repair businesses and one ice provider that are struggling financially, four large-scale processors and a number of smaller processors that sell to restaurants. A fishing supply store recently shut down, and another is about to close. Cape Ann Fresh Catch, the local CSF, currently has 22 regional distribution sites and 6,500 subscribers, and is working with some of its 100 fishermen to build a market for underutilized species.
Scituate, MA	\$1,783,465	56	4	1	Scituate is primarily a small-vessel port whose fleet fishes inshore grounds. Most vessels landing in Scituate truck their fish to New Bedford since there is little in the way of auctions or exchanges in the area. One interviewee said that he trucks ice in from New Bedford and ships his fish to New Bedford for sale. Scituate’s shore-based businesses have declined dramatically in recent years due to constriction of the fleet.



Port	2012 Groundfish Revenue	2012 Total Vessels			Current Portside Infrastructure Status
		<50'	50'-70'	>70'	
Chatham, MA	\$998,562	111	2	0	The community of Chatham on the elbow of Cape Cod is host to a mixed fleet that pursues a mixture of state and federally regulated species, including groundfish. Chatham’s infrastructure includes a municipal fish pier and facilities that service the local fleet. The town of Chatham’s fishing community faces pressure from an increasingly robust tourist economy.
New Bedford, MA	\$21,098,897	52	24	175	New Bedford is a “full-service port” owing to the strength of its infrastructure that includes “chandlerys, icehouses, welders, net designers, boat yards, gear builders, engineers,” and so on. National and international seafood dealers are located here, as well as the Whaling City Seafood Auction. Much of New Bedford’s wealth comes from the scallop fishery that in 2012 had a landed value of \$331,937,084.
Point Judith, RI	\$1,750,923	102	30	24	Point Judith’s infrastructure remains robust. Fishermen in this port mostly rely on DAS species such as long-fin squid, mackerel, and butterfish and only fish within the New England multispecies complex part of the year. There are two dealers able to handle high volume: Town Dock and Handrigan’s. Sea Freeze, Handrigan’s, and Town Dock all sell ice and Superior Trawl services trawl gear.

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 Sources: NOAA Fisheries 2007, 2012, and personal communication.

Appendix C

Study Methodology

To best understand the strengths, capabilities, constraints, and challenges of the various entities participating in the New England groundfish industry, we engaged local field researchers with existing relationships and contacts in the fishery to conduct in-person and phone interviews with a sample of players representing the entire value chain. Customized questionnaires were administered, and responses were recorded and transcribed. Questions pertained to: (1) the player's experience with the groundfish fishery and the transition to sector management; (2) financial resources made available; (3) financing needs; and (4) perceptions of what could sustain the industry and improve the profitability of fishers and port-based businesses.

In all, we spoke with 100 individuals, including:

- 25 fishers (vessel size 31'–95')
- 9 sector managers
- 12 port-based businesses (e.g., auction houses, processors, ice plants, vessel servicers, wholesalers)
- 7 seafood distributors and brokers
- 3 permit banks
- 2 CSF representatives
- 13 NGO representatives
- 4 government/policy experts
- 25 financial service institutions

Interviews typically lasted two to three hours. At the end of each interview, participants were asked to provide additional contacts that may be interested in speaking with a member of the research team.

Appendix D

Sample of Grassroots Initiatives Needing Financing (Gloucester, MA)

Market-building for Northern Silver Hake (Whiting)

The Gulf of Maine Research Institute (GMRI) sought \$227,388 from the Saltonstall-Kennedy Grant Program for a two-year project to help mitigate the economic impacts of the groundfish fishery disaster by enhancing Gloucester fishers' access to an underutilized whiting resource, while simultaneously working to strengthen and grow markets for the domestic product. Approaching the problem from catch to consumption will align conversation engineering with the optimum utilization of harvested resources. The effort would (1) aim to expand whiting fishing opportunities through demonstrated selectivity using commercial fishing vessels as research platforms; (2) convene fishers and seafood industry leaders to discover opportunities and processes for traceability and marketing of whiting; and (3) build awareness activities to raise consumer demand for whiting.

Expansion of the Cape Ann Fresh Catch Community-Supported-Fishery (CSF) Outreach and Education Program.

The Gloucester Fishermen's Wives Association (GFWA) requested \$265,000 from the Saltonstall-Kennedy Grant Program for an 18-month project to expand the Cape Ann Fresh Catch CSF and its efforts to promote the benefits of locally sourced, underutilized species. Objectives include: expanding CSF distribution from 22 sites to 30 sites; developing partnerships with 10 culinary institutions or high school departments; partnering with additional farmer's markets; developing more corporate relationships, (e.g., Boston Medical Center); increasing exposure to restaurant diners; and increasing promotional events from 12 to 36 per year. Broadening the distribution and appeal of underutilized species—thus raising their

market value—would aid fishers tasked with selling those species and would help alleviate the economic burden caused by low quotas for more popular species.

Industry-Based Surveys for Northeast Multispecies Stock Assessments

The Massachusetts Fishermen’s Partnership sought \$7 million from the Saltonstall-Kennedy Grant Program for a fishing industry–academic partnership with the School for Marine Science and Technology at the University of Massachusetts–South Dartmouth. In collaboration with NOAA’s National Marine Fisheries Service, the partnership aims to improve the quality and amount of data on key groundfish stocks for which there is most uncertainty. Idle fishing vessels and crews would be commissioned to help collect data on abundance, distribution, and biological characteristics. The project would serve the long-term goal of studying fish stocks from an ecosystem perspective (e.g., predator-prey relationships, competition among groundfish, availability of plankton, food web), while also exploring the impacts of environmental changes, such as ocean warming and acidification.

Community-Based Aquaculture Development

The City of Gloucester requested \$274,098 from the Saltonstall-Kennedy Grant Program for a two-year project to establish subtidal shellfish aquaculture among Gloucester’s displaced groundfish fishers. This project aims to retain the talent and infrastructure of the 350-year-old fishing port. By farming with lobster pots in pens (as opposed to pots suspended in the water column), the effort aims to capitalize on existing knowledge, gear, and expertise within the lobster fishery. The project would remove the high costs associated with site survey and preparation, offer various types of training to would-be shellfish farmers, and mitigate risks of market demand. The project would provide a template for introducing a new aquaculture fishery from within a community.

Assessing Social Impacts in Groundfish Fishing Communities

Researchers from Northeastern University requested \$200,000 from the Saltonstall-Kennedy Grant program to document and mitigate the chronic social and psychological impacts of the groundfish fishery failure on Northeast fishing communities. Previous research revealed that social disruption and high levels of psychological stress were common among active groundfish permit holders. More than three quarters of fishers reported observing changes in their work environments and communities, and over half of fishers reported noticing changes in family cohesion. The two-year project aims to examine longitudinal trends in fisher stress and put into place an applied intervention strategy to facilitate recovery and resilience.

Healthy Harbors

Fishing Partnership Support Services (FPSS) is seeking \$250,000 to fund ongoing efforts to provide vital health interventions and referral services to fishing families during the current groundfish crisis. FPSS is supporting the industry during this time by staffing offices in port towns, where highly trained healthcare navigators assist fishing families with referral services and health programs. Navigators themselves come from the fishing industry and participate in ongoing training to serve as valuable resources for the health needs of the community.

Supporting Community Mental Health

FPSS is also seeking \$100,000 to develop and implement mental health services for groundfish fishing families during the current fishery crisis. Research shows that depression in fishers is associated with an income loss spiral, as shrinking fish stocks in New England have led to physical and mental health problems, including stress disorders, hearing loss, high rates of injury, and chronic back pain. The FPSS mental health program will provide separate support groups and stress reduction programs for fishers and their families. Private, online programs modeled on existing web-based support for other chronic disease sufferers will supplement these groups. Funding will be applied to curriculum development, instructor training, evaluation, and operational costs.

Personal Financial Planning for Fishing Families

FPSS seeks \$50,000 to develop and implement a financial planning education program designed specifically for workers in the New England fishing industry, most of whom face wildly fluctuating incomes, unemployment, and the challenge of saving money—be it for children to attend college or retirement. The program will offer several different one-day courses in several specific areas of financial planning, business management, and household budgeting.

Fishermen's Fish Leasing Program

The Gloucester Fisheries Community Preservation Fund (GFCPF) seeks \$1 million to free up and reallocate allowable groundfish quota that is not harvested due to compounding market failures. Funds would serve to lease back unused quota from those who require immediate income. It would then be leased out at favorable rates to active Gloucester fishers. (Weekly reports are public and transparent.) Increased quota circulation would lead to increased use of vessels and a steadier supply of fish landed, and would reverberate through the supply chain and community.

Adaptive Reuse of Gloucester's 165-Year-Old Ice Factory

Cape Pond Ice (CPI) Company seeks \$500,000 to \$1.5 million in grants, loans, or equity to fund an adaptive reuse of the underutilized iconic building housing the ice factory. Declining demand for ice service and other factors make it financially infeasible to sustain safe, reliable operations at its previous level of output. Plans to downsize and isolate the 900-ton ammonia refrigeration system, while maintaining a smaller ice installation on a smaller footprint would allow the company to continue providing ice service to the industry, and would also give CPI an active role in the reinvention of Gloucester's harborfront. Funding would cover the costs of design, engineering, construction, legal, marketing, and initial operating expenses.

Tanker Vessel Replacement

Rose's Oil Service is seeking \$500,000 to replace the single-hulled tanker vessel Capt Dave with a double-hulled vessel in order to comply with updated oil tanker regulations effective January 1, 2015. Currently, Capt Dave is Gloucester's only vessel-to-vessel oil transfer service, and Rose's Oil will be forced out of business if the vessel is not replaced. Affected clients would include hundreds of local fishers, as well as the US Coast Guard, research vessels, yachts, charter boats, and whale-watching vessels. The alternative to vessel-to-vessel fuel transfer is truck-to-vessel transfer, which poses significantly higher environmental and safety risks.

Travelift Upgrade

Rose's Oil Service is also seeking \$2 million to upgrade its large-vessel hauling capacity. The current travelift apparatus is aging and labor-intensive. Supported historically by Gloucester's commercial fishing fleet, the shipyard has suffered with the fishery's decline and needs to reinvest in new technology in order to remain in business. Without this project, all local vessels in excess of 70 tons will be forced to steam to other locations, most of which are already close to capacity.

Multitenant Ocean Development Center Design

The Gulf of Maine Research Institute (GMRI) seeks \$62,749 to manage a conceptual design effort for a multitenant ocean development center—otherwise called a seafood hub and Innovation center—on Gloucester's working waterfront. The center is envisioned to encourage research, science, and innovation in the fishery. The City of Gloucester is offering the two-acre parcel known as I4C2 at the heart of downtown. Funds will be used to conduct three-day-long design workshops to engage city staff and potential tenants in the design effort.

Center for the Adaptive Fishery

The City of Gloucester seeks \$500,000 to formulate a way to integrate the accountability to livelihoods within the environmental regulatory environment. This effort would involve (1) designing models by which economic returns would be forecasted based on catch limits and expected price points for catch; (2) linking to established real-time data feeds tracking catch and to actual market prices; and (3) establishing peer-run panels within participating sectors to allow relief on pressure points within the system, making adjustments that balance minor environmental impact with significant economic return. The project aims to provide reciprocal benefits for both researchers and fishers. It may also be possible to link the Study Fleet initiative started under NOAA Cooperative Research to participating sectors wherein this program would return immediate economic relief to the independent fisher.

Green Fishing Ports Project

With a funding request of \$368,306 to the Saltonstall-Kennedy Grant Program, this collaboration between Green Harbors Project (UMass Boston), Mortillaro Lobster Company, Ocean Alliance, Oceanic Innovations, Floating Island SE, and Blue Planet aims to demonstrate the environmental performance and business viability of two new “green” materials. The innovative “green concrete technology” will be tested for waterfront/shoreline infrastructures, and is based on biomimicking coral reef construction while providing a double reduction in greenhouse gas emissions. Floating islands are vegetated floating platforms built with recycled materials; they function to provide water purification, habitat enhancement, shoreline erosion protection, and landscape enhancement. The two-year project aims to design, construct, test, and monitor these materials by working with local industries to learn how their perceived benefits and costs might accelerate or steepen their adoption.

Gloucester Harbor Community Development Corporation (GHCDC)

A grant of \$138,000 is requested to support the initial operation (18 months) of the GHCDC, which aims to protect the harbor as an economic asset. Specific objectives include: (1) supporting the creation of a Marine Innovation Center as a business incubator; (2) simplifying the permitting process for repair on existing footprints; (3) promoting improvements by subsidizing water and wastewater pretreatment costs for large-volume users; (4) taking advantage of property groupings when planning facilities; (5) facilitating public-private infrastructure improvements; (6) identifying low-interest loans; (7) organizing private stakeholders in the designated port area in a voluntary Marine Industrial Park Association (similar to Maine’s Coastal Enterprises, whereby members consent to a 20- to 30-year marine industrial use easement on harborfront property).

Appendix E

Available Financing to the New England
Groundfish Fishery

Fishery Specific / Small Biz / Economic Development. Targeted or Mission	Eligible	Loan Types: Line of credit (LOC); Small Business Association (SBA)	Business Entities (E) or Individuals (I)	Amounts Available / Average	Term / Average	Flexible Payments	Debt Service Coverage Ratio	Percent Secured as Collateral	Vessels (V), Permits (P), or Quota (Q) Accepted as Collateral	Fund Capitalization
Y/N/Y	Commercial fishers; Processor; Distributors "Not used for purposes which contribute to the overcapitalization of the fishing industry."	Term	E & I	Up to 80% of actual cost	Up to 25 yrs	Quarterly; payment can be deferred	Depends	Depends	V, P, Q	Federal
Y/Y/Y	MA, NH Fishers; fishing-related biz, aquaculture; nonprofits	Term	E	Up to \$2M	Up to 30 yrs	Y	Depends	Depends	V	Federal

Fishery Specific / Small Biz / Economic Development. Targeted or Mission	Eligible	Loan Types: Line of credit (LOC); Small Business Association (SBA)	Business Entities (E) or Individuals (I)	Amounts Available / Average	Term / Average	Flexible Payments	Debt Service Coverage Ratio	Percent Secured as Collateral	Vessels (V), Permits (P), or Quota (Q) Accepted as Collateral	Fund Capitalization
N / Y / Y	Qualify as a small business (<\$4M for finfish fishers)	Term	E	Up to \$350K	Up to 25 yrs, not to exceed life of invest.	Depends	Depends	Depends	Depends	Federal

Fishery Specific / Small Biz / Economic Development. Targeted or Mission	Eligible	Loan Types: Line of credit (LOC); Small Business Association (SBA)	Business Entities (E) or Individuals (I)	Amounts Available / Average	Term / Average	Flexible Payments	Debt Service Coverage Ratio	Percent Secured as Collateral	Vessels (V), Permits (P), or Quota (Q) Accepted as Collateral	Fund Capitalization
N / Y / Y	<\$15M tangible net income; <\$5M average net income after taxes	Term	E	Up to \$5M	10 yrs equip.; 20 yrs real estate	Depends	Depends	Depends	Depends	Federal

Fishery Specific / Small Biz / Economic Development. Targeted or Mission	Eligible	Loan Types: Line of credit (LOC); Small Business Association (SBA)	Business Entities (E) or Individuals (I)	Amounts Available / Average	Term / Average	Flexible Payments	Debt Service Coverage Ratio	Percent Secured as Collateral	Vessels (V), Permits (P), or Quota (Q) Accepted as Collateral	Fund Capitalization
Loan Programs										
Y/Y/Y	Resident of or vessel ported at Cape & Islands; no record of permit sanctions; fishing trips of no more than 1.5 days on average for the previous year; owner/operator; single vessel owner	LOC for quota or DAS	E	Up to \$50K	1yr	Y	Depends	Depends	V, Q for scallop only	Federal

Fishery Specific / Small Biz / Economic Development. Targeted or Mission	Eligible	Loan Types: Line of credit (LOC); Small Business Association (SBA)	Business Entities (E) or Individuals (I)	Amounts Available / Average	Term / Average	Flexible Payments	Debt Service Coverage Ratio	Percent Secured as Collateral	Vessels (V), Permits (P), or Quota (Q) Accepted as Collateral	Fund Capitalization
Y / N / Y	Commercial fishers from north of Boston to the NH border (focus is on Cape Ann). Borrowers must continue to do business in Cape Ann after receiving the loan.	Term	E & I	Up to \$100K	Varies/7-10 yrs	Depends	Depends	Depends	V, P	Federal

Fishery Specific / Small Biz / Economic Development. Targeted or Mission	Eligible	Loan Types: Line of credit (LOC); Small Business Association (SBA)	Business Entities (E) or Individuals (I)	Amounts Available / Average	Term / Average	Flexible Payments	Debt Service Coverage Ratio	Percent Secured as Collateral	Vessels (V), Permits (P), or Quota (Q) Accepted as Collateral	Fund Capitalization
Y / Y / Y	Base of operations in NH	Term	E	Up to \$150K	Up to 15 yrs	Y	Depends	At least 100%	V, P, Q	Federal
al Banks										
N / N / N	Depends on loan	Consumer; LOC; term; construction; SBA	E & I	Up to \$200K	Up to 5 yrs	Y		100%	V, Q for scal- lop only	Depositors
N / N / N	Depends on loan	Consumer; LOC; asset-based; term; construction; SBA	E & I	NA / \$50K	1-5 yrs / 3 yrs	Y		100%	V	Depositors

Fishery Specific / Small Biz / Economic Development. Targeted or Mission	Eligible	Loan Types: Line of credit (LOC); Small Business Association (SBA)	Business Entities (E) or Individuals (I)	Amounts Available / Average	Term / Average	Flexible Payments	Debt Service Coverage Ratio	Percent Secured as Collateral	Vessels (V), Permits (P), or Quota (Q) Accepted as Collateral	Fund Capitalization
Development Financial Institutions & Similar										
Y/Y/Y	Small business; business based in MA	LOC; asset-based; term; construction; bridge; mezzanine	E & I	\$10K min. /\$100K	5-20 yrs /5 yrs	Y	Depends	100%; usually 120%	V	Federal & state incl. SBA, USDA, CDFI, MassDev, EDA RLF

E

Fishery Specific / Small Biz / Economic Development. Targeted or Mission	Eligible	Loan Types: Line of credit (LOC); Small Business Association (SBA)	Business Entities (E) or Individuals (I)	Amounts Available / Average	Term / Average	Flexible Payments	Debt Service Coverage Ratio	Percent Secured as Collateral	Vessels (V), Permits (P), or Quota (Q) Accepted as Collateral	Fund Capitalization
Y/Y/Y	Target low to moderate income in the lower end of Cape Cod	LOC; asset-based; term	E & I	Up to \$40K	1-5 yrs	Y	Depends	Usually 100%	V, Q for scallop only	State

Fishery Specific / Small Biz / Economic Development. Targeted or Mission	Eligible	Loan Types: Line of credit (LOC); Small Business Association (SBA)	Business Entities (E) or Individuals (I)	Amounts Available / Average	Term / Average	Flexible Payments	Debt Service Coverage Ratio	Percent Secured as Collateral	Vessels (V), Permits (P), or Quota (Q) Accepted as Collateral	Fund Capitalization
Y/Y/Y	Maine; harvesters; aggregators; processors; marketers; transporters	Term; LOC; equity; hybrid equity; SBA	E & I	Up to \$500K	3–20 yrs; 20 yrs for real estate	Y	1.2	Depends; Can be less than 100%	V; Would consider P & Q	Federal, state, private sources
Y/Y/Y	New England harvesters, aggregators, processors, marketers, transporters; proven positive cash flow;	Letters of credit; LOC; young, beginning, small lending programs (flexible terms)	E & I	\$25K min.	3–20 yrs; 20 yrs for real estate	Y	1.2	100%	V; Would consider P & Q; main focus is character and cash flow	Private sources; combination institutional capital & issuing bonds to match fund underlying borrower needs

Fishery Specific / Small Biz / Economic Development. Targeted or Mission	Eligible	Loan Types: Line of credit (LOC); Small Business Association (SBA)	Business Entities (E) or Individuals (I)	Amounts Available / Average	Term / Average	Flexible Payments	Debt Service Coverage Ratio	Percent Secured as Collateral	Vessels (V), Permits (P), or Quota (Q) Accepted as Collateral	Fund Capitalization
N / Y / Y	Target minorities and poor areas; proven positive cash flow	LOC; asset-based; term; construction; bridge; SBA	E	\$100K-\$1M	1-5 yrs/3 yrs	Y	1.2	100%	V	Federal & State

Fishery Specific / Small Biz / Economic Development. Targeted or Mission	Eligible	Loan Types: Line of credit (LOC); Small Business Association (SBA)	Business Entities (E) or Individuals (I)	Amounts Available / Average	Term / Average	Flexible Payments	Debt Service Coverage Ratio	Percent Secured as Collateral	Vessels (V), Permits (P), or Quota (Q) Accepted as Collateral	Fund Capitalization
de NE Fishery										
Y / ? / Y	AK residents; exceptions to land-based processors	LOC; term; vessel construction	E & I	No limit / \$100K	1-20 yrs/12-15 yrs	Y	Depends	NA	V, P for IFQ	Members; CoBank loans
N / N / N	USA & Canada; positive cash flow or close to breaking even; 3 yrs operating history; collateral available; approx. \$1M in revenues	Term; LOC	E	\$100K-\$3M	1 yr for LOC; 5 yrs for mort-gages amor-tized over 20	Y	1.25	70% min.	V	Individuals and institutions

E

Fishery Specific / Small Biz / Economic Development. Targeted or Mission	Eligible	Loan Types: Line of credit (LOC); Small Business Association (SBA)	Business Entities (E) or Individuals (I)	Amounts Available / Average	Term / Average	Flexible Payments	Debt Service Coverage Ratio	Percent Secured as Collateral	Vessels (V), Permits (P), or Quota (Q) Accepted as Collateral	Fund Capitalization
Y / N / Y	Fishers; processors; distributors; ports; fishing associations; nonprofits; US West Coast	Term; LOC	E & I	\$50K-\$250K	1-10 yrs	Y	1.2	100%	V, P for IFQ	\$2M from State of CA; private family foundations

Small Boat Only	Limited Access Groundfish Permits (2013)	Vessels Served (2012)	Eligibility	ACE Prices or Additional Fees	Purpose	Business Model	How Permits Were Purchased
Y	4	19	Every boat in NEFS XI & XII < 45' (19 in 2012); no permit sanctions; reside or operate in NH in a town of less than 30,000	Free of charge	Provide options to fishers with little access to capital; help fishers improve operating efficiencies; maintain small boat enterprises	ACE is distributed free of charge from state; state absorbs cost of operating program.	\$1M federal grants NMFS
Y	11	18	Owner/operator; at least 1,000 lbs of documented groundfish landings in at least 1 of the 3 prior yrs; vessel < 55'; based in and land fish in Maine	About 25% of market price except GOM cod, which is priced at a competitive premium	"Supplement and maintain access to fishing through discounted allocations"	Sell GOM cod ACE at enough of a premium to recoup \$50,000 permit bank operating costs	\$3M federal grants NMFS
N	24 (2 include scallops)	16	Cape Cod residency of captains & crew; owner-operator; fixed gear sector or others relating to responsible business and vessel operations	50% of market lease rate as determined at the beginning of the fishing year	Stimulate economic development; ensure long-term profitability of local fleet	Lease rates cover: interest costs; principal repayment over the next 6 yrs; part of overhead costs (grants cover majority); research costs; acquisition of more quotas.	\$2M from 5 different sources (also included part of surf clam quotas)

Small Boat Only	Limited Access Groundfish Permits (2013)	Vessels Served (2012)	Eligibility	ACE Prices or Additional Fees	Purpose	Business Model	How Permits Purchased
N	49	Up to 71	Permanent berth in Port of Gloucester (2006–present); normally land all groundfish in Gloucester; conduct maintenance and repairs in Gloucester and engage in commerce with local suppliers; owner is MA resident or corporation prior to 2006	50% of market value (2011 & 2012)	Preserve and strengthen independent family-owned fishing businesses in Gloucester	GFCPF is in a lease-only sector—all ACE is distributed to sectors in which qualified fishers are enrolled.	Mitigation from applying for LN through MA D
N	2	22	All NEFS XI and XII active fishing vessels	Lease price is only charged for GOM cod at a rate that pays back the permit bank's loan liability—generally ½ the expected market rate.	Support the local fishing community in New Hampshire	Loan liability paid through leases; sector manager manages permit bank, and overhead is absorbed by the sector.	\$500,000 loan Community Economic Development C

	Small Boat Only	Limited Access Groundfish Permits (2013)	Vessels Served (2012)	Eligibility	ACE Prices or Additional Fees	Purpose	Business Model	How Permits Were Purchased
t	N	2	NA	Priority for eastern ME fishers, “but none currently exist because the fish populations are extremely low”; secondary considerations are within sector, elsewhere in ME, outside ME.	20% below market value for hook gear within sector	Ensure access for groundfish fishers in eastern ME	NA	NA
	N	3	10	No hard criteria; primary focus is working with fishers in the Maine Coastal Community Sector but leases to other sectors in the region.	No cost for fishers participating in collaborative research projects; 50% of market value to fishers utilizing gear that exceeds minimal regulatory requirement; 80-90% of market value for fishermen using standard practices and gear	Support development of more sustainable fishing practices and support ME fishers during the transition	Lease revenues and general operating support through annual budgeting process	Support from n donors

	Origin	Mechanism	Term	Individual Grant Amounts / Total Funding	Purpose	Restrictions	Comments
	Federal government	Grants or cooperative agreements	24 mo. max	\$30K–\$400K / \$5M–10M	Aquaculture; optimum utilization of harvested resources under federal or state management; fisheries socioeconomics; conservation engineering; ecosystem studies; territorial science		
	Federal government	Grants or cooperative agreements	Depends	50% of total project cost (higher in economically distressed areas); \$100K–\$3M depending on program	Public works; economic adjustment; partnership planning; trade adjustment assistance for firms; university centers; research and national technical assistance; local technical assistance	Nonprofits; public, private, and state-controlled higher education; state, county, Native American, city, and township governments	Priorities: collaboration; regional innovation; partnerships; national priorities; global competitiveness; environmental development; economic distressed and under-served communities
d	Public/private partnership	Grants	2 yrs	Unspecified, but generally \$50K–\$200K	Community capacity building; bycatch reduction initiatives; sustainable fishing practices; improvement in the quality, quantity, and timeliness of fisheries-dependent data	Not for land or easement acquisition, facility construction, political advocacy, lobbying, or litigation	Administered by NOAA and Wildlife Foundation

RAMS

	Provider	Mechanism	Term	Amounts	Purposes	Limitations
an gram	Federal government	Loan guarantees	7 yrs—working capital; 15 yrs— equipment; 30 yrs— real estate	Up to \$65M combined for cooperatives	Businesses and industrial acquisitions; purchase of land, machinery, and equipment; construction, enlargement, or modernization; eligible fees and costs; educational or training facilities; tourist facilities; pollution control or abatement; working capital; refinancing when necessary to improve cash flow and create new or save existing jobs	
m	Federal government	Tax credit for investors	7 yrs	39% of original investment; yrs 1–3: 5%; yrs 4–7: 6%; not more than \$125M of allocation	Promote investment in low-income communities; processing; waste disposal; pumping facilities related to fisheries; fish hatcheries	Open to individual and corpor investors; CDE must: (1) be a corporation or partnership at certification application; (2) d a primary mission of serving o ing investment capital for low- communities or persons; and representatives of communiti erning or advisory boards of th

Project Team

Cheryl Dahle

Lead Strategist

A journalist and entrepreneur who has worked at the intersection of business and social transformation for more than a decade, Cheryl Dahle conceived and coled the effort to found Future of Fish. Prior to her work with fisheries, Cheryl was a director at Ashoka: Innovators for the Public, where she distilled knowledge from the organization's network of 2,500 fellows to provide strategic insight to foundations and corporations. As a consultant, she has served leading organizations in the space of hybrid business/social solutions, including Humanity United, Nike, the Robert Wood Johnson Foundation, the David and Lucile Packard Foundation and the Center for the Advancement of Social Entrepreneurship at Duke University. Cheryl spent 15 years reporting on social entrepreneurship and business for publications including Fast Company, the New York Times, and CIO magazine. Cheryl founded and led Fast Company magazine's Social Capitalist awards, a competition to identify and recognize top social entrepreneurs. Before her work with nonprofit organizations, she was part of an incubation and startup team for which she helped secure \$12 million in venture funding to launch an online environmental magazine.

Neel Inamdar

Impact Investment Advisor

As the former fund manager of the Verde Ventures Fund at Conservation International, Neel Inamdar has extensive experience with assessing, developing, and implementing financial solutions to environmental and sustainable resource utilization challenges. These include successfully developing and implementing investments in a range of sectors and geographies, from fisheries in Kenya and Mexico to agricultural commodities in Latin America, Africa, and Madagascar. In

each case, Neel led a focused, value chain–driven approach to identify conservation and sustainability focused opportunities and constraints for investment in small and medium-sized businesses. This resulted in the successful development of financial investments totaling over \$23 million in a range of sectors and SMEs.

Colleen Howell

Project Director

Colleen Howell is the research director for Future of Fish. Specializing in technical and nontechnical writing, research, project management, survey development, and data analysis, Colleen was a principal researcher in the discovery phases of Future of Fish. As a scientific and sustainability consultant, she has worked for NASA's LAUNCH program, spearheaded the development of in-house sustainability goals for Saint Vincent's Day Home in Oakland, CA, created custom green event guidelines for the Gallup Organization, and created a carbon offset credit report for Architecture for Humanity. She earned both an MS and a PhD in Environmental Sciences from UC Riverside.

Peter Battisti

Business Strategist

Peter Battisti is the business services director for Future of Fish. A cofounder and partner in multiple entrepreneurial ventures, Peter has 10 years of experience as an entrepreneur starting and operating renewable energy and real estate development companies. Through partnerships with high-net-worth investors and several wealth management funds, Peter has been a stakeholder in the placement of more than \$20M of real asset development. As an advisor and consultant, Peter has been intimately involved in developing and implementing business and investment strategies for dozens of startup and early-stage companies in the renewable energy, aquaculture, agriculture, and food service industries.

Jada Tullos Anderson

Finance Researcher

Jada Tullos Anderson specializes in projects concerning agricultural, energy, and the environment and focuses on market-based solutions to development. After graduating from Texas A&M, she worked for John Deere and then volunteered and worked with the Red Cross, where she was privileged to serve people affected by disasters. Wanting to learn even more about the natural world, Jada worked as an environmental scientist and earned a master of environmental management degree from Duke, focusing on energy. She has worked with organizations such as the Overseas Private Investment Corporation, providing input on environmental risk, and with Kiva, giving strategic recommendations to partners as well as performing field audits of microfinance groups.



Lise Breen

Value Chain Researcher

Lise Breen is a writer, editor, and researcher who holds a master's in anthropology from New York University. She curated and coauthored material for the new Gloucester HarborWalk; it has won numerous awards, including the American Alliance of Museum's Gold MUSE award. She also coauthored *Objects of Myth and Memory: American Indian Art* at the Brooklyn Museum (University of Washington Press, 1991), winner of the New York Historical Society prize for best publication. Lise has helped organize the Gloucester Harbortown Cultural District and serves on the [Judith] Sargent House Museum Board. She held positions as a research associate, exhibition coordinator, and education specialist at the Brooklyn Museum. Lise is currently researching material for an African-American Heritage Trail on Cape Ann with support from the Massachusetts Local Cultural Council. She lives in Gloucester with her family.

Joshua Wrigley

Value Chain Researcher

Joshua Wrigley is a research consultant and writer with a background in marine environmental history. A graduate of both Bard College and the University of Kansas, he has worked on fisheries projects with the Maine Coast Fishermen's Association and the Island Institute.



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