Building the Massachusetts Seafood System

Institutional Strategies and Investments by
State Agencies, Fishing Ports and the University of Massachusetts

Innovation, Infrastructure, and Systems Change

Urban Harbors Institute
University of Massachusetts Boston
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The Urban Harbors Institute was funded by the Seaport Economic Council to explore two questions: What specific institutional strategies and investments by Massachusetts fishing ports, with the assistance of state agencies, will maximize economic growth and development of the Massachusetts seafood and coastal economy; and What can be appropriate roles and contributions of the University of Massachusetts campuses, as anchor institutions, in these port-based initiatives?

Activities of the project were proposed to include: research on lessons learned and current best practices in food system economic development nationally; interviews and data collection on the characteristics and make-up of the fishing industry in the major fishing ports of the Commonwealth, the particular needs and opportunities of the industry, the existing economic development infrastructure in the Massachusetts fishing ports; and convening of a conference on optimizing public strategies and investments in the seafood sector.

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Seaport Economic Council

The mission of the Seaport Economic Council is to deepen the maritime economy, promote economic development, and support resilient infrastructure in all 78 of Massachusetts' coastal communities while preparing them to engage with the challenges posed by sea level rise and increasingly powerful coastal storms. The Council helps communities to use their unique economic assets to grow the economy and unlock job creation. The council's competitive capital grant program supports working waterfronts, local tourism, coastal resiliency, and maritime innovation, from the North Shore to Cape Cod and the South Coast.

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EXECUTIVE SUMMARY

The Massachusetts seafood industry continues to be a major asset for the state and for coastal communities, in particular, but significant potential also exists to:

- rebuild traditional parts of the industry, including increased landings, diversified catches, institutional sales, and greater local consumption of locally-caught fish, and
- support the growth of emerging segments, including value-added products, waste recovery, shellfish aquaculture, environmental restoration, research initiatives, food security programs, cultural activities, fuel-efficient boats and new gear, and downtown development and heritage tourism.

Purpose of the Project

The purpose of this project was to identify ways in which state agencies, fishing ports and the University of Massachusetts campuses could help fill gaps and address market barriers to building the Massachusetts seafood system. Input was sought and obtained through:

- interviews with fishing industry leaders and review of reports from the state and major ports,
- a review of the national literature on the food and farming sector and public sector engagement and investment in promoting growth and sustainability, and
- a multi-stakeholder conference held on August 2, 2017 in Gloucester, Massachusetts.

This report focuses primarily on the groundfish fleet and ports and on harvesters and seafood products that could supply expanded local and regional markets, as well as niche export markets.

There are successful processing companies, employing several thousand workers in New Bedford, Gloucester, and Boston, that export scallops, lobsters, oysters, and clams or that import frozen fish from out of state and then export processed product out of state. While these enterprises are important to port economies, they were not a focus of this study.

Underperformance of the Massachusetts Seafood Sector

Major impediments to develop and innovate include:

- Downward pressure on dock prices of local landings from imports that supply a steady source of frozen and fresh product to processors and buyers
- Reduced financial viability of fleets and shoreside businesses
- Insufficient public agency support to the industry, including minimal provision of business and technical assistance, incubator facilities and labs, financing, or research and pilot projects
- Delayed emergence of a local food movement of activists and entrepreneurs in the seafood sector, insufficient collaboration among private, non-profit and public actors, and absence of a common narrative and policy agenda
- Unfocused multi-stakeholder discussion on identifying and testing potential improvements to collaborative stock assessments and federal fisheries management
- Federal fisheries management and science that have lowered allowable catches, encouraged consolidation of the fleets;
- Absence of an understanding of how the seafood sector operates as a system or of breakthrough innovations that would collectively trigger and support a paradigm shift to greater health and resilience of the sector.

Opportunities for building the Massachusetts seafood system that emerged as priorities in this project include:

An Expanded State Role

- Assist innovative projects, entrepreneurs, and conferences
- Fund cluster economic development and value-chain related initiatives and capital infrastructure in ports and the University of Massachusetts
- Identify capstone pilot projects and public policy reforms that will internally strengthen the industry

Collaboration

- Develop new multi-stakeholder seafood system networks that include fishermen, fish processors, researchers, institutional purchasers, chefs, public officials, foundations, cultural leaders, and environmental and social just advocates
- Partner with the federal government and foundations, in particular in the pooling of funds

Leadership in Ports

- Take on a major role in growth and redevelopment of the industry, starting with the hiring of seafood coordinators, preparation of economic assessments, and development of strategic plans
- With assistance from the Commonwealth and federal agencies, including EDA and USDA, invest in port-appropriate test kitchens, product development labs, dock and pier repair, water and transportation infrastructure, training programs, business incubators, and processing and distribution centers, potentially with public access and public seafood markets

University of Massachusetts

- Develop and implement an incubator initiative and grand challenges research program across the five campuses
- Collaborate with stakeholders and ports, convene conferences and capstone projects, and network with other academic institutions in New England

Breakthrough Innovations

- Prioritize funding of R&D and pilot projects on grand challenges or innovations that bring significant benefits to the economy, but also to coastal community well-being, public health, and ocean and coastal habitat
- Set a goal of policy innovations and publicly-supported infrastructure that will collectively create the conditions for a systems or paradigm shift to a far healthier and more productive local seafood sector

A Multi-Year Agenda for Collaborative Partnerships across the Seafood Sector

- Organize multi-stakeholder conferences and workshops
- Hire port coordinators and fund economic assessments and plans
- Identify incubator services and grand research challenges in the University of Massachusetts
- Partner with federal agencies in funding port and UMass capital investments and research
- Partner in multi-stakeholder efforts to assess and support major policy reform in NOAA fisheries management and stock assessment science, Farm Bill provisions for support of

value chain investments that include seafood, and EPA and NOAA efforts in habitat restoration and pollution reduction

- Begin to focus on a long-term strategy for understanding internal seafood system dynamics and breakthrough innovations that would facilitate a paradigm shift to sustainability and resilience

Chapter 1

INTRODUCTION

THE MASSACHUSETTS SEAFOOD INDUSTRY – A SIGNIFICANT ASSET TO THE COMMONWEALTH

The Massachusetts seafood industry, from boat to processor to restaurant, grocer, institutional buyer and to consumer, is a significant asset to the quality of life and well-being of the Commonwealth. For port communities, it is a centerpiece of the local economy and a source of culture and tradition, which also attracts residents involved in the creative and visitor economies. The industry pays middle-class wages, including for those without a college degree, and provides better jobs on boats and in processing plants than are in the seasonal tourism industry. Fishermen are stewards of the ocean, and sensible fisheries practices and shellfish aquaculture can help restore coastal habitat and ocean bio-diversity. Seafood is a particularly healthy source of protein and Omega-3 oils.

RECENT DECLINES IN THE INDUSTRY

Several drivers have led to a decline in landings and value to the Commonwealth. Foreign imports have been driving down prices of locally-landed fish. Sharp quota cuts have limited catches. Pressures for efficiency gains and higher profitability inherent in the catch share system have led to some consolidation of ownership. There has been a narrowing in consumer preferences for the diversity of local fish and a growth in demand for imported shrimp and farmed salmon. Only certain sectors, such as lobsters, scallops, and oyster aquaculture have remained strong.

OPPORTUNITIES FOR REBUILDING AND FOR GROWTH

Nevertheless, there is very significant under-utilized capacity and value inherent in the industry. If the properly targeted strategies and investments are implemented by the Commonwealth, fishing ports and the UMass System, greater economic and other values can be achieved over time.

Increased landings, diversified catches, institutional sales, shellfish aquaculture, new value-added products, waste recovery, fuel-efficient boats and new gear, environmental restoration, science and technology jobs, food security, maritime history and culture, downtown development and heritage tourism are all parts of the seafood sector with significant potential to rebuild and grow.

In this regard, the Massachusetts seafood sector can be viewed as both a traditional economic cluster centering around fishing effort that can be rebuilt and an emerging cluster of innovation further down the seafood supply chain and in support services and community development.

PURPOSE OF THE PROJECT

The purpose of this project has been to explore specific institutional strategies and areas of public investment to support the rebuilding of the local seafood system. Three focal points of leadership were studied: state government, ports, and the University of Massachusetts.

THE RESEARCH METHOD

Research and input to this project fell into these three main categories:

- interviews of industry leadership and review of state and port reports on trends, needs, and opportunities,

- research of the national literature on the food and farming sector and on public agency and state university support of the sector, which is many years ahead of fishing and seafood in the development of its programmatic support and infrastructure, and
- An August 2, 2017 conference of keynote speakers and panelists, and break-out group discussions, which included participation by multiple stakeholder groups.

1. Input from industry and ports interviews and review of reports
   Interviews with fishermen, processers, dealers, port representatives, industry advocates, and State officials
   Gloucester – Gloucester Fisheries Commission, Gloucester Fishermen's Wives Association, Cape Ann Seafood Exchange, fishermen
   New Bedford – Harbor Development Commission, processors
   Boston – processors
   Chatham – Cape Cod Commercial Fishermen's Alliance, fishermen
   Provincetown – fishermen
   Marshfield – lobstermen
   State agencies – Executive Office of Housing and Economic Development, Massachusetts Division of Marine Fisheries, Massachusetts Department of Agricultural Resources

   Review of Reports:
   Baker-Polito Opportunity for All Strategy and Plan
   Navigating the Global Economy: A Comprehensive Analysis of the Massachusetts Maritime Economy
   Massachusetts Local Food Action Plan
   Building a Sustainable Value Chain for New England Groundfish: Finance Needs and Opportunities for Investment
   Groundfish Port Recovery and Revitalization Plan for the Port of New Bedford/Fairhaven
   Economic Impact Study of New Bedford/Fairhaven Harbor
   Gloucester 2014 Harbor Plan
   Multi-Species Business Development Report
   Gloucester Groundfish Port Recovery and Revitalization Plan
   Strengthening the Local Foods System and Downtown Revitalization: Actions and Strategies for Gloucester, Massachusetts

   Input from the interviews and reports creates a compelling narrative of an industry facing significant challenges, but with many opportunities for growth and development. There is a need for collective action and increased investment by the public sector in support of industry initiatives and innovation.

2. Research on farming and food sectors around the country

   A wide variety of literature on the national food and farming sector was reviewed, including books by leading authors, government reports, conference agendas and papers, non-profit websites, and university research programs and curricula. Exemplary development of the food sector and the important role of the public sector can be seen in both rural states like Iowa and Vermont and in heavily-industrialized states such as New Jersey, Michigan and Rhode Island. While agri-business and industrialized agriculture continue to dominate the U.S. farming and food sector, nevertheless there has been substantial development of local

food value chains, eco-agriculture methods, and policy advocacy around food access and health. Public investments have been integral to this progress.

A comparison of this national literature and the status of the Massachusetts seafood sector suggest:

a. Collaboration and networking are relatively weak in the Massachusetts seafood sector, as distrust and conflict have developed between the fishing industry and fishery scientists and managers and between industry and advocacy groups.
b. public sector engagement is heavily tilted toward the harvesting end of the value chain
c. multi-stakeholder dialogue and work on a systems understanding of the seafood sector is minimal – on either identifying the drivers causing technology lock-ins or negative externalities or on breakthrough innovations and public policies that collectively create the conditions for a paradigm shift in the system.

The literature offers specific models for state governments, ports and state university engagement:

- convening and supporting collaboration and networking
- funding capital improvements, business and technical assistance, training, and innovative product development
- encouraging multidisciplinary and multi-stakeholder research and pilot projects
- supporting discussions around federal policy reform and funding support for sustainable agriculture and local food systems, through enhanced provisions in the Farm Bill

3. August 2, 2017 conference in Gloucester, Massachusetts

The conference program included templates for food system leadership in collaboration, port development, and university support to the industry in the morning sessions and highlights of innovation in the New England seafood economy in the afternoon. The conference concluded with facilitated break-out group conversations and recommendations.

Keynote Speakers – Models for Investment:

Michael Grozyne, Red Tomato -- *What are We Fighting/Collaborating For?*

Caroline Paras, Greater Portland Council of Governments – *Portland's Investments in Port Infrastructure, Food Manufacturing and Innovation*

Margaret Brennan-Tonetta, Rutgers Food Innovation Gateway – *The Role of the University in Business Development: The Rutgers Food Innovation Institute as a Case Study*

Scott Soares, BostonBay Consulting, *Seafood is food just add water! (What does USDA have to do with fish?)*

Breakthrough Innovations in the New England Seafood Sector:

Kate Masury, Eating with the Ecosystem – *Matching Our Markets to Our Ecosystems*

Josh Stoll, University of Maine – *Strengthening Community Resilience through Innovative Seafood Marketing Strategies*

Vito Giacalone, Northeast Seafood Coalition – *Fisheries Science and Management Impacts to New England: A Fisherman's Perspective*

Angela Sanfilippo, Gloucester Fishermen's Wives Association – *Gloucester's Fishing Heritage, Culture and Placemaking*

Anamarija Frankic, UMass Boston – *Healthy and Productive Coastal Habitats: Creating Conditions Conducive to Life*

Two questions for discussions at break-out tables included:

1. List the kinds of fishing industry and seafood system initiatives or programs that you would like to see public-private-civic partnerships advance in Massachusetts fishing ports.
2. List research projects or other activities you would like to see researchers from the University of Massachusetts or from other institutions take on, in collaboration with industry and port communities, to help build the Massachusetts seafood system and fishing industry.

The chapters that follow presents a summary the information collected and reviewed along with findings and recommendations for actions to build the Commonwealth's local seafood economy.

Chapter 2 – The Massachusetts Fishing Industry
This chapter describes the aspirations of the MA fishing industry to reverse recent declines and to rebuild the industry through a series of public investments.

Chapter 3 – A Brief Overview of the Food and Seafood Systems
This chapter summarizes the major trends, innovations, and collaborative initiatives in the food and farming sector, along with the early adoption of some of these approaches in the fishing industry and seafood sector.

Chapter 4 – Roles for State, Port, and UMass Engagement and Support of the Seafood System
This chapter develops recommendations for collaboration, state and port engagement in coordination, planning and infrastructure upgrades, and UMass planning and development of incubators and of grand challenge research and capstone projects. Guidance documents and other literature are cited for use by each of these levels of government.

Chapter 5 – Summary Findings and Conclusions and Next Steps
This chapter summarizes the major themes from the research and input to the project and outlines next steps for state investment in coordinators and convenings and in planning and assessments in both ports and the UMass system. Based on these studies and reviews, the state should expect to partner with federal agencies, foundations, and municipalities in funding major capital improvements and research in coming years.

Chapter 2

THE MASSACHUSETTS FISHING INDUSTRY

In this chapter, the background state and port studies and recommendations are described, along with major themes in the interviews with fishing industry leadership and in break-out group discussions during the August 2017 conference. Consistent themes emerge around the causes of financial distress in the industry and needs for capital investments in the ports. Widespread support is voiced for the funding of seafood innovation centers and public markets, investments in processing and new product development, engagement of the University of Massachusetts, and taking on the longer-term task of reevaluating stock assessment science and fisheries management.

Included in this chapter are multiple "excerpts" from reports and "quotes" from interviews. Even a cursory review of the bolded phrases demonstrates this pattern of drivers of decline in the industry and ports, and of yet to be pursued opportunities that are articulated by the fishing industry and other stakeholder groups.

The Massachusetts Seafood Industry is a significant economic sector for the Commonwealth and, in particular, for coastal communities.

In 2012, Massachusetts was ranked second in the nation for number of employees in the fishing industry, behind Alaska, and third highest in sales. The industry generates

$8.4 Billion in sales
$3.3 Billion in value-added

(Source: NOAA, Fisheries Economics of the U.S., 2012)

The Baker-Polito *Opportunity for All Strategy and Plan* lists fishing and fishing products as one of its "Key Clusters and Industries," due to its status as a statewide and regional traded cluster that competes on a national and international scale. The competitive advantage of Massachusetts rests in its access to rich fishing grounds, several full-service ports, national and international transportation networks, and historic capacity in fishing and processing.

In 2014, NOAA estimated an employment impact of 107,064 jobs, including

64,882 retail
16,095 import
14,433 commercial harvest
8,288 processing and dealing
3,367 wholesale and distribution

(Source: Fisheries Economics of the United States, 2014, NOAA Fisheries Office of Science and Technology)

The Commonwealth's Top 10 ports in 2016, based on ex-vessel value include:

New Bedford	$304,928,886
Gloucester	52,739,305
Fairhaven	20,338,316
Chatham	17,918,789
Boston	16,957,656
Provincetown	8,195,924
Sandwich	7,235,850
Wellfleet	6,183,408

Rockport	6,175,646
Duxbury	5,668,619

(Source: MA Division of Marine Fisheries)

The Top 10 Commercial Landings by Value in 2015 were:

Sea Scallops	$264.9 million
American Lobster	78.3 million
Clams	30.0 million
Cod & haddock	17.6 million
Monkfish	13.6 million
Eastern Oysters	22.7 million
Atlantic Herring	8.8 million
Flounder	17.4 million
Goosefish	10.3 million

(Source: NOAA, Fisheries Economics of the United States, 2015)

STATE REPORTS

Navigating the Global Economy: A Comprehensive Analysis of the Massachusetts Maritime Economy, Public Policy Center, UMass Dartmouth, 2016

This report identified "Living Resources" as one of the six major sectors in the Commonwealth's "Blue Economy," and including:

Fish Hatcheries and Aquaculture – Finfish Farming and Fish Hatcheries, Shellfish Farming
Average annual wage -- $42,810
Fishing – Finfish Fishing and Shellfish Fishing
Average annual wage -- $66,932
Seafood Markets – Fish and Seafood Markets
Average annual wage -- $27,409
Seafood Processing – Seafood Canning and Fresh and Frozen Seafood Processing
Average annual wage -- $58,103

Changes in number of establishments and employment, gross state product 2005-2013
10.9 % decline in establishments
13.4 % decline in employment
16.7 % increase in GSP –

Exports and Imports
$445 million in exported fish, crustaceans, and aquatic invertebrates in 2015
$2.0 billion in imports

Key Drivers in the Industry:

- Major fish **processors have become more reliant on imported frozen fish** from other regions due to the decline of consistent fresh fish availability from the Northeast region.
- Reduction in number of jobs likely due to the "**tightening of catch limits** or increased automation in processing" and "**consolidation of fishing licenses** among a smaller number of larger businesses as the cost of regulatory compliance created very difficult financial and operational challenges for small businesses and independent operators in the Fishing Industry."

- **The decline is primarily driven by federal regulations** that make it increasingly difficult for smaller fishing operations to operate profitability. Consequently, the industry is consolidating around larger fishing operations that have economies of scale.
- Since 36 percent of GSP in the sector is produced by the Seafood Processing industry, which mostly processes seafood caught outside of the country, the sector's GSP is less prone to fluctuations in fish and shellfish prices.
- Greater resilience in the industry is also due to more reliance on high-value scallop landings.
- In the early 1980's, Gloucester was the state's top port in terms of its annual catch, with 166 thousand pounds of fish landed, more than double New Bedford's annual catch of 76 thousand pounds. However, the fortunes of these two ports have reversed, with New Bedford landing nearly twice the weight of seafood in 2015 than Gloucester (123.8 versus 67.7 thousand pounds).
- N**iche seafood processors have begun to enter the market**. These small companies focus on high value-added products, such as smoked haddock, salmon bacon, and a wide range of other cured fishes.

Opportunities and Recommendations:

Aquaculture

- MA DMF's goal to "support continued development of an **ecologically sustainable marine aquaculture industry**"
- Currently dominated by shellfish – 85% in farmed oysters and clams
- EPA grant to UMass Dartmouth's School for Marine Science and Technology to measure nitrogen pollution reduction associated with oyster aquaculture
- Deal with "regulatory requirements, workforce issues, funding, marketing, competition, and insurance coverage"

Capitalizing on the Ocean-To-Table Movement

- the seafood industry has been **slow to jump on the locavore/direct marketing movement**
- the tendency of consumers to shy away from lesser-known varieties of seafood
- **need for education of consumers**, to promote consumption of underutilized species and lead to advocacy for better regulations and policy for the industry
- development and monitoring of an "identity preservation system" to preserve the integrity of product differentiation and marketing claims

Stock Assessment Science

- To help inform the debate between fishermen and scientists over the size of the current fish population, UMass Dartmouth has equipped a fishing vessel with video cameras to record fish. The hope of fishermen is that this kind of research can "yield what they have concluded based on their own anecdotal evidence: There are more fish in the sea."

General Policy Implications of the Report – Relevant to the Seafood Sector

Preservation and protection of ocean and coastal resources

- 66 percent of survey respondents cited "preserving and protecting ocean resources" as a critical or very critical issue to the success of their businesses
- policies that **balance ocean health and coastal economic activities** will help to ensure the vitality of the Maritime Economy

Federal research funding

- State advocacy for **federal funding of applied and basic research**, which is the foundation for the marine technology cluster

Port Infrastructure

- 41% of survey respondents report that "**improving the infrastructure of the state's ports**" is a critical or very critical policy area
- There is no one size fits all solution in terms of capital needs, "as each port has unique physical infrastructure, water depths, and facilities that meet varied water-dependent uses", including pile supports, decking, bulkhead, and buildings.

Training

- 36 percent of survey respondents report that the jobs in their business require specific educational credentials or technical certifications
- "The state should support the development and expand the capacity of specialized **training programs**."

Capitalizing on the Ocean-to-Table Movement

- "**creation of a locavore "foodie" movement** has the potential to benefit both the Living Resources and Tourism & Recreation sectors through increased consumer interest and price premiums
- The existing isolated efforts to promote locally-sourced and fresh seafood … should be supported and expanded on as a means of diversifying and strengthening the industry.

MA Local Food Action Plan, 2015 – Fishing Industry Chapter

Fishing Industry Goals:

- The marine ecosystem will be resilient and will sustain the seafood industry
- The local seafood system will have strong markets, support livelihoods, and increase customer purchases
- Local seafood will be available and affordable
- The local seafood system will be collaborative and networked
- Research will help the fishing and aquaculture industries grow sustainably

Recommendations that relate to economic development of the industry include, among others:

- **Improve data collection methods, systems, and technology for 'fishery dependent' and 'fishery independent' fish stocks**
- Develop oyster, clam, and mussel beds as a method of enhancing marine ecosystems
- Increase consumer education on local seafood
- **Expand local seafood markets, product development and seafood supply chain innovations**
- Support value-added seafood product development
- Determine feasibility and develop **seafood innovation districts** that include elements such as **test kitchens, laboratories for developing value-added products and innovative technologies to recover and utilize waste, and start-up accelerators to develop new businesses**
- Upgrade and expand current aggregation methods, processing, facilities and equipment, based on research and in the context of expanding the local seafood industry and building equity and sustainability into the value chain

- Encourage the sale and **consumption of lower-cost, underutilized species**, like whiting, Arcadian redfish, dogfish, and scup in all markets
- **Build collaborative networks** comprised of a range of businesses, organizations, and institutions with interest and stake in development of the local seafood system
- Conduct research to advance the fishing and aquaculture industries
- Commit State funding and grants to **expanded research** for local seafood product development and sustainable fish and shellfish operation innovation, with an eye toward expanding markets for underutilized species.

Building a Sustainable Value Chain for New England Groundfish: Finance Needs and Opportunities for Investment, Future of Fish, 2014

The inability to catch ample volumes of fish – whether because of natural causes or falling quotas – was universally listed as the primary challenge by fishermen, vessel servicers, auctions, processors, distributors, and financial institutions alike. 90 percent of landed groundfish is sold into commodity markets and this fish may pass through as many as many as twenty hands from boat to plate. Only 32.7 percent of allowable catch is actually landed, because of choke species, low prices per pound, and instability of quota leasing markets. Only two percent of landed fish is channeled through CSF programs.

Concerns of fishermen include:

- **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**
- **psychological stress**

Recommended opportunities for investment:

- Improve **stock assessment methodology**
- Help fishers diversify – **target other species**
- Recapitalize permit banks
- Transparent quota leasing mechanisms
- Gear and fish handling improvements and **vessel reinvestment**
- **Differentiation and market development support** – branded, storied fish
- Facilitate forward contracting marketplaces
- **Build business ecosystems** – **participation of multiple players** in the value chain

PORT OF NEW BEDFORD

Groundfish Port Recovery and Revitalization Plan for the Port of New Bedford/Fairhaven, UMass Dartmouth, 2014

Data

- **Value of groundfish landed in New Bedford by all vessels declined** from $31 million in 2011 to $19 million in 2013, a decline of 44 percent in two years
- The number of groundfish vessels actively landing any species in New Bedford declined from 97 vessels in 2006 to 47 vessels in 2013

- The average value landed per trip and the average annual value landed from vessels 75 feet and longer increased significantly in 2010 through 2012 relative to years before sectors
- Average costs for groundfish trips on vessels 75 feet and longer increased from $9,833 in FY2009 to $29,714 in FY2012, largely due to increases in fuel prices
- **Fifty businesses that supplied products or purchased fish from New Bedford fishing vessels have gone out of business** between 2004 and 2013 – these include marine equipment service and supplies, insurance, welding, vessel and equipment repair, fishing gear, and other

Key Drivers in the Industry

- The decline in the vessels, trips, and landings in groundfish has created more dependence in the port on the scallop fishery, which landed 85% of the port's value in 2012
- The Port of New Bedford remains a full-service port with numerous businesses in every category of shoreside services, with a total of 148 shoreside businesses
- 47 shoreside business owners or managers that were surveyed reported that they are **at the mercy of federal government agencies "with little knowledge** of the way that the industry works, little consideration for fishing businesses, and almost no information on the fish available to be caught"
- Sector managers of the four sectors from New Bedford "can't find quota to lease when they need quota on choke species at prices that make fishing trips profitable"
- In 2012, **only 32 percent of the Northeast groundfish quota was caught**, down from 41 percent in 2011

Recommendations:

- Develop a video groundfish survey process to generate data for stock assessment
- **Change Magnuson-Stevens Act to achieve a balance between conservation and economic growth**
- **Improve scientific support for annual catch limits** – recommendations for stock assessments, including collaboration with fishermen and more accurate, transparent and frequent stock assessments, with alternative sources of data
- Examine the effects of individual species quotas on commercial landings – using biological and economic models, for example a model that predicts apparent or available abundance as a function of costs, regulation, availability, catchability and stock size. An **experimental fishery** using from the catch could be used to underwrite data collection.
- Use **conservation engineering** to develop more effective fishing gear
- Capital project recommendations, including repairs to and expansion of **fishing piers, dredging, and shoreside power**

Economic Impact Study of New Bedford/Fairhaven Harbor, Martin Associates and Apex Companies, 2016

Data:

35,350	Total employment from seafood processors and fleet operations
5,635	direct employment
3,760	induced employment – as a result of local and regional purchases

2,215 indirect jobs – businesses supplying services to processors, marinas
23,379 jobs related to downstream logistics operations in seafood processing

Seafood processing -- $9.6 billion total economic activity
$1.6 billion of total personal wage and salary income, including $794 million in direct, indirect, and re-spending and local consumption and $844 million in personal income by related port users.

Key drivers of the industry

- 140 million pounds of seafood landed in New Bedford Harbor and 250 million pounds of domestic and international seafood processed – including sea scallops, Atlantic herring and mackerel, surf clams, lobster, Jonah crabs, flounder, angler, haddock, cod, hake, redfish, and squid
- Processing includes weighing, fileting, cleaning, and repackaging the seafood, which is either trucked locally to wholesalers, goes to cold storage warehouse, or trucked to Logan or JFK airports, or trucked to Worcester, where it is railed out to the West Coast for export to Asia.

Interview with port official, June 19, 2017

Reflections:

- New Bedford fish are **doing well in international markets**
- The Port helps make connections for seafood buyers, has a clearinghouse for all fish houses
- Working on branding, thinking of community supported fisheries concept for bycatch (pollack, dogfish, red fish), local farmer's markets, working with "no kid hungry" and working waterfront festival in September
- **Little interaction with the public**
- Landings of 130 million pounds, only 1/3 processed in New Bedford
- Processors need certainty of supply, so **limits focus on local fish**

Needs:

- An offloading facility with a **public access component** -- interpretation
- **Basic infrastructure** investments (dock space, dredging)
- Funding for **full-time marketing staff**

PORT OF GLOUCESTER

2014 Harbor Plan

Gloucester's maritime economy represents roughly **one third of all jobs and 21 percent of the total wage base of the city**. Highest wages are in research and government, **middle-income wages are in the fishing fleet and seafood processing**, and low wages are in tourism.q

Data:

Fishing Fleet: 717 jobs; $28.7 million payroll
Seafood industry (seafood processing, brokering, distribution: 670 jobs; $59.9 million payroll
Tourism: (hospitality, recreation, amusements): 890 jobs; $19.7 million payroll
Research, science, and education: 632 jobs; $20.8 million payroll

Government (NOAA, USCG, MA DMF, MA Environmental. Police, MA Development Fish Pier Management, MCZM, city Harbormaster and Assistant Harbormasters): 315 jobs; $22 million payroll.

Analysis by Ninigret Partners for Harbor Plan Committee:

Sector opportunities assessment:

- Strengthen thru **innovative product development** – as a fundamental component of the city's economy, opportunities to stabilize and generate some growth through diversification:
  Tourism
  Fisheries and seafood
- Target for Growth – a current area of interest and investment by the private sector
  Marine biomaterials – research
  Translational science
  Product manufacturing
- Opportunistic – lack of a major anchor plus established centers limits growth potential, but Gloucester's location could create the right "serendipity"
  Marine technology
  Marine research

Multi-Species Business Development Report, HDR Engineering, 2013

Key drivers in the industry in Gloucester:

- Fishermen may not completely understand the **processors' reliance on frozen or non-Gloucester landed fresh product** – a holistic approach needs to be taken and should be led by the Fisheries Commission
- Processors maintain an inventory of frozen product that allows them to keep their workers employed and facilities running. Most cannot keep their doors open depending on fresh product alone.
- The best chance of **diversification by fleets and processors** are in Acadian Redfish, Pollock, Hake, Mackerel, and Herring.
- Unlike other ports, **Gloucester possesses an identity** that can be used as an extremely strong marketing tool and should do so
- Over the last twenty years or so, fishermen have been portrayed as hard drinking danger-loving risk takers who were out to exploit our oceans. Gloucester is the only port in the U.S. that because of its history, and the blood, sweat and tears of generations of its families can really change the public perception of commercial fishing.
- Opportunities exist in a **multi-functional facility**, which would include shared space for contract processing and specialized value added products
- Other opportunities are in **fish waste pre-treatment, communal processing facilities, and cooperatives**.

The primary **impediments to fishing industry success** have been identified as:

- **Resource availability from year to year**
- **Potential access limitations to the resource**
- **Low cost of the commodities**
- **High transportation costs**
- **Seasonal use of processing facilities**

- **Low return on investment for both vessels and facilities**
- **Price instability**
- **Difficulty of opening new markets outside of the United States**
- **High cost for inventory and equipment necessary for start-up**

Recommendations:

- Develop a framework of **leadership including stakeholders** who will take a course of strategic actions to institute these and other industry recommendations
- Determine the feasibility for the development of a Gloucester certification program by developing the framework through the City of **product certification** as advised by industry representatives
- Identify and pursue probable sources for farmed and frozen product to supplement supply. This includes Atlantic and Pacific product based on transportation routes and availability
- Explore and design programs that may be of interest to **research institutions** in cooperation with educational institutions now engaged in this activity
- Determine feasibility of current and alternative water sources and the price point for potential shared basis as part of a cooperative facility approach
- Determine best trade shows for a Gloucester certified program announcement including The Boston Seafood show
- Identify food product development firms that can assist with new product formulations
- Examine a cooperative model for a new **processing facility for smaller business interests**
- Examine a cooperative model for a **marketing program** such as a check off program
- Work with other port interests and small ocean carriers to develop a direct call feeder service into the Port that can supply existing and emerging processors with product shifted from trucking

Note: Since the publication of this report, Gloucester has successfully developed a Gloucester Fresh brand and program, with the assistance of Endicott College, and funded a booth at The Boston Seafood Show, with tastings of underutilized species and information on the Port, along with tours from international seafood companies.

Gloucester's Cape Ann Seafood Exchange also received two Saltonstall-Kennedy (S-K) grants for a total of approximately $700,000 to purchase redfish processing equipment and to invest in marketing and branding, including for exports of redfish. Other S-K proposals over a period of three years, including for research and development on chitin recovery and lobster bait from liquid fish, experimental aquaculture, innovations in harbor clean-up and rebuilding of piers, test kitchens and local food marketing, etc. have not been granted funds by the S-K program.

Groundfish Port Recovery and Revitalization Plan, 2014

The Port of Gloucester aims to stabilize and **rebuild the harvesting, processing, and marketing sectors** of the fishing industry and shoreside services, to achieve the goals of: **diversified, high value-added, and equitable economy; ecologically sustainable harvesting and an environmentally clean port and ocean; and provision of healthy local fish to the region**.

Recommendations included:

- Transition assistance to fishermen, crew, and shoreside businesses, including disaster relief funds, due to drastic cutbacks in quota

- Establish a technical assistance fund for small business use
- Establish a water rate funding subsidy for processor and invest in fish processing wastewater pretreatment
- Redeploy **fishing boats as research vessels and fishermen as scientists' partners**
- Establish the **Northeast Center for Fishery Management Innovation** – an alignment of stakeholders around a shift into a diverse and adaptive fishery
- **Tell the story** of the northeast fishery and seafood
- Promote education and access to assist the next generation of fishermen to enter the industry
- Develop a Stability Plan for the groundfish fleet – to include more **flexible and adaptive implementation of fisheries management** under a reauthorized Magnuson-Stevens Act and improvements to the harvesting, processing, and marketing "value chain".
- Enable the real time flows of catch and market data from dock to industry
- Establish a **test kitchen** to expand commercial use of under-utilized species, develop value-added product, and conduct research, product testing, and product branding
- Invest in cooperative ocean **product development**, including with Saltonstall-Kennedy grants
- Develop a Task Force of processors
- Expand the **UMass System presence** in Gloucester
- Establish an extension agent position in the northeast regional office of the Cooperative Extension program of UMass to support commercial fishing
- Seek assistance from one of the Commonwealth's Sea Grant College programs to work with shoreside processors
- Promote **marketing initiatives** to encourage consumers to adapt their seafood preferences to changing species
- Work to secure language and funding for seafood in the MA Food Policy Council
- Establish **infrastructure** so that local, fresh seafood product can be processed in larger quantities and sold directly to a wide array of purchasers, such as schools and health institutions
- Explore opportunities to market traceable local seafood
- Explore the establishment of a **Food Hub** – to increase market access for producers, while working with and adding value to the existing food distribution, with improvements in marketing, product development, and outreach and education of consumers.
- Develop local **collaborative institutions** and networks and align missions and investments by federal and state agencies, universities, foundations and private companies

Note:
In addition to development of the Gloucester Fresh brand and the booth at the Boston Seafood Show, Gloucester received a Seaport Economic Council grant to the City for a "Gloucester Fresh Seafood" Innovation program, to advance the branding campaign, develop contracts with ten new institutional buyers, and organize a Gloucester Fresh Seafood Festival.
Gloucester also received a $20,000 USDA Rural Business Development grant to further promotion of Gloucester Fresh and the future establishment of a Seafood demonstration and product development center or "test kitchen" by community partners Gloucester Fishermen's Wives Association and Snapchef.

A fishing industry chapter was included in the MA Local Food Action Plan, based in large part on input from panel and audience discussions in Gloucester and New Bedford.

Strengthening the Local Foods System and Downtown Revitalization: Actions and Strategies for Gloucester MA, Local Foods Local Places Technical Assistance Program, 2016

Consolidation of fleets and processors, including shipment of locally landed seafood out of state and overseas, has stripped coastal ports of income, jobs, and taxes – including support services of engine and boat repair, ice, fuel, and other items – and has deprived the local ports of a strong economic multiplier from the high-wage fisheries.

Goals for Gloucester developed through multi-stakeholder discussions:

- **Strengthen culture, heritage, identity and sense of place**
- Advance public health, improved nutrition and food access
- Promote and advance the seafood industry through **branding, marketing and outreach**
- **Connect and grow our local seafood** and produce economy locally and regionally

PORT OF BOSTON

Interview with fish processor, June 20, 2017

Reflections:

- **Small to mid-size fishing businesses are in jeopardy** because of lack of affordable landing, processing, and distribution space in the Boston waterfront – encroachment from private development of commercial structures, bio-tech in the Seaport area
- **Boston Fish Pier is outdated** in terms of operating a fleet of trucks for effective daily seafood distribution, no fish auction remaining
- **Overzealous regulations and quota reductions**, along with higher costs, make it increasingly difficult to sustain a profitable business as a local seafood company
- Seafood wholesalers are isolated from their suppliers, who are isolated from their customer base and the general public
- **Fishermen are ignored** in the science of fisheries

Needs:

- A new state of the art fish pier that offers more to get the public involved, make different types of fish more of a household name
- A **modern seafood center** for wholesalers to be more interactive and collaborative with end users, visitors, and potentially having their fresh fish source right on site – something wholesalers would be excited about – perhaps on model of Pike Place Market in Seattle or Fisherman's Row and Pier 39 in San Francisco, where locals and tourists share in fishing history, boats, seafood, events

CAPE COD PORTS – CHATHAM AND PROVINCETOWN

Interview with Cape Cod Commercial Fishermen's Alliance, June 13, 2017

Reflections:

- **Seafood landed in Chatham goes, unprocessed, to New Bedford** and some back to Chatham for sale, product is often frozen due to short shelf life
- Dogfish primarily goes overseas, fins and tails to the Asian market, also landings of skates

- Belief there is current **science and federal management** working against viable businesses
- Congestion at the pier, not enough infrastructure, 3-4 hour wait to unload boats, especially in summer when pleasure boats are docking, shifting sandbars, not enough moorings or parking space
- Difficult to get prices low enough for institutional buyers
- Pier to Plate program funded by a Saltonstall-Kennedy grant, with aim to get dogfish and skate onto menus on the Cape, now giving away free to 20 restaurants, one local high school

Needs:

- **A small processing facility** on the Cape, possibly under a new cooperative structure
- New markets in restaurants, hospitals
- New **infrastructure at the pier** to cut down on wait times, more moorings and parking

Interview with fisherman, Provincetown, July 15, 2017

Reflections:

- Catch goes to New Bedford Auction, which sets prices
- Fishes for scallops, with leased permits from Cape Cod Fisheries Trust
- 8-12 boats fish out of Provincetown full-time, a small part-time dragging fleet, moving of boats into lobster and dogfish
- Seals are a problem for fisheries, altering migration, competing for food, worms making fish sick

Needs:

- More **emphasis on dock quality**, including bulkheads, pilings, water, electric, floating docks, ladders, ice system
- A local facility to haul out and repair boats
- **Fishing interests should be better represented** in decisionmaking, not just advisory roles
- More state autonomy regarding state and federal regulations

GLOUCESTER CONFERENCE AUGUST 2, 2017

Break-out Group Themes

After eight keynote presentations at the August 2 conference in Gloucester, the audience of 67 fishing industry representatives, academics, advocates, and government officials broke into five tables to answer two questions about priority seafood system initiatives in the ports and potential projects and activities in the University of Massachusetts.

Reports back from the break-out tables included these major themes:

- Organize **more frequent dialogues** involving industry leaders, community members, fisheries managers and other government officials, politicians, scientists – host events, bulletin boards, create institutional memory, turn projects into longer term studies
- Mobilize **clusters of existing organizations in ports**, around existing capabilities (e.g. processing), infrastructure, ecological environmental needs, and heritage/culture
- Create **seafood innovation centers,** in collaboration with the University of Massachusetts, that provide incubator services of technical assistance, access to financing, marketing, and lab space

- Assess needs for **value-chain investments** in processing capacity, cooperatives, traceability, local branding, public fishermen's markets, and consumer education
- Support **capstone projects** in communities and other interdisciplinary research

Summary of Reflections and Opportunities

Multiple reports, interviews, and break-out group discussions capture the following narrative summary of the seafood sector and strategic opportunities moving forward:

1. export-import markets and federal regulations have been the major contributors to reduced size of fleets, volume of landings, local processing capacity, and of narrower seafood consumption patterns
2. many potential areas and niches of economic development are not adequately pursued, for lack of technical, business, and financial support
3. there is widespread need for planning, coordination, and capital improvements in ports and the University of Massachusetts
4. investments in the local food value chain are needed
5. seafood innovation centers and public markets are envisioned in multiple ports
6. more collaborative and interdisciplinary research and capstone projects are indicated
7. stakeholders care about economic viability of the industry, but also ecological sustainability, vibrancy of port communities, equity, and public health
8. there is a widespread call for better stock assessments, involving both scientists and fishermen, and for engagement of the fishing industry in piloting and reform of federal fisheries management

Chapter 3

THE FOOD AND SEAFOOD SECTORS – A BRIEF OVERVIEW

Recommendations for state, port and University of Massachusetts strategies and investments rest on both an understanding of the history and shape of the food and seafood sectors, including broad-based movements and initiatives for reform; and from the market failures or imbalances that the public sector would be in a position to help address.

In this chapter, the activist and entrepreneurial efforts to create a local food economy parallel to the larger "globalized and industrialized" food economy are described. Much of this work has been directed at rebuilding rural economies, reducing adverse environmental impacts of agriculture, and meeting new demands for healthy food in the marketplace. There has been a steady evolution from initial Farmer's Markets and local foods in restaurants to a more complex pursuit of systems change in the way food is produced and consumed.

The seafood sector is clearly years behind the larger food movement in this kind of collective effort, but has recently been adopting some of the same strategies and approaches, for similar reasons and for many of the same goals. Seafood has the potential to rapidly catch up and "leapfrog" in these pursuits, in particular if the public sector provides the necessary supports and investments.

Chapter 2 showed that these activities are still small in scale and impact. The 2016 Massachusetts Maritime Economy report commented that "the seafood industry has been slow to jump on the locavore/direct marketing movement" and there are only several new "niche" product companies that have been formed.

A GLOBALIZED AND INDUSTRIALIZED FOOD SYSTEM

In recent years, there has been a dramatic shift of the food economy from one of many small farms and local processors serving local, as well as some national, markets with a diversity of local and seasonal varieties of foods, to a nw system of large farms growing only one or two crops, vertically-integrated and concentrated ownership of processing and distribution, and consumption of foods grown at some distance, including from international sources. The large farms also increased use of fertilizers and pesticides, and in many instances, genetically-modified seeds. Research has focused on goals of high-yield varieties at least cost per acre.

Seafood

The seafood economy has also shifted dramatically in recent years. Within "living memory", there were still many local fish markets, local deliveries to restaurants, and a diverse set of fish cooked in homes, including fish heads for stock, and seasonal varieties of fish. People along the shoreline also remember harvesting clams and mussels for their own dinners.

The seafood sector has also now become dominated by an export-import driven commodity marketplace, as described in Chapter 2. It is now estimated that about 80% of fish landed in New Bedford, for example, is headed overseas, and conversely, 90% of seafood consumed in the state is imported, particularly shrimp and salmon, often frozen. Fish is also imported whole or in blocks, and processed in big plants in New Bedford and, to a lesser degree, in Gloucester and Boston, to in turn be shipped out of state. At the same time, consumer tastes narrowed to fewer species, such as cod and haddock, and familiarity and use of whiting, mackerel, and other species declined. In order to provide a steady supply of fish to restaurants, supermarkets, and

institutional buyers, local fresh fish is blended with imported stocks, for example, in cod, which comes in from Iceland and Canada.

STRENGTHS OF THE CURRENT FOOD SYSTEM – LOW PRICES, SAFE PRODUCTS AND DIVERSE, STABLE SUPPLIES

The industrialized food system has achieved the goals of steady supplies of safe and diverse foods, in spite of weather-related crop losses or shortages at any given time AND at low cost to the consumer. The system rests on an expansive and efficient network of processing, transportation, and distribution. The share of income spent on food is historically low and there is steady access to a wide range of foods.

Seafood

Similarly, at the core of the seafood value chain, there is a capable and adaptive distribution and transportation system. Multiple, different species of differing quality come in each day off of hundreds of boats in several ports and are sent off to varying markets for international, national, and local buyers. These many sources of frozen imports and local fresh product provide for a reliable and steady supply of fish to customers, in particular to restaurants and to institutional buyers.

NEGATIVE EXTERNALITIES – TO RURAL COMMUNITIES, ECOSYSTEMS AND PUBLIC HEALTH

While globalized food markets and high-yield farming practices have lowered the price of food, as intended, they have also produced a wide range of adverse impacts or externalities on the environment, communities and public health. The increased use of fertilizers and pesticides, along with monoculture and fewer rotation of crops, has resulted in significant degradation of soil health, water quality and habitat, with a resulting loss of insects, birds, and other wildlife. The modern food system has also typically hollowed out the economy of rural towns, as employment on farms has fallen and processing facilities and supply stores been closed. Many rural areas are dealing with odors of manure-related pollution from concentrated animal feed operations (CAFOs), such as in states like North Carolina and Iowa, and a resulting drop-off in population in rural towns. CAFOs are also heavy users of anti-biotics, which are contributing to development of resistant strains that can affect human populations over time.

Americans also shifted diets to include more calories and more processed food, with resulting increases in obesity and associated diabetes and heart disease, and cancer. With high fertilizer and pesticide applications, the nutritional content of food has also fallen.

Seafood

Similarly, consumption of seafood has shifted and narrowed markedly to emphasize imported shrimp and processed fish, with compromised quality and chemical additives.

The survival of processing and distribution companies in this export-import dominated market has necessitated a ruthless pursuit of efficiencies and economies of scale. In order to stay profitable, the industry often relies on immigrant labor, commodification of product, overseas markets, freezing, and a narrowing of American seafood consumption patterns.

Consolidation of fleets and processors has stripped coastal ports of income, jobs, and taxes, both direct and rippling through support services of engine and boat repair, ice, fuel, insurance, and others. These changes in the industry have deprived the local ports of a strong spending multiplier from the high-wage fisheries workers. Many ports are left with low-wage, seasonal work in tourism and real estate development. Commercial dockage and processing plant

capacity have also been displaced by recreational boating, and real estate development more generally, in coastal waterfronts.

THE LOCAL FOOD MOVEMENT – FARMER'S MARKETS, CSA'S AND FOOD HUBS

The "local food" movement has been a multi-pronged attempt to stall the steady concentration and industrialization of the food chain and to rebuild a parallel food system with many of the beneficial attributes of the traditional rural economy. These include: maintenance or increase in numbers of both small and mid-size farms, restoration of local processing and distribution, diversification of crops, ecologically-based farming that reduces or eliminates application of oil-based and imported fertilizers and pesticides, restoration of water quality and habitat, and greater consumer access to healthy food, regardless of income.

Hallmarks of this movement have been the establishment of Farmer's Markets, Community Supported Agriculture (CSA) projects to link farmers to consumers, food hubs with processing and distribution facilities, Food Policy Council initiatives to reach underserved and low-income populations, and leadership by chefs in making local food a fashionable choice. Massachusetts is one of the early and leading states in implementing these kinds of innovations and markets for locally-marketed produce and fruits, and more recently for pasture-raised chicken and beef.

Seafood

While lagging behind the larger local food movement, there are parts of a local seafood value chain that have been developed in the last few years in Massachusetts. Community Supported Fisheries projects have been organized, the largest of which is Cape Ann Fresh Catch out of Gloucester. CAFC takes fish from approximately 25 boats, and occasionally from the local auction, and processing and distribution are provided by Ocean Crest and Turner Seafoods. Pick-up sites are in several dozen communities in Eastern Massachusetts. Several smaller CSFs have also been organized on Cape Cod and the South Shore. Some local fishermen also participate in broader Buy Local Groups, such as Sustainable Nantucket.

The Northwest Atlantic Marine Alliance (NAMA) has participated in "throw-downs" at multiple Farmer's Markets events, in order to increase public awareness of threats to the survival of local fishing fleets and to educate consumers about how to cook under-utilized species. Turner Seafoods out of Gloucester and Foley Fish out of New Bedford are two well-known companies that take local fish landings and ship to their own or other high-end restaurants in Boston and elsewhere, including as far afield as Vermont. Red's Best is a new distribution channel company, with innovative reporting and information management technology, that arranges for fish to be landed and distributed to many dispersed restaurants and other customers.

Multiple values appear to drive consumers who are buying local seafood through these channels, including the wish to support local, traditional fishermen and ports, and, because of concerns over unsafe imports, an interest in healthy, fresh fish from clean North Atlantic waters. The Fish Locally Collaborative is developing a "Know Your Fisherman" public relations campaign to increase public awareness about the work and contributions of local fishermen. Accompanying that campaign will be pledges from restaurants and consumers to increase their consumption of local seafood.

A FOCUS ON EQUITY – FOOD POLICY COUNCILS, SNAP ELIGIBILITY, HIGHER WAGES

A growing part of the local food movement, both in urban and rural areas and in Massachusetts, has zeroed in on the adverse distributional impacts of the food system. The agri-business model has brought large profits to corporations and a wide suite of foods to wealthier

populations, but created food deserts in poor neighborhoods and low wages on farms and in packing plants. The result of a cheaper, but high-sugar, diet has been high rates of obesity and associated diabetes and heart problems.

Starting with the formation of Food Policy Councils in cities and towns, social justice and health advocates have organized Farmer's Markets in urban areas, arranged for deliveries of local foods to food banks, and advocated for the expansion of Food Stamp eligibility to include local fruits and vegetables. More recently, they studied the concept of food "prescriptions" from doctors, to help cover the costs of local food.

Other activists have been advocating for fair wages of migrant workers on farms and processing plants.

Seafood

As a relatively high-cost food, there have been less significant inroads of seafood into the food justice movement. However, several recent innovations include a research grant in Rhode Island to develop processing and storage technologies for under-utilized species to be delivered to Food Banks. Other efforts have involved development of value-added products, such as Fish Burgers, that utilize cheaper species of fish and delivery of unprocessed whole fish to ethnic neighborhoods

NAMA has also advocated for higher wages and working conditions in seafood processing plants.

SOCIAL INVESTING AND NEW TECHNOLOGIES

A second movement to reform the food system has been led by investors, with the aim to alert and mobilize the energies of the technology development and start-up community to significant business opportunities in the food system. Recognizing that there are significant challenges to providing enough food to burgeoning global populations in an environmentally sustainable way, many large environmental groups have also partnered in supporting new technology development around precision agriculture that would more accurately target irrigation and the application of fertilizers and pesticides. There is a continued search for seed varieties that would be drought and flood-resistant, as well. Large mono-culture farms have already begun to adopt innovative technologies and apps, but there is a possibility that these new technologies could help small, multi-crop farmers as well.

In general, the investment community has focused on climate change and water quality challenges in the food system, but not been as concerned about the adverse distributional or rural community impacts of technology development and investment.

Seafood

Fish 2.0 out of California is the best-known example of an effort to link investors with the development of new technologies and opening of new markets in seafood. Arguing that seafood is "on the cusp of thoroughly reimagining products, supply chains, and technologies", Fish 2.0 recently identified five trends that are motivating their competitions and the innovative ventures that they fund: "climate change effects, wild fish stocks at a maximum, product globalization and online sales growth, growing health-conscious middle class, and aquaculture expanding rapidly". They see business innovations emerging in: "monitoring systems, better information and gear for fishers, new supply chains for local seafood, and new fish feeds and technologies to boost production in aquaculture".

It is fair to say that while the local seafood movement has focused on strengthening the livelihoods of small-scale fishermen in coastal communities and in developing more ecologically-sustainable methods of wild capture fisheries, Fish 2.0 investors and affiliated foundations have in the past supported catch shares and sharp quota cuts as conservation measures. They are now are endorsing a major pivot away from wild harvesting to a farm-raised fisheries and shellfish aquaculture.

RECENTLY-EMERGING THEMES AND TOPICS IN THE FOOD REFORM MOVEMENT

CEILINGS IN LOCAL FOOD MARKET DEMAND

While the local food movement slowly found its legs in the Farmers Market, CSA, and Food Hub initiatives, more recently that has been a realization that there is a limit to how much of the overall food and farming system can be penetrated or altered through such channels. Because the customer base has been relatively so small, a growing emphasis has been put on opening up and expanding distribution and sales to colleges, schools, hospitals, prisons, and other large institutions. In part this represents a shift to focusing on mid-size farms that are too big for selling at Farmer's Markets, but often not competitive with distant large farming operations with high volumes and low prices. There has also been increasing interest in development of value-added products.

Michael Rozyne, a speaker at the August 2nd conference, is one food system leader who takes the point of view that significant improvements in the farming and food system will only occur in partnerships and ventures with larger network of conglomerate ownership and vast distribution networks. Similar to some of the thinking behind social investing, the goal would be to shift the core of agri-business to more sustainable practices. The value would be in harnessing the substantial logistics, transportation, and safety capabilities and resources within the existing system.

Seafood

While some of the early elements in the local food movement, such as food hubs for assembly and distribution for small-scale operations, have not yet been fully tried in the seafood sector, seafood advocates have also started to look at the ceiling in local customer demand and have begun to explore larger-volume institutional purchasing. The University of Massachusetts at Amherst dining room has an existing contract with Red's Best and there have been brief forays of local seafood ventures into school cafeteria lunches. The Gulf of Maine Research Institute has been arranging deals with other colleges and universities and Gloucester Fishermen's Wives Association has been funded to contract with ten hospitals to purchase locally-landed fish.

VALUE CHAIN COORDINATION AS A FIRST STEP

Many in the local food movement have begun to realize that a very cost-effective step in building a more sustainable local and regional food system is in the hiring of a "value chain coordinator". A food "value chain" is intended to shift a typical food "supply chain" oriented around business success to also incorporate multiple goals of social benefits of farm viability, farmland preservation, healthy food access, and sustainable production methods. USDA and EDA have in the past funded both the construction of buildings to house incubators or food hubs and capital investments in water and transportation infrastructure, often to realize that other necessary pieces of the value or supply chain were missing. A new program called FoodLINC has recently been organized by multiple foundations and USDA, and thirteen communities have received awards so far. The roles of a coordinator are to: match markets, convene and build

relationships, provide technical assistance, raise policy issues, pursue grants, and help test new business models on a pilot basis.

Seafood

The position of a value chain coordinator has not yet been adopted in the seafood sector, perhaps because establishment of such a position would require substantial public-private collaboration at the local and regional level. As stated earlier, the seafood system remains relatively fractured and fragmented.

RECOVERY OF FOOD WASTE

Environmental and food security groups have joined forces in noting that about forty percent of food produced is never eaten, while millions of people still go hungry. Food waste occurs at four stages along the food chain: growers, processers, retailers and consumers. New initiatives are focused on identifying and piloting the means to redirect surplus food to people in need, to equip consumers with strategies to minimize waste, to assist municipalities in composting food scraps that would otherwise go into landfills, and to urge government to adopt waste-reducing policies.

Source: Natural Resources Defense Council, Food Waste

Seafood

Fish 2.0 has recently estimated that 40-47% of landed U.S. fish are wasted, either by discards, processing waste, or consumers throwing away uneaten fish. There is not yet a coordinated strategy to minimize this waste. There are, however, scattered examples of initiatives to make better use of the whole fish. Neptune's Harvest out of Gloucester had worked with UMass-Amherst faculty to turn fish waste into fertilizer, which is now being sold in all fifty states. There are scattered other examples of turning fish skins into dog treats and, as mentioned above, fish burger patties from under-utilized species that often would be otherwise thrown out. Iceland has specialized in efforts to make products out of 100% of landed fish, including conducting research and development on high-end bio-pharmaceutical products such as bandages for diabetics. New Bedford partners have signed on to a partnership with the Icelandic Cluster House to begin work on such efforts. As mentioned in Chapter 2, companies in Gloucester have also been interested in developing processes for chitin recovery and fish waste into lobster bait.

ECO-AGRICULTURE AND SUSTAINBLE FISHERIES AND SHELLFISH AQUACULTURE

Substantial efforts have been made in recent years to develop and spread the use of ecologically-beneficial and natural systems-based farming practices, including organic farming methods, biodynamic farming, permaculture, crop rotations, and rotating livestock grazing based on patterns in wild herds and healthy savannahs. These efforts are intended to enhance the quality of soils and the nutritional value of the food grown on these soils, to reduce runoff of pesticides and fertilizers, to restore wildlife habitat, and most recently, to capture carbon in the soils. Some of these efforts, such as adding a third oat crop into the rotation of corn and soybeans, can produce simultaneous benefits of increased output value, increased employment, and reductions in runoff. Numerous organizations have been formed around promoting these and other practices, conferences have been convened, and an ongoing National Academy of Sciences panel has identified "green" methods as one of the most important "grand challenges" for multidisciplinary research and development.

Seafood

There has been comparatively little serious parallel work on ecologically-sustainable practices in the fisheries. The central foci of fisheries management have been on restrictive allowable catches on single species that show signs of overfishing and on protecting fish habitat and spawning areas. More recently, environmental organizations have advocated for large marine protected areas as a means to restore the biomass and for a lightening of wild capture harvesting by shifting production to aquaculture. But, as described in Chapter 2 and in the section on Systems Thinking below, there has been minimal multi-stakeholder thought put to more holistic fisheries management.

At the August 2 conference, several presentations hinted at new ways of thinking about ecological sustainability of the fisheries. Kate Masury described Eating with the Ecosystem's project to link consumption to a more balanced harvesting of both currently popular and under-utilized species. Anamarija Frankic described the application of "biomimicry" principles that "create the conditions conducive to life", such as restoration of oyster reefs that simultaneously produce shellfish, restore water quality and habitat, and protect the shoreline from storm surges.

Bren Smith of Thimble Island Oyster Co. in Connecticut, has been piloting open ocean polyculture systems that include seaweed, mussels and scallops in a closed-loop recycling of nutrients. There are also a few interesting efforts to develop products and markets for "invasive species", such as green crabs or lionfish. The goals would be both to create new business opportunities and market value, and to remove species that out-compete or consume high-value stocks such as clams, or that destroy coral reefs.

A PIVOT TO THE FARM BILL

A growing focus of the food movement has been on influencing the 2018 reauthorization of the Farm Bill. A major push is on to mobilize allies around strengthening funding for USDA programs that support the local food movement, conservation farming, and rural economic development. Some legislative proposals also incorporate a proposal to reduce funding for crop insurance payments that go disproportionately to large corporate farms.

Senator Sherrod Brown of Ohio and Representative Chellie Pingree of Maine have co-sponsored "The Local Food and Regional Market Supply Act of 2017, provisions of which would constitute amendments to the Farm Bill and that would:

- Create a new comprehensive and streamlined local and regional food economies development program funded at $80 million per year that merges the Farmers Market and Local Food Promotion Program and Value-Added Producer Grans Program and that would include support for farmers markets, farm to retail marketing, local food enterprise development, value-chain coordination, food hubs, planning and feasibility studies, producer-owned value-added enterprises, and regional planning through public-private partnerships.
- Expand the Senior Farmers Market Nutrition Program, pilot a Harvest Health program to demonstrate and evaluate the impact of produce prescription programs and provide regulatory relief to school food procurement, making it easier for schools to procure locally and regionally produced food and farm products.
- Support supply chain infrastructure and expand the Food Safety Outreach Program for small and medium sized family farmers.

Representative Blumeneaur of Oregon convened two years of multi-stakeholder sessions on the food and farming sector, recognizing that a unified vision, voice, and constituency necessary for action had not yet materialized and that incremental gains in sections of the current bill, while they matter, are a fraction of what is needed, merited, and possible. A bipartisan consensus emerged from these efforts in his home state, along with a holistic vision of a new food and farming sector based on new approaches in sustainable and resilient farming that "have the potential and power in growing healthier, more affordable food while meeting an array of needs for health, nutrition, the economy, and environmental conservation, all while saving taxpayer money." Backers of this bill include an interesting set of partners with different objectives and different motivations, including the Union of Concerned Scientists, Human Society of America, Taxpayers for Common Sense, and others.

Representative Blumenauer has proposed a package of reform and increased funding similar to the Brown-Pingree bill, but that in addition would include:

- Greater limits to commodity programs and creation of a new crop insurance program that is more accessible to those who grow fruits and vegetables and focused on those who really need assistance;
- New programs to support beginning and underserved farmers
- Increase in funding for research and development to maximize innovation
- Shift to performance-oriented conservation programs, providing farmers and ranchers flexibility in achieving cleaner air and water, and healthier soil.
- Support for rural communities that treat immigrant workers fairly
- Strengthen nutrition programs and reduce waste

There are several reasons for this new focus of local and sustainable food system advocates on federal policy. The local food movement has had enough success in demonstrating the value to the health and economy of rural communities of small farms, processors, and short supply chains to local customers, that a strong case can be made for increased federal funding to widen and deepen this new arena for rural economic development and food security. Scholars have also noted that there are limits to how large an alternative and parallel food system can become, without mounting an effort to unravel subsidies and restructure the mainstream food and farming sector, as well.

Seafood

The seafood system movement has barely started to integrate into the larger food and farming movement, not only in the sharing of ideas and practices, but also in advocacy for the Farm Bill. Because the seafood sector has been managed largely by NOAA, there has been little thought to how other federal policies and departments might be of greater help. At a minimum, it would be advisable for advocates to urge that "seafood" be listed as eligible for all USDA funding and research, while acknowledging that management of the harvesting side would remain with NOAA-Fisheries.

SYSTEMS THINKING

In recent years, there has been increasing attention to the food and farming sector as a complex and internally dynamic system, as opposed to just a sum of its parts. This new focus is important, because significant improvements or changes can only be accomplished when these interactions and triggers or blocks are understood and addressed or leveraged. An innovation in one new product or practices, while valuable in its own right, will have minimal impact on transforming the larger sector.

The fields of systems thinking and economics, more generally, have generated a number of perspectives on the internal dynamics of systems. A variety of these have been applied to the food system, including:

1. Track impacts across the entire system –

   What are the multiple impacts of any new technology, product, or market on economic viability, environmental health, community well-being or public health?

   "Decisions that affect one part of the food system may have unexpected consequences beyond their original intent. The food system is complex and adaptive – composed of many different pieces whose interactions drive behavior in ways that cannot easily be understood by considering any one component separately. Studies to inform food and agricultural decisions, therefore, require an analytical approach and methodologies capable of considering the full range of key interactions, adaptations, and other features of complex systems."

   Source: Institute of Medicine and National Research Council, A Framework for Assessing Effects of the Food System

Seafood:

Failure of fisheries managers and environmental advocates to foresee the adverse impacts of groundfish quota cuts and catch shares on total landings, fleet viability and ports is an example of compartmentalized thinking focused only on managing "overfishing".

2. Lock-ins of technology or policy

   Are there reasons why successful initiatives will not be able to "scale up" into any major significance or larger market share, because too many parts of the industry and too many constituencies who benefit from the way it is, block change? If so, collaborative shifts or multiple, interlocking parts of the industry may be required all at the same time.

"Industrial agriculture is perpetuated or locked in by attitudes and policy frameworks around export promotion expectations of cheap food, feed the world narratives, compartmentalized thinking and short-term thinking, measures of success – around total yield, and concentration of power from those who stand to benefit from current policies. Benefits of agro-ecology systems that are typically under-valued include high total outputs, high nutrient content of outputs, resilience to shocks, provision of ecosystem services, high resource efficiency, and job creation."

Source: IPES Food, From University to Diversity: A paradigm shift from industrial agriculture to diversified agro-ecological systems

Seafood:

Economists also focus on the problem of technology lock-ins, where a new product can't sell because the ancillary technologies or maintenance services are not provided in the market. For example, there may be limited demand for remote drones or genetic sampling of fish and water samples, if fisheries scientists lack the methods or mandate to consider such new data sources.

3. Information gaps and asymmetries

   Is lack of information across all parts of the industry a barrier to small farmers processors, in particular, and in comparison to vertically-integrated food

corporations that can fairly easily plan and benefit from innovations in the supply chain?

At a recent National Governors Association panel discussion about the food system, Growing Food, Growing Economies: A Journey From Field to Fork, it was noted that small farmers typically have little understanding of the shifting tastes and preferences of consumers in the burgeoning healthy and local food movement or of the interests and motivations of chefs who often lead in these trends. Neither do they have the time to invest in gaining this information. In contrast, large, vertically-integrated food companies have staff that collaborate internally and externally with suppliers, customers, and academic institutions.

In addition, "Quite often…the innovation takes part in one part of the value chain and the benefit is in another part of the value chain. So unless you're a vertically integrated business….you're not going to innovate, are you?"

Source: National Centre for Universities and Business, Science and Translation of Innovation in the Food Economy

Recognizing the competitive advantage that agri-business has in internal knowledge and activity across the supply chain, publicly-funded food incubators, such as at Rutgers University, have been established with a mission specifically to help small farmers and food processors with access to knowledge and expertise and to facilitate new business partnerships

Seafood:

The relative lack of information that fishermen have about the processing sector and consumer demand, and, conversely, the lack of information by chefs and institutional buyers about what choices would most help local fishermen are both barriers to opening up new markets for underutilized species.

4. Resilience and tipping points

   Is the food system resilient to external shocks, such as droughts and crop loss or competition from low-cost imports, or if not, what measures could be taken to enhance resilience?

Definition of Fishing Community Resilience: "The ability of a fishing community to withstand, recover from, and successfully adapt to change. In this context, change may occur over a broad spectrum of environmental, social, and economic conditions, caused by sudden disasters, regulatory changes, consumer and market shifts, or more gradual events such as climate change."

Source: NOAA Fisheries' Greater Atlantic and West Coast Region Study Group on Fishing Community Resilience – Fall 2015

"A resilience strategy does not guarantee short-term stability, but rather survivability of the system's essential functions in the long term. Resilience is often an emergent property of the system."

Source: Langstaff, et al., Building Resilient Communities: A Preliminary Framework for Assessment

Among qualities of communities that are resilient are these:

- "Diversity: Broad diversity of race, culture, gender, skills, income, and history helps a community or utility to have increased capacity to understand change, innovate in the face of change, and provide perspective to change or disruption

- Connectivity: During times of stress, communities that are connected are better able to adapt to changing conditions. …. Thus a key strategy for social resilience is to connect the highly-connected nodes in a community before an event. Government officials, community leaders, cultural leaders, and opinion leaders in business, environment, and social equity should be well-acquainted with each other to leverage each's network of trusted contacts and advisors
- Story: Tell the story of the place to foster understanding of complex adaptive systems and to reinforce the social connections and identity of residents, employers, and employees.

  The story we tell ourselves about ourselves is fundamental to identity and culture. In fostering a resilience ethic, the story becomes the framework upon which expectations and anticipations about 'what's next' evolve. Understanding that we are in a complex continually adapting world can become a framework for how we give meaning to shocks, shifts, and gradual change. These stories become the foundation for identity -- and identity is an important element in the definition of resilience. Resilient systems adapt to change while retaining their identity.
- Trust. …. a fundamental building block of social life. Without trust, a system cannot provide consistency during times of stress and change. When the rules bind a system such that it cannot adapt, then rules may make a system brittle which can lead to failure.
- Self-organizing. If all operations are centralized, a system reduces its capacity to adapt to variability and decision-making at higher levels can become a bottleneck. Thus self-organizing systems and sub-systems that have operational autonomy are much more able to make decisions in the field to address emergent issues in a timely manner. Broad guidance, shared values, and authority to act throughout the organizations are essential for a system to be adaptable and flexible to change over time.

Source: Steve Moddemeyer, Eight Qualities of Sustainable Communities

Seafood:

The resilience of the MA groundfish fleet depends on the strengthening of these features, including involvement of a wider diversity of stakeholders, creation of a shared story, rebuilding of trust, and greater local control.

5. "Wicked systems" and grand challenges

   What are some of the grand challenges (see also Chapter 4 sections on UMass participation and breakthrough innovations) that should be addressed or solved through collaborative discussions and research, pilot projects, and experimentation?

The committee will gather insights from scientists and engineers in the traditional fields of science in food and agriculture, seek ideas from scientists in other disciplines whose knowledge, tools, and techniques might be applied to food and agricultural challenges, and organize interdisciplinary dialogues to uncover novel, potentially transformational, approaches to advancing food and agricultural science.

What are the greatest challenges that food and agriculture are likely to face in the coming decades?

Source: The National Academies of Sciences, Engineering and Medicine: "Science Breakthrough 2030: A Strategy for Food and Agricultural Research"

6. Scientific Revolutions -- Thomas Kuhn

> Are food system-related ecological, economic, and behavioral sciences increasingly disconnected from on-the-ground realities?

Thomas Kuhn's Structure of Scientific Revolutions, released in 1962, asserted that increasing "anomalies", where real-world data increasingly do not match theory in normal science, have historically led to new theories or "paradigm shifts" in how scientists understand and predict predict what happens in the real world. Concepts of breakdowns in conventional wisdom, as it increasingly fails to represent the truth, have been applied in the natural and social sciences, including in economics.

Seafood:

Arguably, the increasing breakdowns and disconnects between both the stock assessment models and predictions and the market-based "Tragedy of the Commons" theories underpinning catch share initiatives and the realities that fleets and ports are experiencing, are signs that more work is needed to develop and explore alternative theories of ocean ecosystem and socio-economic dynamics and science.

Systems thinking projects are an increasing priority for academics, industry, advocacy groups, and government leaders, not only in food and farming, but also in water, energy, and other sectors, as seen in National Academy of Sciences, National Science Foundation and university-based multidisciplinary, multi-stakeholder projects. There are even efforts to merge sectoral systems thinking at a higher level, such as around the "food, energy, and water nexus."

Clearly, since so little of this approach has penetrated or mobilized work in the fishing and seafood sector, it should be a top priority for multi-stakeholder collaborative efforts going forward. Working through the internal dynamics of the seafood sector can help immeasurably in identifying the priority initiatives and strategies that collectively would create the conditions for a transition or shift to a significantly more productive and resilient system.

Chapter 4

ROLES FOR STATE GOVERNMENT, PORTS, AND THE UNIVERSITY OF MASSACHUSETTS IN THE MA SEAFOOD SYSTEM

In Chapter 2, a broad consensus emerged from state and port-specific reports and interviews about both the causes of recent declines in the fishing industry and the multiple opportunities for growth and development. In Chapter 3, the lag of innovation in seafood behind the larger food and farming movement nationally was described. Both of these perspectives point to a significant opportunity to rebuild and advance the MA seafood system. The question for this chapter is the appropriate roles for state government, ports and the University of Massachusetts in stimulating and supporting this growth.

A central insight of this project is that multiple innovations and pathways to economic development have been recommended by participants in the seafood system but "languish on the vine", for lack of focused planning and targeted public investments at the state level, in ports, and in the University of Massachusetts system. While the State has initiated important work in seafood marketing and stock assessment research, and several ports have developed branding and local marketing initiatives, these do not yet match the scope and scale of what is called for or that has been developed in the larger food and farming sector across the country. Entrepreneurs and potential start-ups also fail to make progress for lack of viable business plans and financial resources, due to the controversial quota cuts and bleeding of resources out of the industry through quota "rents".

This report provides consensus-based proposals for specific public sector roles and responsibilities in Massachusetts that will collectively and cost-effectively move a seafood system development and innovation agenda forward.

THE BAKER-POLITO OPPORTUNITIES FOR ALL STRATEGY AND PLAN

The Baker Administration's economic development strategy from December, 2015 provides a template for institutional strategies and investments that are attuned to the particular needs and opportunities in the state. Fishing and fish processing are identified as one of the traditional "clusters" of comparative advantage nationally and with significant markets for product both nationally and internationally. The backdrop to the plan is the need to invest in regions that have not kept up with the dynamic high-tech, research-oriented economy of the Boston metro area and to capitalize on the unique historical and potential assets of the less advantaged local and regional economics, including ports along the coast.

The plan is intended to be used "to develop and shape specific initiatives that will respond to issues, themes, and priorities highlighted in the plan". This project is a necessary first step in that exercise. Specific initiatives and recommendations will emerge from port and UMass planning exercises, as described below.

Highlights of the report include:

- A Vision for the Commonwealth that supports economic prosperity for **citizens**, economic vitality for **communities**, and economic growth for **businesses**
- All parts of government working together through **coordination among state agencies**
- Seven priority areas, including four that relate directly to the MA seafood system: preparing communities for success, fostering **a culture of innovation and**

entrepreneurship, workforce development and talent retention, and **supporting key clusters and industries**

- The Commonwealth as partner with willing communities and regions to **invest in people, infrastructure, and planning**
- Drive regional economic opportunities through **partnerships with private, public and institutional actors,** including partnerships between businesses and the state university and community college systems.
- Invest in, and leverage, human capital in communities through **strategic engagement with elected officials and community-based organizations**
- Provide public funding for **public infrastructure** that leverages and promotes private sector investment, economic development and job creation
- Build leadership and local capacity through **technical assistance** and programs that empower community-based organizations
- Engage the **University of Massachusetts** system as regional stewards of research, innovation, entrepreneurship and economic development
- Develop and sustain supports for a broad range of small businesses, from **traditional businesses, to innovative start-ups,** to the creative economy
- Grow a statewide community of innovation by supporting **locally grown innovation districts**, representing tech, manufacturing, food, art, etc. and including a diverse community of active participants
- Pair capital access initiatives with **business technical assistance** programming to ensure that community-based entrepreneurs have the technical skills they need
- Strengthen both established clusters and engage cluster leaders to **identify cross-cutting issues and opportunities**
- Support emerging clusters and foster connections among sectors to spur innovation
- **Foster multi-stakeholder collaborations** and aid in data and strategy development
- **Deepen local supply chains** and facilitate local sourcing
- **A primary role for the state in identifying unmet needs in clusters, convening clusters, providing research and data**

In sum, the Baker-Polito plan describes a role for the state in developing traditional and emerging clusters, such as the fishing industry, in convening collaborations and partnerships, in focusing on and developing leadership in local communities, in encouraging University of Massachusetts engagement, and in funding technical assistance, planning, business development, and capital infrastructure. Or, as Lt. Gov. Karen Polito said at a recent event announcing a Blue Economy grant to New Bedford, the state hopes to "unleash" the seaport economy by supporting local leadership, people, and places.

The plan also describes the need for coordinated assistance from multiple state agencies, many of which would be significant sources of planning and infrastructure support, in particular for the fishing cluster, from the Seaport Economic Council and Mass Office of Business Development. Other agencies and programs include the Seafood Marketing Commission, the Advanced Manufacturing Collaborative, and the Life Sciences Center.

Each of the roles for state government, local communities, and UMass are described in more detail below, along with examples from the food and farming sector in other states.

An Expanded Commitment to the MA Seafood System from State Agencies

While most funding for local and regional farming and food investments and strategies has been from USDA and the EDA-Department of Commerce, there are some states that have played an active role in promoting the sector. These examples suggest that the Commonwealth could do a great deal more to catch up in supporting economic development in the fishing industry. States may not be the central lead and should not anticipate total control over a seafood system development agenda, but it should encourage and financially support the innovative ports, entrepreneurs and academics within the state. State officials also have a unique position to signal to stakeholders the importance of collaboration and to require networking and partnerships as a condition of future grants.

The National Governor's Association

A session at the summer NGA meeting held in Des Moines, Iowa in 2016 focused on the value of supporting the local food system and value chain. Panelists spoke of the benefits to both farmers and rural communities from linking participants along the value chain. Small farmers who lack time or knowledge of emerging markets. Chefs are helping to shape consumer demand and restaurants are part of successful downtown redevelopment efforts. One role of state government in the food economy is in creating opportunities for collaboration and information-sharing.

Source: NGA, July 2016 panel, Growing Food, Growing Economies: A Journey From Field to Plate

STATE ENGAGEMENT

Washington State staff are taking the lead in coordinating a Blue Economy partnership with the University of Washington and Port of Seattle to develop a Washington Maritime Blue 2050 initiative. Funded by the U.S. Economic Development Administration's (EDA) Regional Innovation Strategies (RIS) program, Washington will use the grant funds for three main objectives: 1) set the course for sustainable maritime industry innovation, 2) support strong blue tech cluster coordination, formatting strategic alliances, growth in trade, and increased jobs, and 3) support development of a maritime innovation center in partnership with the Port of Seattle and the University of Washington. The initiative includes sustainable fisheries and green ports and boats in its list of needs and opportunities.

New Jersey state government, since the late 1990's, has been a major partner with Rutgers University in investing in and promoting the local food system. The focus has largely been on incubator services to small farmers and processors. Development and job creation in the food system has been so successful that the statewide economic development initiative, "Choose New Jersey" has ranked jobs and entrepreneurship in food and farming as a high-priority for the state, with the same priority as life sciences and health care.

Rhode Island has also designated the food system, including seafood, as one of its priority economic development sectors and has recently hired a local food policy coordinator for state agencies and outreach. Rhode Island has included seafood as an eligible category in state infrastructure investments, research project funding and training programs. A stated intention is to move to an industry that supports multiple dimensions of ecological, community, and public health sustainability.

Vermont has funded the "Farm to Plate" network, an effort of over 350 businesses, non-profits, government agencies, capital providers, and educational institutions since 2002. Priority areas of work have been: protecting and expanding sustainable farmland, improve viability of farms

and food businesses, increased local food availability, increased consumer demand and positive work environments. Since 2007 gross food system sales are up 32%; 5,300 new non-farm food system jobs were created; and food manufacturing has been the highest growth manufacturing sector in the state.

Iowa established a food and farming working group and funded regional food system coordinators and research programs in Iowa State University's Aldo Leopold Center for Sustainable Agriculture. Studies have shown that this assistance has helped in the growth of the local food system and rural economy.

Maine, not surprisingly, has a dense network of fisheries and farming organizations, non-profit research and advocacy groups, financial assistance providers, and academic programs in the University of Maine and other colleges. The State of Maine has been a major partner and funder in developing the Maine Food Strategy Framework and Food Strategy Councils, the Portland food manufacturing projects, and a variety of Innovation Challenges and studies. State government has also prioritized marine aquaculture as a key emerging industry. The Maine Food Strategy has also adopted a framework of multiple values, including economic development, healthy Maine environment, vibrant communities, and healthy food for all. As described more fully below, stakeholders have also highlighted the importance of collaboration and networking.

COLLABORATION

As suggested in both Chapters 2 and 3, the Commonwealth has not yet developed the dense multi-stakeholder networks that are necessary to advance the MA seafood economy. In Maine's Food Strategy, for example, these three priorities were described as critical to advancing the identified goals and objectives:

- Network building – convening organizations around common needs and interests; seed opportunities for collaboration
- Keeping the whole system in view: Promoting deeper public awareness of the interconnectedness between food system components and their impact on public, community and environmental health and well-being;
- Demonstrating the value of collaboration: showcasing how and where coordinated approaches can help us more effectively address areas of opportunity and concern.

The Hardwick, Vermont based Center for an Agricultural Economy suggests "We're building a food system for the 21st century and it's going to need to be diverse and community-based, one that's grounded in knowing each other, in providing for each other and in sharing our stories and our practices with one another."

There are a number of different ways in which collaboration is advancing growth and development in the food and farming sector:

<u>Value chain coordination</u>

Sharing information, developing a common vision, and developing business partnerships

Benefits: While large corporations can internally organize information-sharing across the supply chain, small farmers or fishermen, processors, and distributors along with buyers, chefs and consumers need help from an active coordinator who facilitates the conversations and collects and disseminates the information.

August 2 Break-outs: A majority of the recommendations for specific projects dealt with innovations along the supply chain that would need collaborative input, including:

transparency, developing markets to match sustainable catches, and rebuilding consumer trust.

Conferences and Convenings:

Multi-stakeholder gatherings as an essential part of developing knowledge and partnerships in clusters and providing the space for long-term systems thinking for building a consensus around reform initiatives.

Benefits: Developing an understanding of the seafood system and potential breakthroughs requires the input and perspectives of the multiple participants in the sector.

August 2nd Break-outs: A major recommendation was for continued convenings and dialogue through hosting of workshops and seminars, bulletin boards, conferences and other dialogue led by UMass and other partners, and potential formation of a sponsoring organization to mobilize a long-term work agenda.

Narratives and Story-Telling

Weaving of stories that convey important information and engage both stakeholders and the general public

Benefits: A common multi-stakeholder narrative is important for mapping pathways forward, but also for developing a broad alliance, including with broad public support, for an agenda of investments and reform.

August 2nd Break-outs: A recommendation was for "sharing of stories" and Michael Rozyne, in his talk, pointed out that people depend more on stories and emotions than they do on facts and information.

Research and Capstone Projects

Transdisciplinary research and engagement of other stakeholders in the identification of "grand challenges" and pilot projects

Benefits: Failure to include industry and citizens in the work of academics and fishery managers means that substantial insights are ignored

August 2nd Break-outs: Recommendations were for multi-stakeholder innovation centers and whole seafood system research initiatives.

Partnerships in Investments and Strategies:

Federal, state, local, foundation and private sector participation

Benefits: Pooling of funds for projects and collaborative policy discussions.

August 2nd Break-outs: Innovative financing was recommended with more than just banks, and philanthropists. Also include community-funded institutions, insurance partners, and government grant programs.

Alliances and Advocacy:

Multi-stakeholder participation in both formulation of priority initiatives and policy reform and of advocacy efforts

Benefits: The wider and deeper the participation of stakeholders, the more government and foundations will pay attention to the seafood sector.

August 2nd Break-outs: A recommendation was made to encourage the fishing community to lobby politicians for budget allocations to communities, public universities, and innovators and for policy initiatives and reform.

HOW TO MOVE FROM A FRACTURED SEAFOOD SYSTEM TO A COLLABORATIVE SYSTEM

As has been mentioned earlier in the report, there is significantly less collaboration and networking in the Massachusetts seafood system than in the larger food system in Massachusetts or nationally, for a variety of historical, cultural, and ideological reasons. Distrust has been created between the industry and federal fishery managers. The industry and advocates are opponents on catch share provisions around consolidation caps and transparency of quota leasing. The result is a failure to find common ground on a host of other policies and projects that would advance a common interest in a sustainable local seafood system.

Michael Rozyne, Red Tomato

The first keynote speaker at the August 2 conference, Michael Rozyne, directed much of his talk at the importance and means to build collaboration, based on his work in the food system, first as a founder of Equal Exchange Coffee and more recently as owner of Red Tomato, a distribution company for New England fruits and produce. Rozyne described lessons he had learned about bringing people together to work on innovative solutions, for example in integrated pest management, even though there were differences in views among partners on the politics and policies of the wider food system. He spoke in particular about the following recently-released book.

Adam Kahane, *Collaborating with the Enemy: How to Work with People You Don't Agree with or Like or Trust*

This book stresses the necessity of collaboration of stakeholders if progress is to be made and describes a number of principles for understanding what is involved in building a collaborative network.

Listening

Rozyne asked the audience to think about how they listened to the presentations and to each other during the day, citing the typical way we listen to each other: *downloading* -- "I knew that already". He encouraged everyone to be open and aspire to with increasingly productive other ways of listening: from *debating* – a clash of ideas between different points of view; to *dialoguing* – listening emphathetically to others; and ultimately, to *presencing* – or openly listening to the ideas that are emerging from the larger group. It is in this larger space of listening and paying attention where creative ideas emerge.

Conventional, Constricted Collaboration Becoming Obsolete

The conventional approach is: "First, smart people think through the problem and the solution and make a plan to execute this solution. Second, they get the people in authority to approve this plan. Third, the authorities instruct their subordinates to execute this plan" in what would be called a "rationalistic, linear, hierarchical model".

Collaborating in complex and contentious situations

"Participants do not agree on what the solution is or even on what the problem is. They each have their own truth about what is going on and why, and who needs to do what about it. The construction of a single agreed-upon model of the whole situation is often not possible.

Collaborating with diverse others therefore cannot and must not require agreeing on a single truth or answer or solution. Instead it involves finding a way to move forward together in the absence of or beyond such agreements."

Recommendations for "stretch collaboration":

"First, in how we relate with our fellow collaborators, we must stretch away from focusing narrowly on the collective goals and harmony of our team, and move toward embracing both conflict and connection within and beyond the team.

Second, in how we advance our work, we must stretch away from insisting on clear agreements about the problem, the solution, and the plan, and move toward experimenting systematically with different perspectives and possibilities.

And third, in how we participate in our situation – in the role we play – we must stretch away from trying to change what other people are doing, and move toward entering fully into the action, willing to change ourselves.

Stretch collaboration is challenging because all three of these stretches requires us to do the opposite of what seems natural."

Finally, Kahane suggests that stakeholders can both maintain their independence and critical stands on issues, in opposition to each other, while also agreeing to participate in collaborative meeting spaces where there is potential for new insights and experiments to emerge.

Potential collaborators at state and local levels

Northeast Seafood Coalition
Massachusetts Fishermen's Partnership
Cape Cod Fishermen's Association
Mass. Lobstermen's Association
Mass. Oyster Association
Northwest Atlantic Marine Alliance
Real Food Challenge
Food Solutions New England
Health Care Without Harm
Massachusetts Food Systems Collaborative
Resilient Rhode Island
Gulf of Maine Research Institute
Farm to Institution New England
Wallace Center, Winrock International
Conservation Law Foundation
Environmental Defense Fund
Nature Conservancy

Guidance Documents for Collaboration:

Adam Kahane, Collaborating with the Enemy: How to Work with People You Don't Agree with or Like or Trust

Tracy Mehan, Symphonic Governance

MSU Center for Regional Food Systems, Creating Change in the Food System: The role of regional food networks in Iowa

Learning from Practice Stories and Reflective Practice: A Narrative Analysis of -Community-based Activism by Common Food System Practitioners

Miranda Frischer, testimonial injustice

Michigan Good Food Summit, Evaluating Food Systems Change Through Stories

Alison Hope Alkon and Julie Guthma, The New Food Activism: Opposition, Cooperation, and Collective Action

William Clark, Linking Knowledge with Action for Sustainable Development

Presencing Institute

Eastern Michigan University summit, Resetting the Table, from Awareness to Action – social inequity, facilitated group discussions that include learning, dialogue, and collective visioning

Next steps for the MA seafood system:

multi-stakeholder conferences convened

value chain coordinators hired in ports

UMass transdisciplinary challenges identified

PORTS

Fishing ports need to be a central locus of collaboration and investment in the MA seafood system, with state and federal government funding and support of these efforts. Each port in Massachusetts has unique assets and opportunities, for example in their access to different fishing grounds. New Bedford and Gloucester are also full-service ports, with needed services in engine repair, marine railways, gear, ice provision, insurance, fish auctions, processing, etc. and with the presence of a UMass campus in South Dartmouth and a reopening UMass Amherst marine lab at Hodgkin's Cove in Gloucester. Others, such as Boston, have large numbers of consumers who would potentially visit a public market, or like Provincetown, have more isolated year-round populations to provide with fresh fish.

Each port as a first step should be expected to hire a full or part-time coordinator to pull together a collaborative network or steering committee and to oversee an economic assessment and development of a consensus strategy and plan. There are three commonly-used frameworks for developing port strategies and plans, this regard: cluster economic development, value chain coordination, and community wealth-building and placemaking. A second step would entail funding by the Seaport Economic Council and other state agencies, in partnership with federal, local, foundation, UMass and private sector funding, as indicated, in a series of needed capital improvements, programming of business and technical services, and other port-based projects and initiatives, as identified in these plans.

Templates for Port Planning

A. Cluster Economic Development

The Baker-Polito economic development strategy "was informed by ongoing engagement with the Harvard Business School and MIT", where there has been significant work on the strengths and importance of economic "clusters". The founder of this work was Michael Porter at the HBS, who articulated the follow descriptions of clusters:

"In advanced economies today, clusters of related industries, are the most sustainable source of jobs, income and export growth.

A cluster is a group of companies sharing local resources, using similar technologies, and forming linkages and alliances. These linkages can take the form of buyer-supplier relationships, turnover and "pirating" of employees, joint marketing, training, or research initiatives, associations, and lobbying. One of the unique features of cluster analysis is the focus on linkages between firms and on implications for shared strategies – often called "Co-opetition" – in which companies selectively compete in some respects (say, in output markets) yet cooperate in other respects (say joint training programs).

The most successful clusters are not only characterized by strong linkages between firms, but also between the private sector firms and the mainly public-sector providers of important local sources of competitive advantage – schools, universities, research centers, venture capitalists and regulators. Thus regions that have mastered the art of public/private collaboration are more likely to be attracting and growing dynamic, competitive clusters.

Economic infrastructure in support of clusters includes: human resources, technology, finance and capital, business climate, physical infrastructure.

Collaborative problem-solving is the only way to develop and effectively implement regional competitiveness strategies."

Source: Michael Porter – Leadership, Competition, and Economic Development: Local Clusters in a Global Economy, "Economic Development Quarterly", February, 2000

EDA in the US Department of Commerce has encouraged communities to support their unique "clusters" and has invested for years in local and regional planning and capital improvement projects, including public works infrastructure and buildings for incubators and innovation centers, that are nested in a cluster framework.

Case study: Portland, Maine Food and Seafood Cluster

Caroline Paras, formerly of the Greater Portland Metropolitan Area Planning Council, spoke at the August 2nd conference about Portland's successful multi-year effort to secure federal and state funds for the implementation of a cluster strategy in food and seafood manufacturing. Several years after their initial proposal to EDA to start work on developing this strategy, they have been awarded nearly $50 million in government grants for capital infrastructure and programmatic support to their partners.

Portland's cluster strategy has rested on the basic elements and goals of:

- Collaboration – an initial steering committee was formed of "champion" organizations specializing in various pieces of the strategy
- Infrastructure – Port of Portland investments in a modern terminal, parking lots, transfer facilities, rail connections and a cold storage warehouse
- Research and development – New England Ocean Cluster House bringing industry, academia, and government together around research and commercialization, including new products from typically wasted parts of fish
- Workforce development – career pathways for Culinary Arts, Food Science and Mechanical Engineering
- Supply Chain Support – St. Joseph's College food hub that combines a working crop and livestock farm, venture enter, poultry processing facility, and event and classroom space

- Trade and investment – Fork Food Lab, a membership-based commercial kitchen incubator and tasting room
- Capital Access – Local Food, Local Finance round tables with community banks, Maine's community development finance institution and the Finance Authority of Maine, leading to a stand alone fund for food manufacturers

B. Value Chain Coordination and Investment

"Creating systems change to move towards a more community-based food paradigm in Iowa requires an unprecedented level of collaboration, communication, and trust building across organizations, food businesses and industries, educational institutions, and government.

Functions and key benefits:

- Information hubs to create solutions for value chain partners
- Catalysts for cooperation across diverse interests to create solutions for food and fiber producers and businesses
- Magnets that attract funding and leverage, channel, and distribute funding for research and development of differentiated products
- Scouts that identify emerging value chain opportunities with high potential to deliver economic benefits to sustainable agriculture stakeholders

Increased credibility that helps change the customs and practices of supporting organizations, institutions, and government and increased influence on public policies that better support regional food systems."

Source: Creating Change in the Food System: The role of regional food networks in Iowa

Building strong, trusting relationships

It takes time for people to really understand learn what it takes to work in a networked way…you can't rush the process". Ellen Kahler from the Vermont Farm to Plate Initiative. It wasn't until year three of their network that people started to feel like they "get what it means to really be in a network".

The importance of building trust – This is likely the task that takes the most time.
"Change begins and ends with relationships and a big part of systems change is rewiring and bringing greater depth (trust) to existing patterns of relationships."
Source: You Can't Rush the Process: Collective Impact Models of Food Systems Change

Case Study:FoodLINC -- (Leveraging Investment for Network Coordination)

A food systems initiative, mentioned in Chapter 3, is spearheaded by USDA and philanthropic partners to increase farm viability and food access by linking farmers to local markets.
$2.7 million in USDA funding, $2.8 million from philanthropies – including Gates Family Foundation, RSF Social Financial, and others
The food value chain may look a lot like a traditional supply chain on the surface, but

- Businesses intentionally structure their core operations to produce both financial success and social benefit
- Shared mission and operational values support decisions and processes – such as farm viability, farmland preservataion, healthy food access, sustainable production methods

"It's not about infrastructure, it's about relationships! -- "The best investment is often in human capital" – i.e. value chain coordinators

The roles of value chain coordinators include market matchmaker, convener/relationship builder, technical assistance, policy thought leader, resource prospector, catalyst/innovator.

C. Community Wealth-Building and Placemaking

Wealthworks projects are oriented around boosting stocks of eight types of capital, increasing the local ownership and control of that capital within the region, and improving livelihoods. The eight types of resources to strengthen include:

- Individual capital – existing stock of skills, understanding
- Intellectual capital – the existing stock of knowledge, resourcefulness, creativity and innovation in a region's people, institutions, organizations, sectors
- Social capital – the existing stock of trust, relationships, and networks
- Cultural – the existing stock of traditions, cusotms, ways of doing, and world views
- Natural – natural resources
- Built capital – existing stock of constructed infrastructure, for example, buildings, sewer systems, broadband, roads
- Political – existing stock of goodwill, influence and power that people, organizations and institutions can exercise in decision-making
- Financial resources – monetary resources available in the region for investment

"Wealthworks value chains rely on a "woven" network of many actors, or "partners" Each partner plays a role in producing and delivering products and services to the market. A value chain is not self-organizing and doesn't happen by accident. A coordinator might be an organization, a public agency, a team or a business, but coordination must be an intentional effort, and must be considered a real part of their job and responsibilities.

Value chains are initially brought together by self-interest – and strengthened by shared and common interests. But while they often begin as transactions or financial relationships, many evolve and partners begin to see a shared and/or common interest in advancing the value chain and its benefits to the community."

Source: Measuring Rural Wealth Creation: A Guide for Regional Development Organizations

Case study: Port Orford, Oregon

The Southwestern Oregon Food Systems Collaborative was formed, with the WealthWorks framework, to build new locally owned, mutual-aid supply chains across market gaps that "have formed in the wake of the region's near-total focus on global commodity exports". As a result of these deliberative processes, Neighborworks Umpqua received a two-year "value chain construction" grant for a 20,000 square foot multi-use dock facility, twice the size of the port's older cannery, that will include new retail, tourism, and smaller-scale processing space in addition to meeting growth needs of an existing commodity-market anchor tenant

Newcomers include two fresh fish retailers and one entrepreneur needing fresh seawater for live fish sales, sea urchins, and sea vegetable dulse (seaweed). In finding local business solutions to local business problems, such as fish waste, SeaCoast Composting takes fish waste local dairy and forestry waste.

Other guidance documents for local assessments and development of strategic plans include:

USDA, Economics of Local Food Systems: A Toolkit to Guide Community Discussions, Assessments, and Choices

USDA, Regional Food Hub Resource Guide

Regional Food Solutions and Michigan State, Food Innovation Districts: An Economic Gardening Tool

ICMA and CRFS, Growing Local Food Systems: A case study series on the role of local governments

Eco-Trust, Oregon Food Infrastructure Gap Analysis: Where Could Investment Catalyze Regional Food System Growth and Development?

Economic Competitiveness Group Methodology: What is a Cluster?

Maine, How to Set Up a Test Kitchen

Wealthworks, Connecting Community Assets to Market Demand to Build Lasting Livelihoods

Project for Public Spaces, 8 Placemaking Principles for Innovation Districts and Toward Place Governance

Iowa State University, Determining Factors for Local Food System Success

EDA, Collaboration Junction, What's Your Function: Partnerships that Drive Results in Advanced Manufacturing

ICMA and MSU, Growing Local Food Systems: A case study series on the role of local governments

Anthony Flaccavento, Building a Healthy Economy From the Bottom Up

Michael Shuman, The Local Economy Solution: How Innovative, Self-Financing Pollinator Enterprises Can Grow Jobs and Prosperity

Irena Knezevic, editor, Nourishing Communities: From Fractured Food Systems to Transformative Pathways

New Leaf Publishing, Finger Lakes: Agriculture Industry Clusters

In summary, ports should request state funding for a one to two year planning effort, including these steps:

- Hire coordinator (full or part time)
- Identify partners and create a collaborative steering committee, including and UMass
- Collectively define vision and values for the port
- Establish the boundaries and potential niches in the seafood economy
- Assessment of these niches
- Identify gaps and needs for cluster-related investments
- Identify sources of funding and potential partnerships of federal, state, local funding sources
- Draft grant applications for programs and infrastructure reflecting the established needs and opportunities of the port

UNIVERSITY OF MASSACHUSETTS

Two key economic development plans issued by the Commonwealth of Massachusetts and a recent report from the national Association of Public and Land-Grant Universities (APLU) together point to a major potential for the University of Massachusetts campuses to play in the rebuilding and growth of the MA seafood system.

Each of these documents recognizes that the particular shape and contents of a "blueprint" for a UMass presence in the seafood sector must be tailored to the particulars of the industry and the capacities and interests of the campuses. While there are a number of particularly well-known and exemplary departments in the UMass system, including in particular the School for Marine Science and Technology at UMass-Dartmouth and the Department of Food Science at UMass-Amherst, there are a host of other schools, departments, and faculty members within the five campuses that have some faculty at least occasionally working on fishing industry topics or that could be mobilized further in a variety of ways. These include at UMass Amherst the Stockbridge School of Agriculture and the Department of Environmental Conservation, at UMass-Dartmouth the Public Policy Program and Business Schools; at UMass-Boston the School for the Environment, Seafood System Collaboratory, and Urban Harbors Institute. In addition, there are numerous faculty in economics, public health, arts and culture, and other departments that could be brought into transdisciplinary and incubator projects.

A preliminary list of topics was identified in both interviews and break-out group discussions. Needs for technical and business support to the seafood sector:

- Consumer education
- Technological expertise – processing, boats, gear
- Financing
- Institutional markets
- Traceability
- Fisheries law
- Market research
- others

Cross-cutting themes for breakthrough innovations:

- UMass as a "convenor" of ongoing multi-stakeholder dialogue
- Capstone projects with communities
- Resilience research
- Consumer – tastes, preferences, narratives
- Stock assessments
- Environmental restoration
- Place-making and innovation

These themes should be viewed as suggestive and just a start.

The Baker-Polito Opportunities for All Strategy and Plan for Making Massachusetts Great Everywhere – December, 2015

The plan recognizes the necessary role of the University of Massachusetts campuses as "engines of dynamic regional growth", and commits the Commonwealth to strategic goals including:

- "engage the University of Massachusetts system as regional stewards of research, innovation, entrepreneurship, and economic development"

- "advance the competitiveness of Massachusetts industries through strong partnerships with institutions of higher education. Partnerships will increase research funding, tech transfer, and talent pipelines into the private sector"
- "leverage the growth of applied research programs and university-based venture centers to drive talent and economic development. Increase supports for tech transfer and research commercialization. Leverage the research work of the University of Massachusetts system to drive entrepreneurship, especially in regions outside Greater Boston."

The Massachusetts Local Food Action Plan -- 2015

The goals and recommendations for the Fishing Industry aim to ensure that fishing communities can remain strong, that industry jobs throughout the supply chain support families, and that new markets can enable distribution of more local and diverse seafood throughout the State and New England. The Plan includes the following recommendations for the University of Massachusetts:

- 1.1.2. Improve data collection methods, systems, and technology for "fishery dependent' and 'fishery independent' fish stocks
- 2.3.6. Support value-added seafood product development
- 2.3.8. Support seafood product development and innovation in culinary schools, and universities, colleges, and primary schools that operate culinary programs
- 2.3.10. Support growth of local businesses that aid in developing the local seafood supply chain. These could be businesses providing equipment, services, or other innovations that advance local seafood distribution
- 5.1.1 Assess ongoing research in the fishing and aquaculture industries, and develop a research agenda that complements and builds on ongoing studies
- 5.1.5. Study climate conditions including sea level rise, severe storms, and ocean acidification, and assess the impact of these on the marine ecosystems, estuaries, and fisheries
- 5.1.6. Increase funding for cooperative research that improves the fishing industry's ability to adapt to changes in fish populations and ensure stock resilience
- 5.1.7. Commit state funding and grants to expanded research for local seafood product development and sustainable fish and shellfish operation innovation, with an eye toward expanding markets for underutilized species.
- 5.1.8. Revive and expand seafood science research and development laboratories

The Association of Public and Land-Grant Universities (APLU) – May, 2017

In their recently-released report: The Challenge of Change: Harnessing University Discovery, Engagement, and Learning to Achieve Food and Nutrition Security, APLU makes the following recommendations for state university systems:

- Elevate food and nutrition security to a top priority
- Align university resources and structures for transdisciplinary approaches
- Enhance and build university-community partnerships
- Educate a new generation of students to be transdisciplinary problem solvers

Public research universities are uniquely positioned to make critical contributions "through research and technological innovation; engagement with local communities and outside partners". "All relevant disciplines are present at public research universities and, with adequate resources and funding, universities are able and willing to undertake this important work."

This report provides useful examples of how various public university systems have identified the needs and opportunities for support of their state food and agriculture sectors and have designed particular incubator and research initiatives that capitalize on the unique capacities and resources of their campuses. The APLU report has identified a number of different approaches that state universities have utilized to synthesize wide faculty and stakeholder input into priority topics. Examples of these procedures from the report and other sources include:

- Faculty are asked to submit topics and themes (Minnesota)
- Surveys are widely disseminated (Rutgers)
- A website is created -- anyone in public can submit topics (National Academy of Sciences Food Challenge)
- A series of multi-stakeholder conferences, workshops and forums (Minnesota)

There is no single model for design of incubator and research programs across the country. However, there are a number of different models that should be considered and combined, including:

- Grants for interdisciplinary research projects (Iowa State)
- Hiring of new faculty in "clusters" of “grand challenge” areas (Ohio State)
- Construction of new food innovation and research centers (Michigan)
- Assistance with transdisciplinary research grant applications (Ohio)
- Curriculum development, internships, and living laboratory programs (Vermont)
- Financial, promotional, and other incentive systems

Case Study: Rutgers Food Innovation Center

Dr. Margaret Brennan-Tonetta, Associate Director, NJAES, Director of Economic Growth and Development, NJAES, Associate Vice President, Office of Research and Economic Development, Rutgers University.

At the August 2 conference described the fifteen-year multi-stakeholder planning process, that led to the establishment of the Rutgers Food Innovation Center in Cumberland County, the hub of the agricultural and food processing industry. Opened in 2001, the Center provides education and training on product trends, business planning, and market research; business and technical mentoring to entrepreneurs; and an equipped FDA and USDA inspected facility for R&D and commercialization use. Center staff also collaborate with partners in rural development, food security, and Farmed to School programs, among others.

Partnerships in financing:

There are dozens of examples of the establishment of new food system incubators or centers being built within state university systems, typically with funding partnerships from federal, state, regional, local, foundation and private sources. For example, the Rutgers Food Innovation Center facility, built in 2008, has received capital and operating funding from: USDA-Rural Development, EDA, SBA, State of New Jersey, NJ Casino Reinvestment Development Authority, NJ Commission on Science and Technology, NJ Department of Agriculture, NJ Department of Labor, Cumberland Empowerment Zone, and the City of Bridgeton.

Guidance materials for state university programs in the food system:

APLU, The Challenge of Change: Harnessing University Discovery, Engagement, and Learning to Achieve Food and Nutrition Security

EDA – Making Connections: Evaluation Report to Assess Best Practices in EDA's University Center Program

EDA, Incubator Best Practices that Lead to Successful New Ventures

Ben Schneiderman, The ABC's of Research: Achieving Breakthrough Collaboration

NRC, Enhancing the Value and Sustainability of Field Stations and Marine Laboratories in the 21st Century

National Center for Universities and Businesses. Science and Translation of Innovation in the Food Economy

AGREE, Research and Innovation: Strengthening Agricultural Research

FoodSpan, Teaching the Food System from Farm to Fork

Global Food Business Innovation Network

In summary, the first step is a systematic identification of the needs for industry assistance and from breakthrough research and capstone projects. Below are various entry points that August 2 speakers and participants have suggested, along with a reminder of the literature on system dynamics that has been applied to the food system, as was described in Chapter 3. In addition, several models for collaboratively exploring creative systems change are presented.

BREAKTHROUGH INNOVATIONS

As described above, the Association of Public Land-Grant Universities has recently issued a report calling on state universities to make the food system a priority area for research and innovative pilot projects. Universities are encouraged to work with other stakeholders on a series of "grand challenges", that if solved would collectively transform or shift the food sector into a more environmentally-restorative, equitable, and high-productivity marketplace with benefits to rural communities and public health.

Similarly, Massachusetts collaborators should seek over time to transform the seafood system from its current state of underperformance and negative impacts on ocean health, communities, and public health to a more robust, restorative, and resilient seafood economy.

The August 2 seafood innovation presentations provided some preliminary proposals and projects for breakthrough innovation, in this regard.

- Kate Masury, Eating with the Ecosystem -- an initiative to develop seafood markets that match the harvesting of a natural balance of and niches of different species of fish
- Josh Stoll, University of Maine and LocalCatch.org -- building relationships and collaboration between fishermen and the public through Community Supported Fisheries
- Vito Giacalone, Northeast Seafood Coalition -- Stock assessments proposed with collaboration between scientists and fishermen
- Angela Sanfilippo, Gloucester Fishermen's Wives Association -- community placemaking and alliances for cultural celebrations, education and downtown development
- Anamarija Frankic, UMass Boston -- Shellfish restoration and Living Lab projects that jointly restore habitat and water quality, provide income to locals, and that protect coastal towns from storm surges, biomimicry design that "creates the conditions for life"

In break-out discussions, other cross-cutting needs and opportunities were summarized:

- Shared stories or narratives for the industry to share and convey to the public

- Ocean ecosystems and responsible harvesting of resources
- Transparency in the value chain
- Understanding better the customer's tastes and preferences for different types of fish and for supporting ecological and community values

These conversations and initial projects have barely scratched the surface of the grand challenges that need to be addressed if a paradigm shift in the seafood system is to be achieved over time. A series of collaborative convenings and identification of grand challenges led by UMass and other stakeholder partners, as recommended in this report, are necessary first steps in this regard. Over time, priority lists for substantial R&D and "capstone" projects will be generated and should be funded by UMass and the Seaport Economic Council, in particular.

Several frameworks for systems thinking that are helpful for beginning to think about priority innovations in the seafood sector were described in Chapter 3, and raise questions such as these:

- Have all the impacts of a given project been assessed?
- Are there "lock-ins" in the system that will prevent a "scaling up" of the work of "early adopters"?
- Is information being provided across the supply chain, including with small and independent fishermen and local processors and retailers?
- Do projects strengthen qualities necessary for resilience such as trust, a shared story and identity, and diversity?
- Does the project include multiple stakeholders in a multi-faceted model for a significant part of a systems change?
- Is there a recognition of anomalies between current ways of thinking and modeling in fisheries science and economics and mismatches with on-the-ground realities, such as in stock assessment modeling?

There are other guides to systems thinking and the identification of breakthrough innovations that should also be utilized:

The Triple Bottom Line and Effective Community-Based Fisheries Management

A multi-stakeholder consortium, with funding from the World Bank, USDA, and other sources, has been developing "Fishery Performance Indicators" as a means to assess the "triple bottom line of economic, community, and ecological sustainability". The research starts from the recognition that most of the attention of fisheries management has been to facilitate stock rebuilding, while impacts on fishing communities or food security have been considered secondarily, if at all. This work recognizes that the sustainability of fish stocks, fishing industries, and fishing communities are interrelated and "that none can provide benefits without the others" and argues for a "holistic approach" that incorporates economic and community outcomes. The research has led to the identification of 68 performance outcomes across ecology, economics, and community dimensions and is aiming for multiple case studies that will "eventually provide a mechanism for understanding the causal and supporting relationships between each notion of success represented by the triad of outcome indicators, and the prevailing enabling conditions and alternative resource management strategies." Source: Anderson, JL et al, The Fishery Performance Indicators: A Management Tool for Triple Bottom Line Outcomes.

Design Thinking

"Design thinking relies on our ability to be intuitive, to recognize patterns, to construct ideas that have emotional meaning as well as being functional, and to express ourselves in media other than words or symbols. Nobody wants to run an organization on feeling, intuition, and inspiration, but an over-reliance on the rational and the analytical can be just as risky.

The design thinking process is best thought of as a system of overlapping spaces rather than a sequence of orderly steps. There are three spaces to keep in mind: inspiration, ideation, and implementation. Think of *inspiration* as the problem or opportunity that motivates the search for solutions; *ideation* as the process of generating, developing, and testing ideas; and *implementation* as the path that leads from the project stage into people's lives.

While design thinking first started with improving the look and functionality of products, eventually the method was extended to creating entire systems to deliver products and and services. Design thinking incorporates constituent or consumer insights in depth and rapid prototyping, all aimed at getting beyond the assumptions that block effective solutions. Design thinking crosses the traditional boundaries between public, for-profit, and nonprofit sectors. By working closely with the clients and consumers, design thinking allows high-impact solutions to bubble up from below rather than being imposed from the top.

The natural tendency of most organizations is to restrict choices in favor of the obvious and the incremental. Although this tendency may be more efficient in the short run, it tends to make an organization conservative and inflexible in the long run. Divergent thinking is the route, not the obstacle, to innovation."

Source: Stanford Social Innovation Review, Winter 2010, Design Thinking for Social Innovation

Backcasting

Backcasting is a planning method that starts with defining a desirable future and then works backwards to identify policies and programs that will connect that specified future to the present. Starting with a description of a very definite and very specific future situation, the analysis involves moving backward in time, step-by-step, in as many stages as are considered necessary, from the future to the present to reveal the mechanism through which that particular specified future could be attained from the present."

These various "systems" questions and the methods of assessing triple bottom line performance metrics, of design thinking and of backcasting represent entryways into thinking about what a better seafood sector might look like from a "birds-eye-view" or holistic system perspective. A useful start at the process might just be an iterative multi-stakeholder conversation about what they view as a desirable future fishing and seafood industry, the values and outputs that it would produce, the internal viability of businesses within the system, and the science and management frameworks that would hold it.

Source: Wickipedia, Backcasting

Seafood:

An ideal seafood system might have the following characteristics, in comparison to current conditions. The backcasting exercise would consider the means by which this ideal could be realized over time:

- Allowable catches are harvested – as opposed to only 37.2% of total quota actually caught
- All fish caught in nets is landed at ports – as opposed to current discards
- Prices of fish per pound are more uniform across stocks and cover the expenses of fishing – as opposed to very low prices for under-utilized species such as whiting and low prices processors that have shifted to imported fish are willing to pay for locally-landed fish, including cod
- Predator-prey relationships are in balance – as opposed to targeted fishing at popular species like cod
- The ocean waters and coastal habitat are healthy, including juvenile fish habitat in eelgrass – as opposed to widespread pollution reaching the ocean, historic destruction of oyster reefs, eutrophication in estuaries, and loss of salt marshes
- Stock assessments accurately reflect the health of various species and how they will react to management measures and are developed through collaboration between scientists and fishermen – as opposed to increasing uncertainties and difficulties in predicting changes through current models and lack of collaborative science that involves fishermen
- Stakeholders generally trust each other – as opposed to the current high-level of distrust between fishermen and federal fishery managers and environmental advocates for catch shares and other measures that limit access to the fisheries and raise the cost of fishing
- Consumers appreciate many fish species and minimize waste of seafood they purchase – as opposed to more selective tastes for only certain types of seafood and very high throw-aways
- Federal fisheries management provides for flexibility and adaptability in fishing effort and focuses on the scale of a defined ecosystem and local fisheries, and of the ability of local fishermen to co-manage – as opposed to large areas of the ocean and fisheries managed at a macro-scale
- Communication and collaboration are developed along the value chain, such that knowledge is shared and innovative ideas are identified – as opposed to fragmentation and lack of information among stakeholders, such that a wide range of potential ideas and products are not envisioned or pursued
- Fishing boats are new, fuel-efficient and safe – as opposed to the current old boats, with high fuel use, and safety concerns
- Young people have entered the industry – as opposed to the current aging of the boat captains and crew
- Fishing is a viable business for a diverse fleet, including small and independent operators – as opposed to many fishermen losing money due to sharp quota cuts and high leasing costs
- Local processing and shoreside businesses have viable businesses in providing necessary services in engine repair, ice, marine railways – as opposed to many going out of business, for lack of fish and working boats
- The public sector provides the necessary services of technical and business assistance, R&D, infrastructure, financing and coordination – as opposed to minimal public support to fishing clusters

- Port communities celebrate their fishing heritage and have a good understanding of the economics and politics of the industry – as opposed to a widespread disconnect of the public from the industry
- There is a vibrant seafood culture of restaurants, markets, and festivals that supports downtown development – as opposed to a lack of sense of place and businesses developed around fresh and healthy fish from local waters
- There are broad multi-stakeholder alliances that strive to think through, experiment with, and keep reforming the seafood system, through such methods as "stretch collaboration" or "backcasting" – as opposed to the current fragmentation in the industry, a cynicism about the potential for change in regulations and science, and lack of a forum for such discussions

Other guidance for Breakthrough Innovations and Systems Thinking;

IPES Food, From Uniformity to Diversity: A Paradigm shift from industrial agriculture to diversified agroecological systems

EEA, Seafood in Europe: A food system approach for sustainability

NRC and Institute of Medicine, A Framework for Assessing Effects of the Food System

Cornell Food Systems Global Summit, Implications of Taking a Systems Approach

Knezevic, I. Nourishing Communities: From Fractured Food Systems to Transformative Pathways

William C. Clark, Linking Knowledge with Action for Sustainable Development

Agree, Research and Innovation: Strengthening Agricultural Research

Steve Moddemeyer, Qualities of Resilient Communities

Thomas Kuhn, Nature of Scientific Revolutions

Michigan Good Food Summit, Evaluating Food Systems Change through Stories: A Hands-on Workshop "Most Significant Change" method

National Academy of Sciences, Engineering and Medicine, Science Breakthrough 2030: A Strategy for Food and Agricultural Research.

Chapter 5

SUMMARY OF FINDINGS AND NEXT STEPS

This Building the MA Seafood System project was purposely designed to provide multiple inputs into answering questions about potential institutional strategies and investments that would have high value in stimulating innovation and development, in particular through expanded roles of state government, ports, and the University of Massachusetts. Input was sought directly from fishing and port leaders. Relevant reports at the state and port level were reviewed. A national literature on the food and farming sector was compiled for models and insights on development in the food system and for how public agencies can best help. Finally, at a daylong conference in Gloucester on August 2nd, 2016, several exemplary models were presented for food cluster development and innovation centers and for breakthrough innovations that are being worked on currently by leaders in the seafood industry, often in partnerships with activists and academics. Break-out group discussions followed, with participation from the multi-stakeholder audience.

Several major concepts and conclusions emerged from this multi-faceted effort that should shape ongoing strategies and investments going forward. Multiple state agencies can partner in these efforts, including the Seaport Economic Council, the Seafood Marketing Commission, the Division of Marine Fisheries, the Mass Office of Business Development, the Advanced Manufacturing Partnership, and the Life Sciences Center.

UNREALIZED POTENTIAL IN THE MA SEAFOOD SYSTEM

First, there is significant unrealized potential in the Massachusetts Seafood System. The Massachusetts seafood industry continues to be a major asset for the state and for coastal communities, in particular, but significant potential also exists both to rebuild the traditional parts of the market, including increased landings, diversified catches, institutional sales, and greater local consumption of locally-caught fish, and to support the growth of emerging segments, including value-added products, waste recovery, fuel-efficient boats and new gear, shellfish aquaculture, environmental restoration, research initiatives, food security programs, cultural activities, downtown development and heritage tourism.

In spite of interest by entrepreneurs and advocates, the current sector is held back from fully pursuing these opportunities by missing infrastructure supports and by structural weaknesses in the industry that inhibit innovation and growth. Some of these needs are understood but not yet met, while others require a much deeper understanding of the flaws and dysfunctions in the system, before action can be taken.

THE SEAFOOD SECTOR LAGS THE FOOD AND FARMING SECTOR

Second, the Massachusetts seafood sector lags behind food and farming sector, in:

- In its continued fragmentation of stakeholders and high levels of conflict and distrust
- An early adoption of CSFs and Farmer's Markets that are modeled on CSAs
- The beginnings of work in institutional sales and shorter supply chains
- A lack of economic development planning for the fishing industry, which would incorporate elements of cluster approaches, value chain coordination, and wealth building and place making
- A relative underinvestment by the public sector, including universities

- Minimal work, as of yet, on collaborative systems thinking or proposals for reform of federal fisheries management or the coverage of seafood in the Farm Bill.

OPENINGS FOR INITIATIVES IN THE SEAFOOD SECTOR

Third, this lag or gap in the adoption of common ways of thinking, alliances, and economic development approaches called for by ports and in break-out group discussions creates a tremendous opportunity for the Massachusetts seafood system to catch up and leapfrog from, based on the lessons of the larger food movement and economy, in particular through:

- A strong commitment by all stakeholders to collaborate in a variety of ways and in a variety of settings, even though conflict and differences of opinion are to be expected
- A search for stories and common narratives, that can remind everyone of the industry's history in New England and can help motivate the drafting of a vision around important goals for a healthy ocean, continued viability of traditional ports and a way of life, and to healthy food.
- A one to two-year planning phase for ports to assess their assets and opportunities and to develop strategic plans for investment.
- A one to two-year planning phase for the University of Massachusetts, to identify grand challenges in research and capstone projects, and to mobilize its incubator services in the five campuses.
- A second phase of financing of infrastructure and programs in the ports and the University of Massachusetts.
- Continuing development of partnerships of state, local, and federal agencies and funding programs.
- A commitment to periodic conferences and other meetings of stakeholders to begin a long-term effort at understanding the seafood system and the various means to move it in the direction of sustainability and resilience.
- Attention to federal fisheries management and Farm Bill reform, starting with pilot projects of community-based management of local-scale fisheries and improved collaborative stock assessment modeling and data collection and with federal funding of value chain investments and strategies.

THE BAKER-POLITO OPPORTUNITIES FOR ALL STRATEGY AS A TEMPLATE

Fourth, the Baker-Polito *Opportunities for All Strategy and Plan* provides an overall framework for economic and community development in the fishing and processing cluster, which they have identified as of major importance to cities and regions outside of the high-tech Boston area. Elements of a strategy that reflect statements of need and opportunity from the ports, but that also are echoed through the country in the food and farming sector, include:

- State support for leadership at the local level
- Engagement of the University of Massachusetts campuses as regional stewards of research, innovation, entrepreneurship, and economic development
- Significantly greater collaboration of stakeholders
- Venture centers providing business and technical assistance
- Capital investments in infrastructure

EARLY INVESTMENTS

While planning and coordination activities are undertaken by ports and the University of Massachusetts system, that will eventually lead to the establishment of innovation centers and

research projects that will help multiple stakeholders in the seafood sector, in the interim, these are niches of innovation and entrepreneurship that are deserving of state, federal, local and foundation support:

Rebuild the traditional fishing industry through:

- Increasing landings – above the current estimated 37.2 percent of allowable catch actually landed – gear improvements, ACL's, higher prices at the dock;
- Diversified catches – new markets and higher prices for underutilized and undervalued species;
- Public seafood markets, with public exposure to boats, landings, and processing;
- Institutional sales – colleges, schools, universities, others.

Develop emerging segments:

- Value-added products – chowders, fish cakes, ethnic foods
- Fuel-efficient and safe fishing boat design and construction
- Marine technology – gear and monitoring
- Waste recovery products – such as chitin from shells, bandages from fish skin, bio-fuels
- Shellfish aquaculture – co-benefits of habitat restoration and harvesting
- Environmental restoration – eelgrass, salt marshes, and oyster beds
- Science – research and pilot projects
- Education – curriculum development and training
- Food security – Food Bank programs, other
- Culture and arts – museums, storytelling, and celebration of port history
- Heritage Tourism – providing historical and real-time exposure to visitors
- Downtown Development – restaurants with local seafood, public markets

SUMMARY RECOMMENDATIONS

1. **EXPANDED STATE ROLE –** The Commonwealth of Massachusetts should increase its level of commitment and capital, programmatic, and R&D investment in the seafood sector, so as to achieve greater economic, health, environmental and social goals and to rebuild internal capacity and resilience in the industry. There are three basic tiers of investment: assistance to innovative projects and entrepreneurs; funding of cluster and value chain-related infrastructure and port capital improvements, that support multiple participants in the industry; and participation in the identification of breakthrough innovations and public policy reforms that will internally strengthen the seafood system.

   State investments should be in the following arenas and nodes of work:

2. **COLLABORATION –** State leadership across agencies should support and partner in the expansion of multi-stakeholder seafood system networks, including public officials, fishermen, fish processors, researchers, institutional purchasers, chefs, foundations, cultural leaders, and environmental and social justice advocates. Partnerships should be fostered as well with the federal government and local and regional agencies, in particular in the pooling of funds.

3. **LEADERSHIP IN PORTS** – The primary Massachusetts fishing ports should commit to a major role in growth and redevelopment of the industry, using standard cluster economic development, value chain, and placed-based templates as a guide. It is at the local level where face-to-face information-sharing and institutional support typically lead to new technology and product development, new businesses or non-profit programs and

ecosystem restoration projects, and where the benefits of cultural and community development are most directly felt. The Commonwealth, along with the federal government, should invest in port-appropriate seafood coordinators and networks, test kitchens, product development labs, docks and piers, water and wastewater, transportation and other capital infrastructure, training programs, business incubators, processing and distribution centers or hubs.

4. **UNIVERSITY OF MASSACHUSETTS** – The University of Massachusetts should develop and implement a transdisciplinary and venture center program across its five campuses, collaborate with stakeholders and ports, convene conferences and capstone projects, and network with other academic institutions in New England. Most importantly, UMass faculty can serve as lead, or co-lead, in thinking through systems change and paradigm shifts.

5. **BREAKTHROUGH INNOVATIONS** – Participants in the seafood sector should prioritize R&D and pilot projects on those grand challenges or innovations that require multi-stakeholder engagement, that would entail significant benefits to the economy, but also to coastal community well-being, public health, and ocean and coastal habitat health, and that have the potential to restructure markets and fisheries management so as to strengthen the long-run internal capacity of the seafood system. Ultimately, the goals of these innovations is to create the conditions for a systems or paradigm shift, to a far healthier and more productive seafood sector.

6. **NEXT STEPS** – Substantial collaboration and planning are needed for both port communities and the University of Massachusetts to define needed investments and institutional strategies to support the seafood system, the environment, and port communities.

   In the near-term, the state should support multi-stakeholder conferences and workshops and should fund the hiring of port coordinators and economic assessments, and in the case of the University of Massachusetts, the convening of faculty and other stakeholders around the identification of both priority challenges and industry services needed and of how the capacity of the University researchers and extension agents to assist the seafood industry could best be mobilized through interdisciplinary research, new faculty hires, or university centers.

   In the longer-term, the Commonwealth should anticipate partnerships with federal agencies in funding the major capital investments, incubators, research and other strategies that are recommended in these initial detailed planning efforts.

   State and local leadership should also lend support to multi-stakeholder efforts to assess and support in such major federal policy areas as NOAA fisheries management restructuring and the reauthorization of the Farm Bill, to include significantly greater investment in programs that support value chain and community economic and place-making development, and EPA and NOAA efforts in habitat restoration and pollution reduction.

APPENDIX

Building the Massachusetts Seafood System:

Collaboration, Industry Support, and Innovation in Port Communities and at the University of Massachusetts

August 2, 2017
The Gloucester House
Gloucester, Massachusetts

Funded by the Massachusetts Seaport Economic Council with a grant to the Urban Harbors Institute, University of Massachusetts Boston

The Program

Recognizing the important role of locally-caught seafood in Massachusetts, researchers—funded by the Commonwealth's Seaport Economic Council—are analyzing models of local and regional government and state university support for farming and agricultural food systems, looking at how those models can inform the development of new strategies and investments for the local seafood system. This conference builds on current research with the goal of identifying and opportunities and priorities for the following topics:

Institutional Strategies in the Food System

Presentations will focus on various strategies adopted in other states, including hiring of food system coordinators; supporting food clusters through economic development infrastructure; developing university incubators and interdisciplinary centers; and mobilizing communities around place-making activities that enhance their food heritage and economic and cultural resources.

Breakthrough Innovations in the Seafood System

Presentations will highlight a number of important cross-cutting efforts emerging in the seafood industry, particularly in New England. These include initiatives that connect various parts of a relatively fragmented fishing industry and that embody values of environmental sustainability, economic development, health, and community well-being. Some examples include tying new markets to a sustainable fishing harvest; shortening the supply chain from boat to consumer; conducting collaborative science with fishermen; and implementing new forms of habitat restoration that produce food and provide water quality and ecological benefits.

Priority Strategies and Investments for Massachusetts Ports and the University of Massachusetts

Break-out groups will blend the broader models of food system support with opportunities for growth and innovation, specifically in the seafood sector. The focus of these breakouts is to identify the roles that coastal communities and the University of Massachusetts can play in advancing innovation and development.

Speaker Bios

Michael Rozyne is founder of Red Tomato, a regional 'food hub' based in Plainville, MA that sources from 45 mid-sized, local fruit and vegetable farms. In 1986, he co-founded the fair trade coffee company Equal Exchange, a worker-owned cooperative. Before that, he worked on conventional and organic farms in Maine, and as buyer/marketing manager for the natural foods warehouse, Northeast Cooperatives.

Caroline Paras recently retired from a 25-year career as an educator and economic developer. As a planner for regional planning agencies in Southern and Western Maine, she developed expertise in a variety of issues, including tourism, affordable housing, freight, bicycle/pedestrian access, downtown revitalization, business retention and expansion, working waterfronts, local agriculture, and brownfields redevelopment. Most recently, she created and managed the Portland Region Food Foundry, one of the nation's 24 Manufacturing Communities, which attracted $48 million in state and federal funding for the region's food cluster. This recent work has inspired her to launch the Argentine Yankee, a new company that will use food as a platform to celebrate community and culture. A native of Southern California, Caroline graduated from the University of California, San Diego with a double major in Political Science and Communication and earned a Master's in American Studies from the University of Southern Maine.

Margaret Brennan-Tonetta is Associate Vice President for Economic Development for Rutgers University, Associate Director of the New Jersey Agricultural Experiment Station (NJAES), and Director of the NJAES Office of Research Analytics. Margaret is responsible for several industry-focused centers and programs,

and for the development of large-scale programmatic initiatives that fulfill the university's vision of being a model of innovation, responsiveness, and collaboration for New Jersey businesses and citizens. She earned a B.A. in Economics, a M.S. in Agricultural Economics, and a Ph.D. in Planning and Public Policy, all from Rutgers University.

Kate Masury is Program Director of Eating with the Ecosystem, a small nonprofit with a mission to promote a place-based approach to sustaining New England's wild seafood, through healthy habitats, flourishing food webs, and short, adaptive seafood supply chains. As the organization's sole staff person, Kate performs many roles, from event planning to graphic design to scientific research. Currently, Kate is coordinating a citizen science project as part of a larger research project in partnership with the University of Rhode Island to compare the availability of local seafood species in the New England marketplace to their abundance in the local marine ecosystem. A native of Kittery, Maine, Kate earned a Bachelors of Arts in Environmental Studies from the College of the Holy Cross and a Masters of Advanced Studies in Marine Biodiversity and Conservation from Scripps Institute of Oceanography.

Joshua Stoll is an Assistant Professor of Marine Policy in the School of Marine Sciences at the University of Maine and holds a joint position at the Maine Center for Coastal Fisheries. His research focuses on questions about the resilience of the commercial fishing sector with the purpose of contributing to the long-term sustainability of our oceans and the communities that depend upon them. Joshua is also the founder of LocalCatch.org, a community-of-practice made up of fisherman, organizers, researchers, and consumers from across North America that are committed to providing local, healthful, low-impact seafood via community-supported fisheries and direct marketing arrangements.

Vito Giacalone is the Executive Director of the Gloucester Fishing Community Preservation Fund, commonly known as the Gloucester Permit Bank. A third-generation Gloucester fisherman with more than 35 years of experience in the New England fishery, Vito is a founding board member of the Northeast Seafood Coalition and has filled the volunteer roles of Policy Director and Chairman of Government Affairs since the organization's inception. Since 2002, Giacalone has been instrumental in drafting numerous policy solutions to complex fishery problems.

Angela Sanfilippo is the Director of Support Services for the Massachusetts Fishing Partnership's Gloucester office, where she also has been certified as a community healthcare navigator. Angela serves as a board member of the Northeast Seafood Coalition, Commercial Fishermen of America, the Gloucester Fishing Community Preservation Fund, the Gloucester Fisheries Commission, the Boston Fisheries Foundation, and the Governor's Commission for a Massachusetts Seafood Marketing Program. In May 2009, Salem State University bestowed an honorary doctorate of letters degree on Angela for her environmental and community leadership. Two years later, Bridgewater State University gave her its 2011 Public Service Award. She also received the Friend of the Fishing Industry Award from the Offshore Mariners' Wives Association.

Anamarija Frankić is a founding director of the Green Harbors Project® and the Biomimicry LivingLabs®, and is a research faculty at the University of Massachusetts Boston and the University of Zadar, Croatia. She is a Biomimicry, Fulbright, American Association of University Women (AAUW), and Sea Grant Knauss Congressional Fellow. In 2014 she co-founded Biomimicry New England. Dr. Frankić has a unique educational background in biology, ecology, limnology, and marine science, which guided her interdisciplinary research in understanding coastal, marine, and fresh water ecosystems, nationally and internationally. She initiated and established the biomimicry 'livinglabs' in built environments where students, local communities, and businesses have an opportunity to learn and teach by applying nature's wisdom in solving local issues. Dr. Frankić's work was recognized with awards from the AAUW, the US President's Higher Education Community Service Honor Roll, two national awards in Engineering Excellence to improve coastal environments, and from the City of Boston, for her services to local communities.

AGENDA

Building the Massachusetts Seafood System Conference

Wednesday, August 2, 2017

Gloucester House - 63 Rogers Street, Gloucester

8:30 – 9:00: Registration and coffee

9:00 – 9:30: Welcome and Introductions

9:30 – 12:00

- Michael Rozyne, Red Tomato - **What Are We ~~Fighting~~ Collaborating For?**
- Caroline Paras, retired, Greater Portland Council of Governments - **Portland's Investments in Port Infrastructure, Food Manufacturing and Innovation**
- Margaret Brennan-Tonetta, Rutgers University - **The Role of the University in Business Development: The Rutgers Food Innovation Institute as a Case Study**

12:00 – 1:00: Lunch (Gloucester House)

1:00 – 3:00

- Kate Masury, Eating with the Ecosystem - **Matching Our Markets to Our Ecosystems**
- Josh Stoll, University of Maine - **Building Community Resilience Through Innovative Seafood Marketing Strategies**
- Vito Giacalone, Northeast Seafood Coalition - **Collaborative Research and Stock Assessments**
- Angela Sanfilippo, Gloucester Fishermen's Wives Association - **Gloucester's Fishing Heritage, Culture and Placemaking**
- Anamarija Frankić, UMass Boston - **Healthy and Productive Coastal Habitats**

3:15 – 5:00

- Break-out groups: Opportunities and Priorities
- Wrap-up

For further information or follow-up, please contact:

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