



The New Maritime Port Economy Gloucester, Massachusetts

March 2012



Prepared by the Metropolitan Area Planning Council & the City of Gloucester

Acknowledgements

The New Maritime Port Economy Summit—Outcomes
Cruiseport Gloucester, Gloucester, Massachusetts*

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Introduction

On November 15 and 16, 2011, the City of Gloucester partnered with the Metropolitan Area Planning Council (MAPC) to host a Summit to explore the potential for development and revitalization around Gloucester's Harbor under the title of The New Maritime Port Economy. The Summit was funded by the Economic Development Administration and followed an Economic Development Assessment Team visit to Gloucester coordinated by the EDA. The Team consisted of representatives of several different federal agencies and was formed in response to economic concerns raised by the impacts of catch regulation over the Northeast Groundfish Fishery. The depletion of the fishery and the institution of regulations meant to restore it have had, and will continue to have, profound impacts on the fishing-based economy in Cape Ann. These impacts necessitate a diversification and controlled transition to new industry sectors for the harbor area that will be compatible with the on-going presence of a smaller, though no less important, fishing industry. The purpose of the Summit and the resulting report is to suggest new, desirable industry areas that will not diminish the maritime character of the Cape area, which is embodied in the continued presence of the fishing industry, while providing employment leveraging the local skill set and able to attract our youth.



Ann Molloy, Gloucester resident and owner of Neptune's Harvest

This transition parallels the shift of much of the Massachusetts economy over recent decades away from foundries, shoemaking, and garment and fabric manufacture, through a brief period of manufacturing computers and peripherals, to the current innovation and production model, led by such industries as healthcare (in all of its permutations, including biotechnology and medtech), education, research and development, and finance. This model rests on three of the State's most important resources, the productivity of its educational and research institutions, its highly educated population, and its environment of innovation, which must be sustained and linked to the production of new goods and services. It was the embrace of this economic model that allowed the region to find prosperity after the collapse of a manufacturing sector undermined by high labor and transportation costs, and the shift to personal computers. The equivalent shift for Gloucester would be towards many of the industries presented and discussed at the Summit including "marine instrumentation and equipment," "marine services (including consulting, technical assistance, engineering and design, testing, mapping, and software systems and supplies,)" "marine sensing," "marine biological research," "high tech marine services," "marine information services," etc.

The manufacturing based economy, what could be termed as a purely production based model, is distinct from the current model in that competitive advantage comes from lowering the cost of production, which ultimately leads to the movement of jobs to places with low labor costs. In the innovation and production model, employees are the primary competitive asset and are therefore paid a premium at both the high skilled and low skilled levels, such as in research and development, advanced manufacturing or industrial design businesses. Similarly, fishing is an extractive industry that depends on relatively low cost access to a natural resource. As the supply of that resource becomes constrained, the cost of access increases, and the industry seeks to move to places where the costs remain low. A shift towards the innovation and production model is to identify competitive advantage in the human knowledge of the marine environment, through innovation that leads to new products and services and through the existing knowledge of a fishing community that continually identifies new ways of doing what they do better and making a living by the resources of the sea.

Research and education represent an essential part of the Massachusetts economy under the innovation and production model, contributing to the transition described above and playing a key role in driving a virtuous cycle whereby research-born innovations are commercialized into new products and services, attracting research funding and the best and brightest students to the institutions and creating opportunities for university-private sector partnerships, which all in turn lead to the development of new innovations with commercial potential. In Massachusetts, high tech jobs cluster around research institutions, such as the educational institutions of Boston and its neighbors and, as it pertains to maritime technologies, around the research institutions at Woods Hole. At the Summit, speakers from MIT and UMass presented cutting edge research and group discussions sought opportunities where these discoveries could translate into development and jobs in the harbor area.



The new Ocean Alliance headquarters in Gloucester is part of the evolving Marine Science and Technology cluster in the port area.
Photo by Ocean Alliance

It is essential to note that not all research must lead to commercially viable products and services to be valuable to an innovation and production based economy. This economy thrives in an environment of exploration, where the majority of inquiries are driven by the need to understand, not to meet commercial needs. New products and services are an inevitable part of this environment, but not necessarily its driving component, and to attempt to limit research to that which will theoretically lead to commercial success would handicap the process of innovation and risk achieving less. There are



Iain Kerr, CEO of Ocean Alliance

important questions and issues in the world that science is attempting understand, from the behaviors of different ocean species, to the impacts of climate change and pollution on the ocean and it is in this rich realm of inquiry that innovation occurs to the benefit of the region and the world.

For this economic transition to occur, for Gloucester to emulate the broader Massachusetts economy in its shift towards innovation and production, while retaining its local maritime character and the fishing industry at its base, there are two primary strategies the City must pursue.

- ❖ First, a purposeful strategy of engagement with the marine research community is necessary. Across the State, new and existing high tech companies have clustered around research institutions, essentially marking such institutions as essential infrastructure for the development of science and high tech clusters like the Marine Science and Technology cluster discussed at the Summit. Gloucester Harbor is a gateway to the ocean and ocean access is a necessity for these marine research institutions. Where the City can play a role is in learning about the needs of these institutions and connecting them to the resources already available in Gloucester. Ultimately, the goal should be a campus presence for these institutions on Gloucester Harbor.
- ❖ Second, the City must work with the community of harbor area stakeholders to regularly assess the effectiveness of land use regulation in the harbor area in its support for a shared vision and objectives for this economically vital area of the City. There are numerous questions now around the ability of the industries or research entities identified during the summit as desirable to be able to locate in the harbor area under existing regulation. Beyond being able to locate there, these desirable uses must be able to do so easily, without long, unpredictable review processes that serve to increase development costs, limit the availability of funding as public and private funding sources become unwilling to invest in long, risky review processes, and reduce the capability of the City to act quickly and decisively when opportunities arise. The entire Summit, and this report, speak to the importance of preserving the fishing industry and the maritime industries already located

at Gloucester Harbor; the regulations in this area must find ways of accomplishing this goal while also ensuring that the opportunities in the innovation and production based economy described and endorsed at the Summit can also be realized.

There was a great deal of excitement coming out of Gloucester's Maritime Summit. Participants had the opportunity to learn about, discuss, and reach common understanding about viable Maritime industries with the potential to contribute to the rich history of Maritime innovation in the City. The task now falls on all of us in the community and its governmental body to take action.

A note on funding...

The purpose of the summit was to explore a vision for Gloucester's future and take a significant step towards aligning community action into a collaborative economic development effort. Funding to support activities identified here and others that will arise through the collaborative process will, by necessity, come from a variety of sources; the budget of the City of Gloucester alone will not be able to sustain this effort, nor would it be desirable or fair for the public to bear these costs alone. This report therefore identifies three types of funding support that will need to play a role in furthering the economic transition of Gloucester's harbor area, Local Public Investment by the City of Gloucester, Local Public/Private Partnerships, and State and Federal Grants.

The New Maritime Port Economy: Overview

Gloucester stands on the edge of humanity's newest frontier: the ocean. Gloucester is the next go-to place for connecting research and advanced technologies to the sustainable harvesting of the many underutilized benefits the sea offers. We are a full-service port with the longest history of commercial fishing in North America. Our unique ocean-centered culture stands ready to support the development of innovative and sustainable marine industries.

Gloucester's New Maritime Port Economy emerges at the nexus of ocean focused research and advanced technologies and the array of intellectual and physical assets that make the City a working gateway to the sea. Tapping the resources of the ocean has increasing importance in fields as diverse as transportation, food, energy and medicine. The synergy created by these diverse industry areas has great potential to drive innovation leading to revitalization in the working harbor, new jobs, and ultimately, new solutions for addressing vital and interconnected issues in the ocean environment from food supply, to environmental quality to energy.

The City's 2010 Harbor Economic Development Plan characterized the port by its three primary water-centric industries: the fishery, tourism, and the maritime economy.

- 1) The groundfish fishery alone continues to contribute over \$50 million in direct new product yearly. It provides jobs throughout its marine fisheries cluster. The particular skills and abilities required by this industry represent one of the City's strongest assets, an asset unknown in almost all other locations. Most importantly, the physical presence of the Fishery, the people who are supported by the industry, and the span of centuries that the industry has been a part of the city has created the cultural landscape that drives a world-wide understanding that Gloucester is an original, genuine, and authentic location. While environmental and regulatory factors are changing the face of the industry, the assets of this industry cluster must be sustained and innovation within the cluster encouraged. The New Maritime Port Economy supports fisheries collaboration outside of its traditional areas but remaining true to its core of harvesting resources from the ocean. Advancing this industry cluster is directly connected to the development and success of the whole, providing the strength and resilience that a balanced and sustainable economy requires.
- 2) The city's intrinsic charm, the many beaches, coves, and parks on the Atlantic, and a mature and lively artistic and cultural heritage support a healthy tourism industry. The authentic and palpable connection to 400 years of history is a valuable asset to a location within the United States, itself a federation for only 236 years. Tourism is understood well in Gloucester; there is a strong community value that development must be managed to sustain the sense of place - the authenticity of the City. There is acknowledgement that the fishing industry is an essential component of what defines Gloucester. The amenities and community services that can be developed to support travel and tourism also offer support to emerging industry sectors. If hotels can support both business travelers and tourists, the entire community benefits from high quality retail areas with restaurants, shops, and amenities that might not exist without dollars brought in by tourists and business travelers

from outside the community. Infrastructure improvements important to both residents and businesses can be leveraged with travel and tourism dollars.

- 3) The maritime economy encompasses the broader range of commercial, industrial, and institutional activities supported by the port's maritime assets. These businesses can be either similar or divergent in nature to existing fishing or tourism business, but all are harmonious. This emerging sector - the new maritime port economy - consists of ocean observing, monitoring stations, modeling and research; fishery product development and augmentation, aquaculture and marine biotechnologies; robotics, gear development, monitoring technology and off-shore energy components and installations.

The Summit uncovered the extent to which citizens and institutions in and around Gloucester already engage in many areas of this Maritime economy but not in a directive or coordinated fashion. The city's natural, locational, and human capital logically support the growth of these sectors, so much so that an alignment and clarification of this economy within a regional, national and global context holds the promise of significant and transformative growth.

The New England/Massachusetts Marine Science and Technology Cluster, like many other industry clusters in the Greater Boston region, has its roots in the wide array of world-class research institutions from which new scientific discovery, innovation, and technology emerges. This steady flow of knowledge and patents provide opportunities for new business development and growth in existing businesses. A 2005 report by the University of Massachusetts Donahue Institute, "The Marine Science and Technology Industry in New England" provides the most detailed picture available of this industry and estimates that, in 2004 the cluster was represented by 481 firms employing 38,906 people and produced more than \$4.8 billion of goods and services. The Marine Science and Technology cluster is difficult to measure using traditional research methodologies. Information on the businesses and sectors that make up this cluster are not readily available through standard data sets and must therefore be collected from a range of alternative sources and then collated. In addition, the presentations at the Gloucester Maritime Summit demonstrated that current global sustainability concerns are driving a broad and increasing array of research, innovation, and advanced technologies. The Summit presents a good picture of the scope and nature of the companies and institutions involved in this cluster and the potential opportunities available.

The success of transitioning Gloucester's harbor into the New Maritime Port Economy framework will rely on the support and active involvement of the greater Gloucester community, its committed leadership, strong advisory boards, and local, state, and federal support. The working port of Gloucester is the local heartbeat, a state-designated asset, and one of the top ten ports in the nation providing food for its people. This City's ability to connect research and advanced technology to the resources of the Atlantic Ocean strengthens all of these communities.

The New Maritime Port Economy: Describing the Marine Science & Technology Cluster

Over the last several decades, the greater Boston region has secured its position as a global stronghold for knowledge intensive and innovation based industries. Information Technology, Biotech, Cleantech, Medical Devices, BioPharma and others have developed here, drawing off the intellectual capital of world famous research institutions, a highly educated population, and deep wells of venture capital funding. These clusters are marked by a high presence of start-ups as well as established companies, both homegrown and based in regions across the US and abroad. The Marine Science and Technology Cluster is growing in this region sustained by a similar set of resources as the existing clusters, with the addition of another critical component, direct access to the ocean. The following section draws on independent research and on presentations delivered at the Summit to develop a definition of this cluster and Gloucester's potential to attract greater cluster activity to the harbor area.



Dr. Valerie Nelson delivered the keynote address at the New Maritime Port Economy summit on November 15, 2011.

The idea of sustainable economic development is a key part to the formation of Gloucester's New Maritime Port Economy and was highlighted by Dr. Valerie Nelson in her keynote address to the Summit. Referred to variously as clean or green economic development, and encompassing related ideas of the "blue economy" and "cradle to cradle" design, sustainable economic development as a concept is much talked about today, but much harder to define in practice. The Brookings Institution defines it as "the sector of the economy that produces goods and services with an environmental benefit." Spanning multiple industries, this area encompasses businesses that find ways of operating that are low pollution, energy efficient, and ecologically supportive. Emerging concepts in this area include economic benefits that can derive from ecosystem restoration, the use of renewable natural resources, and the recovery of waste into valuable products. For Gloucester, with its historic connections to the sea, these principles are critical; they apply just as readily to business activity in the marine environment as they do to those in terrestrial environments and are a natural area of growth and innovation for the Marine Science and Technology Cluster.

On a global scale, the marine environment is under stress, facing issues of pollution, acidification, warming, and depletion of species. In each of these problems, there are a range of potential solutions, many of which involve business opportunities for the industries of the Marine Science and Technology Cluster. These solutions will frequently be identified by research institutions. With many of the top marine research institutions in the field located in the greater Boston region, the opportunities for businesses to grow from these innovations or for existing businesses

to tap into that research and help to develop those solutions are very good. That is one of the fundamental strengths of this cluster and the opportunity for Gloucester's harbor to play a role in that development.

The 2005 Marine Science and Technology Report by the Donahue Institute categorized businesses in the cluster into a set of five core industry sectors; Marine Instrumentation and Equipment, Marine Services (including consulting, technical assistance, engineering and design, testing, mapping, and software and systems design), Marine Research and Education, Marine Materials and Supplies, and Shipbuilding and Design. Overall, the report authors found that the industry cluster was largely made up of small firms and a high proportion of these produce products and services for a variety of markets, not just those that are marine-related. Bomco, a Gloucester based metal forming company specializing in engine and turbine parts is a good example of a Marine Science and Technology cluster company. With advanced high tech processes and products, only a portion of their product portfolio is marine-based, with the remainder serving aerospace and industrial turbine markets.



Gloucester Mayor Carolyn Kirk with Ocean Alliance Founder Roger Payne at the summit

The Massachusetts portion of this cluster tends to be focused in activity requiring large amounts of technical expertise or skill specialization with most of the State's businesses working in the Marine Instrumentation and Equipment Sector. Higher labor, housing, and energy costs in Massachusetts typically exclude lower value added production such as shipbuilding, which is currently focused in Connecticut and Maine. Within Massachusetts, the greatest industry concentration is in the Greater Boston region, most especially in Cambridge, the Route 128 corridor, and the Route 495 corridor, capturing 43% of companies in these high tech areas. Next is Cape Cod and Southeast Massachusetts, with 19% and 16%

respectively, attracted to the research activity at Woods Hole and UMass Dartmouth. Finally, the Northeast Massachusetts region, including Gloucester and the Merrimac Valley, holds 15% of the cluster's businesses. Notably, the Northeast region is second only to Greater Boston in terms of cluster employment with 24% of the State's Marine Science and Technology employment and produces 37% of total sales in the cluster indicating that the firms in this area are larger with higher value added products. The majority of the currently identified firms in the Northeast are located around Lowell.

The Marine Science and Technology Cluster also includes marine research institutions, whose generation of new knowledge and technology advance innovation and progress in the entire cluster. The ocean represents one of the largest single systems in the world, with influence that extends to the global climate and weather, the production of oxygen, global economics, medicine, and in other ways we may only be beginning to understand. The opportunities for scientific

research in the ocean are immense, and it is in this environment of exploration that innovation is born.

Gloucester's advantage as a location for ocean or marine related scientific research is in the access it provides. First, Gloucester is conveniently close to marine areas like Stellwagen Bank and the Gulf of Maine where ecologically rich and diverse environments can be learned about and that knowledge applied to understanding the larger ocean system. Similarly, the City is connected to the research institutions of Greater Boston, one of the most robust academic environments in the world. Finally, Gloucester itself presents an ideal environment for research and innovation connected to the sea with its deep knowledge and experience of marine environments drawing off 400 years as a fishing community and its vibrant arts and cultural scene, which is attractive to, and supportive of, the innovative people pushing the bounds of scientific knowledge. Cities like Gloucester offer a dynamic environment that encourages serendipity and creativity, making it an ideal connector for marine science and the ocean.

Many of the presentations in the first day of the summit were devoted to current marine science and technology related research and the potential opportunities presented for the City's maritime economic development, divided into the topic areas of Dynamic Areas of Ocean Sciences, Diversification Opportunities in the Fishing Industry, and Ocean Technologies and Product Development. Topics included ocean observing and monitoring, aquaculture, biotech, robotics, and off-shore energy development. This report will highlight two examples.

- ❖ Marine sensing, or ocean observing/monitoring, was identified in many of the presentations including those by Dr. Molly Lutcavage of the UMass Large Pelagics Research Center, Dr. Pierre F.J. Lermusiaux of MIT, and Dr. David Burke of MIT (retired). The technology and analysis available to do this work have advanced considerably at the same time that the need for knowledge on marine environments and ecosystems has ballooned. Summit presenters described a variety of data collection methods from autonomous robots to tethered buoys and including data transmitting tags on marine animals and more traditional spotting by aircraft or boat. This data is critical across a range of maritime industries; the need for better data on fisheries is well established, but there are now increasing needs for data to support alternative energy development, maritime navigation, environmental protection, homeland security and other needs. Meeting this need opens opportunities for scientific research, business development, and jobs in a number of potential ways.

In a 2008 paper titled Development of the Marine Science and Technology Industry Cluster in New England commissioned by the John Adams Innovation Institute, Ocean Observation, Prediction and Management was identified as one of the most important areas of growth for the New England Marine Science and Technology cluster, with direct opportunities in the collection and analysis of data and indirect benefits to numerous other related industries, as described above, as the data becomes available and spurs further innovations. Potential jobs generated by this activity include those in research and analysis, development of measuring tools and technologies, and the placement and servicing of measuring equipment in the ocean environment. Growth is being driven in this area by the

increasing demand for data and information from government and private users and federal funding opportunities created to support projects to meet that demand.

- ❖ Professor Brian Hodder from MIT gave a presentation on the potential for harnessing the natural locational assets of an ocean environment to create renewable energy storage at offshore wind turbine sites. The basic concept of the technology would utilize a portion of the wind energy generated to pump water out of an underwater concrete capsule. When the wind is not blowing, water can be released back into the capsule, spinning a turbine that essentially releases stored energy for use by the grid. Beyond the direct job opportunities in off shore alternative energy development illustrated by this technology, the presentation highlighted the immense opportunity for innovation at the intersection of the Marine Science and Technology Cluster and other active technology clusters now developing a growing influence in the Boston region and the North Shore.

The Ocean Renewable Energy Storage project Professor Hodder described illustrates the use of marine science and technology knowledge to help address one of the biggest challenges facing renewable energy projects; the issue of energy storage for when the wind is not blowing or the sun not shining. As has already been noted, companies in this cluster already work across market areas on a regular basis, identifying opportunities at the intersection of industry clusters where knowledge, skills, and technologies useful to one market area can be applied in another. This aspect of the cluster is particularly valuable in an area like the North Shore where there is already a strong presence of other high tech clusters and ready access to the wealth of such activities in the Boston area. Primarily marine oriented firms can discover opportunities working with other industry clusters and tech companies in other clusters can be introduced to opportunities in Maritime industries.

The North Shore is well positioned to realize the benefits of high tech cluster growth, with the increasing participation of the Marine Science and Technology Cluster. High quality of life, proximity to Boston/Cambridge, and a highly educated workforce all contribute to this environment, with the results evident in Northeast Massachusetts being second in the State to Greater Boston for the amount of venture capital invested and patents issued to businesses in the region.

Though it was not highlighted in formal Summit agenda, there is evidence of some strength in Gloucester and the North Shore in boat building and design. Northeast Massachusetts represents one part of the country that has retained a manufacturing presence, with parts suppliers like Bomco offering high quality, high tech products and many of these serving the GE Riverworks jet engine manufacturing facility in Lynn. This particular expertise would seem to have promise, coupling manufacturing know-how to innovative boat design in the development of new products that might naturally serve the ship building industries in Maine and Connecticut.

The spirit of innovation, demonstrated in the presentations at the Summit and the expected growth of the Marine Science and Technology Cluster in Massachusetts, is a central part of Gloucester's New Maritime Port Economy. Focused on sustainable marine products and services

for the future, Gloucester's port has the opportunity to connect the innovation of the North Shore with the opportunities of the sea.

The New Maritime Port Economy: Diversifying the Fishing Industry



Declining fish stocks and increasing regulations have hit the fishing industry hard, in many communities resulting in the nearly complete abandonment of fishing and the conversion of harbor front areas to residential and tourism oriented uses. In Gloucester though, fishing remains an essential part of the economy and an aspect of the community's character that will not be erased. A certain amount of diminishment is inevitable though in the face of current realities. New Maritime industries will help to bolster the local economy while retaining the City's Maritime heritage, but ultimately there must also be greater diversification within fishing itself to keep this essential aspect of Gloucester and Cape Ann viable. Fortunately, the innovation that characterizes Marine Science and Technology industries can also be found within the fishing industry.

The current conditions and economic contributions of the fishing industry in Gloucester are well documented elsewhere and will not be repeated here. The results of the 2011 draft Northeast fisheries stock assessment present a very different picture of the Gulf of Maine cod stock than was described in 2008. Rather than a fishery on the road to recovery, it appears that groundfish are in continued decline and that catch restrictions will, as a result need to be both more severe and of a much longer duration. Where there are resources and support though, innovation can rise out of such hardship.

Maritime Summit presentations identified two areas representing opportunities for diversification in this industry, Marine Biotech and Aquaculture. Neptune's Harvest is a division of Ocean Crest Seafoods Inc., which was established in 1965 as a wholesale fish and seafood company. The focus of Ocean Crest has been to purchase the freshest seafood the port of Gloucester has to offer and distribute it to high end supermarkets, restaurants, and retailers on the East Coast. The Neptune's Harvest Fertilizer division came about as an endeavor to fully utilize all parts the fresh fish that Ocean Crest processes. Ann Molloy, a Gloucester born success story, demonstrated the potential of Marine Biotech in her discussion of Neptune's Harvest, a fertilizer product making use of the

gurry, or waste product left behind after fish processing. Neptune's Harvest, in conjunction with the state of Massachusetts and its local universities, has developed a process which changed an environmental hazard into an environmental benefit, the result being Neptune's Harvest liquid fish fertilizer. After several years of trial and error and further refinements, Ann's company was able to create a fish based organic fertilizer product that has been proven successful by enthusiastic farmers and gardeners across the United States and by the significant sales generated by the product. This story demonstrates the principles of sustainable economic development or the Blue Economy, described in the previous section, showing that these concepts offer economic opportunities to the fishing industry as well. There is great potential for Marine sourced biotech as any number of products offering human uses may be developed from marine organisms.

Aquaculture represents another means of diversifying fishing, moving from wild caught fish to a farm-like methodology. Tim Jackson, an industrial technology advisor with the National Research Council of Canada's Industrial Research Assistance Program, based in Saint John, New Brunswick discussed advances in this industry that are improving the health of the product and reducing the potential negative impacts of the industry on the environment. Massachusetts is a center of research to support this industry; Salem State University hosts the [Northeastern Massachusetts Aquaculture Center](#), which is focused on the development of shellfish oriented aquaculture opportunities.

Promoting aquaculture as a viable complement to the existing fishing industry would require a larger community-based conversation that would necessarily need to include other coastal communities within the region and the State. There is a range of environmental, social, and economic impacts, both positive and negative, associated with this industry that would require careful discussion in order to reach the appropriate regulation of this activity, ranging from a total ban to various levels of control on placement and operations enacted at the State and local level. As these impacts could be felt across the entirety of Cape Ann or the North Shore, the discussion must be regional in order to avoid the possibility of one or more communities imposing potential negative impacts on other communities that have opted against supporting aquaculture.

The New Maritime Port Economy: Summit Vision and Dialogue



If one were to attempt to extract a single general theme from the visioning that occurred amongst the participants of Gloucester’s Maritime Summit, it might be the idea of synergy; the interaction of two or more agents for a combined effect greater than could be achieved individually.

Gloucester’s opportunity is in finding the synergy between the future world of data rich, high tech marine sciences, and the wealth of knowledge and skills inherent to the traditional maritime industries of the historic harbor. Realizing this opportunity will require an environment of information sharing, openness to

ideas, and continual dialogue, creating the opportunities for people and ideas to connect. The summit was a great demonstration of that potential in Gloucester.

When summit participants talked about a vision they spoke in terms of this synergy and of sharing knowledge and information; passing it on to future generations as well as collaborating across industries, the community at large, and academia. There was also a strong sense, as has been described already, that the benefits that accrue through this synergy and collaboration should forward the larger goal of global sustainability.

Strengths

The elements of the vision for Gloucester’s harbor can easily be connected to the strengths participants identified. Gloucester has a deep history of innovation, driven in large part by the needs and challenges of the fishing industry 400 years, and the various skills, knowledge, and infrastructure that support this industry were identified as part of the strengths of the community going forward. Included herein are the fishermen themselves, the port infrastructure and the Designated Port Area regulations that protect its functionality, and other community and governmental organizations that support this industry. Another critically important community strength is the evident and strong sense of independence and self-reliance inherent to a fishing community of long standing where we see strong local stewardship and sense of community.

Vision for Gloucester

Offered by Roger Payne, Founder of Gloucester-based Ocean Alliance and summit participant.

“Gloucester stands on the edge of humanity’s newest frontier: the ocean. Gloucester is the next go-to place for connecting research and advanced technologies to the sustainable harvesting of the many underutilized benefits the sea offers. We are a full-service port with the longest history of commercial fishing in North America. Our unique ocean-centered culture stands ready to support the development of innovative and sustainable marine industries.”

Challenges

While summit attendees identified strengths that were largely unique to this community, the challenges identified were amongst those broadly common to many communities. Lack of time, funding, information and data are challenges many communities must address as they consider economic development strategies. Also identified were contaminated waterfront properties, necessary infrastructure upgrades, non-maritime uses occupying large harbor front properties and lack of broadband. Perhaps the most complex challenge will be developing better working relationships with federal agencies. The impacts of federal regulation of the fishing industry have a larger impact on the local economy than other communities, supported by other industries, might face in a lifetime.

Needs

Summit attendees focused on needs that generally related to the management and distribution of information and knowledge, with a clear emphasis on spreading those resources within the community. The needs of workforce development in anticipation of the rise of the Marine Science and Technology cluster were noted. Infrastructure needs were also highlighted. The need for action by the City government itself was also identified, linked to specific business needs of streamlining the permitting process and incentivizing marine technology businesses to locate in the City.

Opportunities

In the identification of opportunities for harbor oriented economic development, summit attendees reinforced the message of the various presentations that the Marine Science and Technology cluster presents great potential for growth in the City. Connecting to these high tech businesses, educational institutions, and other potential partnering organizations represents the greatest opportunity for the City. Summit attendees also recognized that the other two primary clusters represented in the harbor area, fishing and tourism, still represent strong and important areas of growth with an important role to play in development of Gloucester's New Maritime Port Economy.

Vision for Gloucester

Offered by maritime summit participants during group dialogue sessions.

Be **sustainable** – produce little to no waste (fishing will use the full amount of fish), be energy-efficient, use shared resources, be responsive to **climate change and sea level rise**.

Be an **extension of the port economy** that maintains and builds upon the fishing industry but does not replace it.

Have industries that **add value locally**.

Focus on marine **education** for future generations, serve as a **knowledge center and intellectual hub** for the maritime industry, and educate on the connections between land use and oceans.

Have solid **partnerships and collaboration** between fishermen, scientists, government and regulators, educational institutions and the working waterfront.

Benefit from **data gathering and analysis** that supports vessel-owners in a variety of activities.

Actions

Identified actions ranged from the general to the specific, from building on past efforts to creating a coordinator position as the primary point-of-contact for all maritime related business investment or development in the City. Overall, these actions focus on getting/distributing more information, building more partnerships, improving physical infrastructure, and addressing the capacity of the local government to efficiently apply necessary regulation while doing more to plan for and promote economic development activity. The following section of this report will draw from this list of identified actions and other sources to suggest a number of strategies the City could pursue.

Please see **Appendix A: Summit Notes** for details of discussions that took place at the summit.

Next Steps and Strategies

The following section draws on the actions identified by summit attendees and MAPC analysis to describe a set of next steps and strategies for the City and its partners in the community to pursue towards the goal of realizing the vision of the Gloucester New Maritime Port Economy.



There are three primary aspects to a collaborative cluster development effort; engagement of stakeholders, shared learning, and trying out ideas. While the specifics of this activity vary from place to place, the basic ideas behind each remains the same. Stakeholder engagement is a process of reaching out to the community to both inform and listen to the recommendations of residents and business owners, building support for the actions that will need to be taken later in support of maritime industry growth. Also a key aspect of this engagement process is a diverse and representative steering committee or advisory group, which in Gloucester is represented by the Maritime Working Group.

Shared learning is a process of the group collecting data and information together, such that all have input into its collection and can agree on the validity. The Maritime Working Group will need to take the lead on this activity in Gloucester, using this report and others that have been presented to the City relative to revitalizing economic activity in the harbor area as a starting point for developing a deeper understanding of the port economy activities.

Finally, the next two sections offer an initial selection of ideas the City can choose to follow-up on. For these, and others that will arise as knowledge and collaboration increase, the City should be careful to define the objectives of the activity and measurable indicators of success.

Next Steps

The Gloucester Maritime Summit brought together nearly 100 attendees representing a range of industries and Gloucester Harbor stakeholders. The event itself generated a great deal of enthusiasm and there was general consensus among attendees that growth in Gloucester's harbor area depended on expansion and development of Maritime industries. The next steps look at ways to continue the engagement of the local community and the greater regional, state, New England, and federal economic development and maritime entities. Broadly, these actions relate to continuing a dialogue in the community about the opportunities and actions open to the City. They include steps to deepen relationships with critical partners as well as means of enhancing the opportunities for serendipity, those fortuitous connections of ideas and people that have the potential to lead to innovations and new business growth.

- Academic Partnerships: MIT is a leader in research related to science and high tech industries and Marine based sciences are no exception. Several of the presenters at the Summit were MIT based researchers and the university is a Seagrant recipient. The City should continue active efforts to link with researchers at MIT and with the technology transfer office. This relationship should be approached from the perspective of asking about the needs of researchers, as well as start-up Maritime companies developing from the university, and the City offering resources, connections, or information that can help to meet those needs. Ultimately, a partnership could develop in which the City becomes a location where advances in marine biological sciences are made or where new technology prototypes are tested.
- The City should also look to developing a similar relationship with the University of Massachusetts using the existing strong link between the Large Pelagics Research Center (LPRC) at the Gloucester Marine Station. LPRC is affiliated with the Department of Environmental Conservation at the University of Massachusetts Amherst and the Graduate School of Marine Science at the University of Massachusetts Lowell. The City may also be able to act as a convener, connecting research and people from the two institutions, with potential future benefit for the City.
- Website: The web is the go-to information source for the majority of people and the Maritime Summit and the larger New Maritime Port Economy effort must have a web presence for people in and outside of the community to connect and learn more. The City has already established a website hosting presentations from the Summit; this site should continue to be updated with additional materials and links and consideration should be given to transitioning it to a more interactive site more broadly covering the New Maritime Port Economy activities. Careful thought needs to be given as to whether the City should continue to host this site or whether an independent, non-advocacy oriented local organization should take up the responsibility. This website might also serve as a means of marketing Gloucester as a Maritime industry destination.
- Maritime Working Group: Created to advise the Mayor on development issues related to the maritime economy and the harbor, this body should continue to play a strong advisory role to the Mayor. Membership of this group should be continually renewed in order to add new stakeholders to contribute new perspectives as they are needed. A regional economic development perspective is critically important for this board, such as the North Shore Alliance for Economic Development (see item below).
- There are three boards concerned with economic development issues in the harbor area, The Maritime Working Group, The Tourism Commission, and The Fisheries Commission. These three boards must coordinate in some meaningful way. One suggestion may be quarterly meetings for an initial one year period to update one another on current activities and long-range plans and to discuss opportunities for projects and programs that bring genuine and measurable benefit to Gloucester Harbor. A first meeting of this nature could look at marketing efforts each may be pursuing and how these could reinforce each other.

- Gloucester Harbor Union: While the name is just a suggestion to start discussion, the idea is to create an organization whose purpose is not public policy advocacy, but simply to facilitate conversation, exchange of information and ideas, and networking amongst Gloucester Harbor stakeholders. This is a venue where ideas can be generated by having the right people in the right place who collectively hold the same sense of purpose and spirit. The technology and life sciences clusters in Kendall Square and Silicon Valley long ago recognized setting conditions for mindful and purposeful connections between like-minded people that spark unintended or unanticipated, but revolutionary and innovative, shared ideas. Understanding the nature and power of so-called intentional serendipity is one of the foundational concepts of cluster development in the 21st Century business environment.
- Indicators: The City should work with the Maritime Working Group to develop a set of longitudinal indicators that track the growth of the maritime economy, with focus on the values inherent to the New Maritime Port Economy concept as presented in this report and presenting data that will encourage maritime companies to locate in Gloucester. The Gloucester Harbor Economic Development Plan may have appropriate data that would be suitable indicators for tracking Maritime industry growth. A list of Maritime businesses in the City and Cape Ann would be one example of a good tracking indicator.
- Economic Development Partnerships: The City should outreach to the North Shore Alliance for Economic Development and the North Shore Workforce Investment Board to get their involvement in developing the region's presence in the New England Marine Science and Technology Cluster. Massachusetts is a leader in this cluster activity and the North Shore has the resources necessary to draw greater levels of activity from this cluster. Greater Boston and the area around Lowell already have some of the highest concentrations of firms working in this cluster.
- Similarly, the City should maintain its relationship with the Marine and Oceanographic Technology Network (MOTN) and the Maritime Alliance in San Diego. Gloucester based firms should be encouraged to join MOTN. The City can broker an initial meeting bringing together the North Shore Alliance for Economic Development and MOTN leadership. The City should offer to host one MOTN event a year.
- Finally, the City should work with the John Adams Innovation Institute, MassDevelopment, and other State economic development entities. The City will need to make it clear to these agencies that Marine Science and Technology related development in the harbor area is a priority for Gloucester and seek what support these agencies can provide. MAPC will continue to support efforts by the City to secure Federal funding to support maritime related economic development.
- Municipal Partnerships: Local economies do not recognize political boundaries. The City should outreach to other municipalities in the region on the issue of developing the Maritime

economy. What is good or bad for a neighboring community will be good or bad for our community as well.

- Partnering Northward: Donald Perkins from the Gulf of Maine Research Institute made the key point during his presentation at the Summit that Gloucester sits at the southern end of the Gulf of Maine ecological system. The Gulf of Maine represents a hugely important resource and Gloucester’s position relative to it, and the equally important resources of the Greater Boston region, means that northward oriented partnerships with research and economic entities could present valuable opportunities to the City in the future.

Strategies

The following strategies refer to actions the City should take directly to boost the City’s competitiveness for Maritime related economic development.

- Flexible Regulation: The harbor area regulations pose a potential challenge for the development of marine science and technology related industries and research institutions of the types described during the summit. While there is consensus that the harbor area should remain a working waterfront and not be given over to residential or strictly tourism oriented uses, there needs to be greater flexibility in the industry types that can be permitted so as to allow these Maritime industry uses to easily locate in these properties. Much of the harbor area’s regulation is imposed by the State, with the City only able to propose changes through its Harbor Planning process. In the coming Harbor Plan update, the City must make the case for an expanded list of permitted uses and the flexibility necessary to respond quickly to opportunities as they arise.
- Predictable Regulation: The City should produce a set of graphics and flowcharts that clearly depict the review process, with estimated timelines, and the different overlapping permitting authorities and the specific jurisdictions and subject areas they are regulating. These graphic representations of the review process can educate property owners and help to illustrate places where regulations might be better streamlined. MAPC has produced a workbook with a variety of recommendations municipalities can use to improve their permitting process. A key strategy is to include within the regulations those requirements desired by the community to the greatest extent possible without requiring special board approvals; put another way, seek every opportunity to make the desired development “by-right” under the ordinance relying on thorough, professional staff review of the application, as many municipalities now do. Where



Metropolitan Area Planning Council (MAPC)
Executive Director Marc Draisen at the summit

State regulation is involved, the City should act as an advocate, to the extent that it is able, to help move an application through the process.

- Harbor Area Capital Improvement Plan: In conjunction with the next harbor planning effort, the City should seek to clearly identify infrastructure deficiencies in the harbor area. A strategic action plan for addressing these deficiencies should be developed that prioritizes action, identifies the responsible entity and funding, and recognizes that implementation will likely rely on different forms of public/private partnerships that spread the cost burden amongst the public and direct beneficiaries.
- '14C2' Parcel: The City has given a great deal of thought to the development of this City-owned, harbor front property. A public input process generated a range of ideas for its reuse and the current request for proposals will likely generate further ideas. Whatever proposal the City ultimately accepts for this site, it should follow the lead of numerous comments that have indicated that the site should support multiple benefits including providing public access, tourist attraction, and benefits to the fishing community. The site represents a key opportunity for the City; harbor front land adjacent to an attractive downtown is relatively rare. There would be value in the Mayor and the Maritime E-Board hosting a focus group with key federal and state agencies as well as regional academic institutions and other Maritime industry stakeholders like MOTN around ideas for utilizing this site.
- Dedicated Staffing: The City has already begun steps to create a new staff position focused on economic development. This economic development position should be strongly connected to, and coordinated with, harbor area planning and community development activities. This position should serve as the point person on economic development issues and the point of contact for businesses and other key institutions looking to invest in Gloucester.
- Workforce Development: Marine Science and Technology industry businesses have indicated a strong demand for Marine Engineers and, more generally, employees with experience in the ocean environment. Gloucester should work with local school systems, community colleges and universities to fill this need by strengthening math and science curriculums and ensuring that there are marine based curriculums in the local primary schools, and encouraging colleges and universities to build up Marine Engineering and general marine related programs. Finally, students in the local primary schools should be encouraged to gain experience with sailing, boat operations, and other aspects of the ocean environment. Gloucester has a strong heritage in these areas that represents a strength that must be preserved.

Funding

Funding to support initiatives that would help to build and diversify the harbor based economy in Gloucester, including those actions identified above and other projects that will likely come through collaborative efforts in the future, will necessarily come from a variety of sources. Generally, these can be divided into Local Public Investment by the City of Gloucester, Local Public/Private Partnerships, and State and Federal Grants.

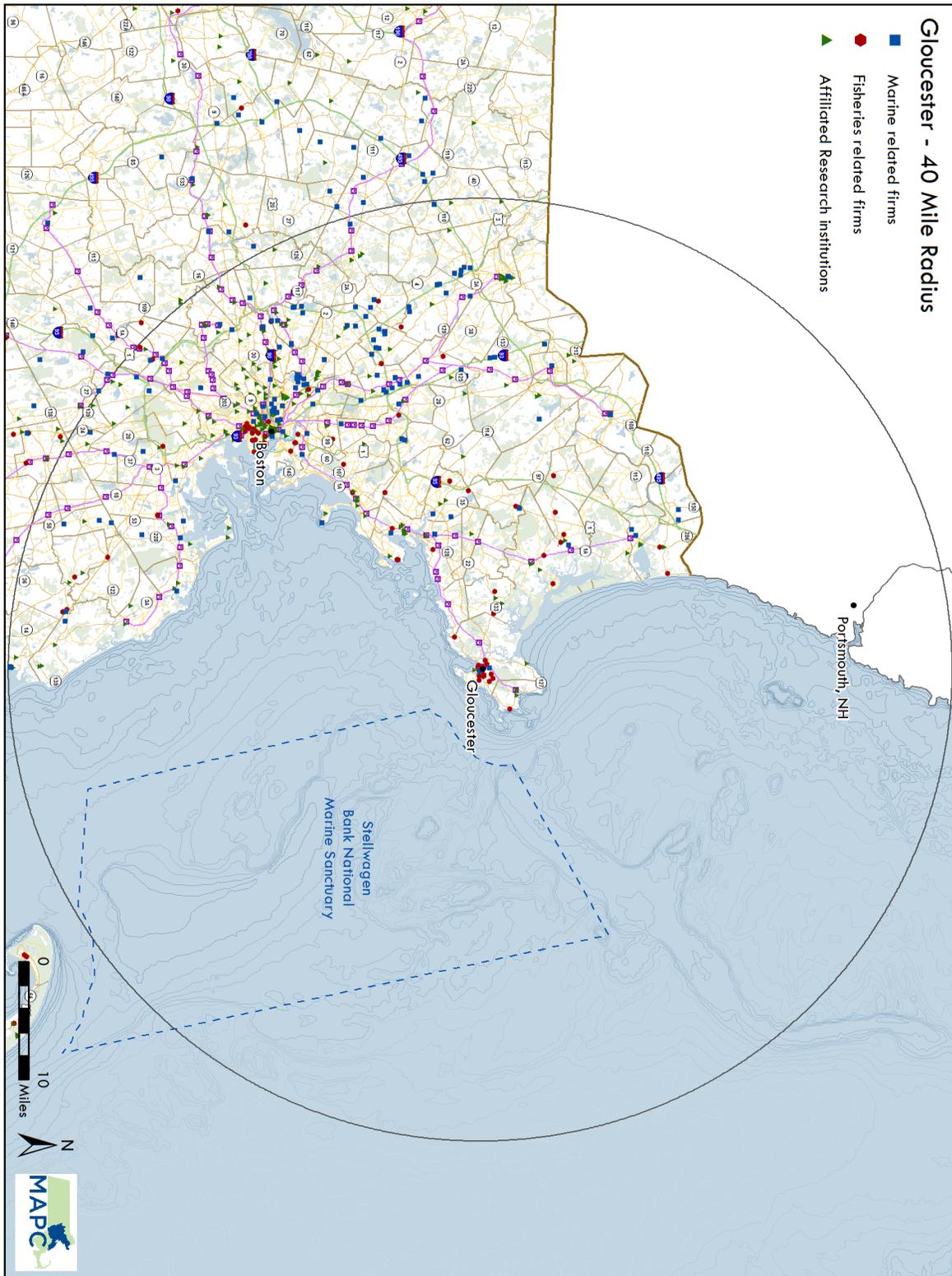
Local Investment – The City of Gloucester’s contribution will primarily be investment of professional staff time; investigating trends in maritime businesses and research, convening stakeholders, working out solutions to regulatory issues and developing new policy, working with the private sector to review and facilitate development proposals, and tracking implementation and progress.

Public Private Partnerships – In some instances, the City may decide to leverage public funds by providing necessary public infrastructure or land that will allow a private development project to proceed while at the same time providing a wider benefit to the harbor area and the City as a whole.

Federal and State Funding – The EDA, in sponsoring the Economic Development Assessment Team visit and funding Gloucester’s Maritime Summit, has already demonstrated a commitment to helping to mitigate the economic impacts of Federal regulation of the fishery. EDA, the multiple agencies who were part of the Economic Development Assessment Team (see glossary) and other Federal agencies must be part of a specific, strategic, short and long term plan for infrastructure and planning funds. Further, the Commonwealth of Massachusetts, through the Executive Office of Housing and Economic Development and Secretary Greg Bialecki (see glossary), offers a wide scope of resources in financing mechanisms for private and public projects as well as technical assistance to support job creation and economic development projects. Many of these State and Federal resources are detailed in the “Gloucester Harbor Economic Development Plan” and in the “Choosing to Compete In the 21st Century: An Economic Development Policy and Strategic Plan for the Commonwealth of Massachusetts.”

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Appendix A: Map



Appendix B: Summit Notes

The following words and phrases reflect the dialogue sessions from the two days of the Summit. Participants were broken out into three groups where MAPC staff facilitated conversations related to the strengths, challenges, needs, and opportunities of Gloucester and its harbor area and identified actions that should be taken in response to these conditions. Scribes in each break-out group took notes on what was said, which are summarized and presented below.

Strengths

- Partnership-building has begun; basis to continue networking
- Strong local leadership.
- Organizations are here, pieces are in place: Seaport Advisory support; NE Seafood Coalition; MA Fishermen's Partnership
- Gloucester is a Designated Port Area
- Fish and fishermen; the sea life
- NOAA and other governmental organizations located in Gloucester
- A model of fisheries management that is going to preserve the resource for decades to come
- Small business diversity
- Knowledge and skills of the fishermen.
- Continued authenticity of community – make heritage widely known

Challenges

- Securing funding
- The perception that Gloucester is divided in interests
- No industrial classification code for maritime industry, so it may be hard to find firms and partners
- Cooperation with existing federal agencies (e.g., NOAA/NIMS) could be better
- Too many challenges on the fishermen's time to develop the partnerships with scientists – capacity problem

- Contaminated waterfront properties, complex regulatory environment an issue

Needs

- Need unified approach for larger requests for large institution and political leaders
- Intellectual network or think-tank: lecture series, meetings, communications/social media, conferences
- Infrastructure: technological infrastructure, water and sewer, building space, dock/pier facilities, light; parking
- Industries that provide opportunities to next generation
- Increase use of “green” or energy-efficient technology
- Partnerships with local government
- Leadership and capacity
- Great schools – emphasis on math and science
- Retraining fisherman/workforce for research work
- Vision, marketing, branding and promotion
- Community support
- Congressional support
- Sustainable ocean management
- Affordable housing and commuter rail
- Business specific
- Streamlined regulatory process
- Economic incentives for new marine technology businesses
- Lab space

Opportunities

- Better/stronger relationship with maritime academies
- Establishing a new educational institution

- Attracting biotech industries
- Becoming a part of Marine Highway activities; freight highway to Maritime Highway
- Preparing for rail-based shipping
- Marine sciences/cluster for ocean science research
- Boat building
- Sea logistics resource for marine technologies
- Become a marine food production hub
- Ocean monitoring
- Research
- New marine products
- Developing relationships with educational Partners: MIT, UMass Lowell, WPI, Woods Hole, UNH, Roger Williams, Tufts, The Landing School, law schools, regional high schools, technical schools
- Developing relationships with other partners: Cape Ann Business Incubator, Maritime E-Board, Cape Ann Chamber of Commerce, Fisheries Commission, NOAA, Seaport Advisory Council, Mass Maritime, technology councils
- Developing national and global partnerships
- Expanding the visitor-based economy and eco-tourism
- Integrating local knowledge/skills from Gloucester residents

Actions

- Build on past planning efforts around economic development by identifying gaps and opportunities
- Develop technological infrastructure (broadband) and physical infrastructure (water, sewer) for businesses
- Create a vision statement for Gloucester that includes core values, areas of focus, and is a consistent message
- Have a “go to” person/coordinator who is the contact for maritime-related business investment/development in Gloucester

- Develop a think tank where actionable items are implemented – including and harnessing local talent and capabilities before looking for outside help
- Engage in community outreach consensus-building activities around maritime economic development
- Make I4C2 parcel location for biotechnology and research center – multi-use, multi-university, commercial collaboration or fisheries institute
- Institute streamlined/expedited permitting
- Develop partnerships and establish a regional maritime industry coalition
- Information on existing businesses and city or locational assets
- Develop long-term partnerships with higher education
- Issue a comprehensive report on Gloucester Maritime Summit
- Become a “sister city” with San Diego and Maritime Alliance
- Leverage congressional support
- Leverage funding outside of “typical” channels
- Improve marking and branding for Gloucester after determining identity
- Strategize to diversify businesses
- Develop and establish a research center
- Map assets – economic resources of existing businesses and fishing industry assets
- Research modern designs for fishing fleet
- Outreach to research community to get sense of what they are looking for
- Start networking – create a database of groups collaborating on maritime economy
- Create a business directory of Gloucester maritime businesses
- Advance boat building industry

Appendix C: Glossary of terms

Blue Economy: An international community of companies, innovators and scientists, providing open source access to develop, implement and share prosperous business models that strive to improve natural ocean ecosystems and the quality of life for all.

Cradle-to-cradle design: A biomimetic approach to the design of systems. It models human industry on nature's processes in which materials are viewed as nutrients circulating in healthy, safe metabolisms. It suggests that industry must protect and enrich ecosystems and nature's biological metabolism while also maintaining safe, productive technical metabolism for the high-quality use and circulation of organic and synthetic materials. Put simply, it is a holistic economic, industrial and social framework that seeks to create systems that are not just efficient but essentially waste free. The model in its broadest sense is not limited to industrial design and manufacturing; it can be applied to many different aspects of human civilization such as urban environments, buildings, economics and social systems.

Designated Port Areas: Source of the law is Massachusetts General Laws c. 91: Public Waterfront Act; 301 CMR 25.00: Designation of Port Areas; 310 CMR 9.00: Waterways Regulations. These are state-designated areas of concentrated maritime industrial activities. Projects proposed in Designated Port Areas (DPAs) must be maritime industrial uses or supporting uses. The state has designated areas in developed ports for the purposes of promoting and protecting marine industrial activities and certain supporting uses. DPAs have been set aside in Gloucester Inner Harbor, Beverly Harbor, Salem Harbor, Lynn, Mystic River, East Boston, Chelsea Creek, South Boston, Weymouth Fore River, New Bedford-Fairhaven, and Mount Hope Bay.

Gloucester's New Maritime Port Economy: The mutually reinforcing synergy between businesses and organizations representing three strong and growing industry clusters in the harbor area, as well as the greater Gloucester community, leading to a diverse and productive local economy producing innovative solutions for the inter-related issues of the marine environment in a revitalized and vibrant harbor area. Inherent to this idea is a focus on Sustainable Economic Development.

Gurry: First known use about 1850. Originally a whaling term for the refuse left over from processing whale blubber. Origin unknown. Now the term for a waste product left behind after fish processing, or more specifically those parts of harvested fish product that remain once the fish has been cleaned and filleted.

Industry Cluster: A geographically concentrated group of interconnected businesses and institutions.

Maritime Industry: Defined in the 2010 Gloucester Harbor Economic Development Plan as all marine related activities other than fishing and tourism.

Marine Science and Technology Cluster

A diverse range of industries producing technologies and equipment for use in the marine environment, including basic equipment from communications antennas and chain and rope to undersea robotics and sensor systems. There are five primary sectors; Marine Instrumentation and Equipment, Marine Services, Marine Research and Education, Marine Materials and Supplies, and Shipbuilding and Design.

- ✓ **Sector One: Marine Instrumentation & Equipment** – Firms producing equipment used for sensing and measuring the marine environment. These include oceanographic and geophysical measuring instruments, acoustics for underwater remote sensing, imaging and positioning, electronics for marine instruments which enable these systems to function in underwater conditions, and electronics for marine navigation and communication.
- ✓ **Sector Two: Marine Services** – This sector includes marine engineering and consulting firms, floating research facilities, applied research, design, testing and evaluation, and marine security or defense firms.
- ✓ **Sector Three: Marine Research & Education** – This category is made up of higher education institutions, marine research institutes, industry groups, and some consulting groups.
- ✓ **Sector Four: Marine Materials & Supplies** – Firms providing the material inputs for marine activities such as paints, engines, riggings, machinery, mooring systems, and other supplies.
- ✓ **Sector Five: Shipbuilding & Design** – Firms engaged in the design or building of boats, including major defense related shipbuilding operations.

Marine Science and Technology Cluster, Cross Cluster Areas

- ✓ **Sector One: Marine Biotech** – Biotech from the sea, this category refers to biological compounds or components drawn from marine life for the beneficial use of people.
- ✓ **Sector Two: Marine Cleantech** – Firms developing off-shore alternative energy, including wind turbines and systems harnessing tidal energy.

Economic Development Assessment Team: In May of 2011, the U.S. Commerce Department organized economic development assessment teams to conduct a two-day analysis of six Northeast fishing communities. The teams visited Portland, ME; Seabrook, NH; New Bedford, MA; Gloucester, MA; Point Judith, RI; and Montauk, NY. The assessment teams will conducted meetings with local leaders to help identify economic development challenges and opportunities facing local industries and communities. Several federal agencies were represented on the team: Department of Commerce, Economic Development Administration, Small Business Administration, US Department of Agriculture, Environmental protection Agency, US

Department of Housing and Urban Development, and the US Department of Labor. The intended outcome of these visits was to provide the critical first step to evaluating and mitigating economic impacts and laying the groundwork for economic resiliency.

Marine and Oceanographic Technology Network (MOTN): Originated as the Massachusetts Ocean Technology Network. MOTN was formed in 1994 as a non-profit corporation with the express purpose of promoting, supporting, and expanding the marine technology manufacturing and service businesses within the state of Massachusetts. The state recognized that Massachusetts had become a hotbed of oceanographic technology, and provided seed money to form a network that would foster cooperation and synergy within this industry to encourage the development and expansion of local business opportunities.

Massachusetts Executive Office of Housing and Economic Development (EOHED): Greg Bialecki, Secretary of EOHED, and the Economic Development Planning Council recently releases a report outlining five initiatives – advancing education and workforce development for middle-skill jobs through coordination of education; economic development and workforce development programs; supporting innovation and entrepreneurship; supporting regional development through infrastructure investments and local empowerment; increasing the ease of doing business; and addressing our cost competitiveness. The steps the council points to in each category describe ways in which government, business and academia can work in collaboration to make Massachusetts more competitive in the national and international economy

Massachusetts Seaport Advisory Council: The purpose of the Seaport Council is to enhance and develop the commercial maritime resources of the Commonwealth, with an emphasis on the next tier deep water ports – Fall River, Gloucester, New Bedford and Salem. The Seaport Council achieves this by investing in projects that are focused on the commercial fishing industry, dredging, port marketing, public access, port institutional infrastructure and port physical infrastructure, safety and security, and short sea shipping.

Metropolitan Area Planning Council (MAPC): The regional planning agency serving the people who live and work in the 101 cities and towns of Metropolitan Boston. We work toward sound municipal management, sustainable land use planning, protection of natural resources, efficient and affordable transportation, a diverse housing stock, public safety, economic development, an informed public, and equity and opportunity among people of all backgrounds. One of our core functions is to serve as a resource and partner to the region’s municipalities. Our regional plan, MetroFuture, guides our work as we engage the public in responsible stewardship of our region’s future.

North Shore: The North Shore has no fixed definition as a region; it is loosely defined as the coastal area between Boston and New Hampshire. The North Shore is an important historical, cultural, and economic region of Massachusetts and contains the cities of Gloucester and Salem. The region also prominently figures in the works of New England poets, from T.S. Eliot to Robert Lowell.

It may include only those communities between Boston and Cape Ann. The Massachusetts Office of Coastal Zone Management refers to the North Shore as the coastal region of Massachusetts north of Boston stretching from Salisbury to Revere, including the inland city of Amesbury. MAPC and the North Shore Chamber of Commerce define the North Shore as encompassing Cape Ann and several inland communities.

Ocean Alliance: A 501 (c) 3 organization founded in 1971 by Roger Payne. In the January 1979 issue of National Geographic, Dr. Payne said, "Pollution has replaced the harpoon as a mortal threat to whales, and in its way can be far more deadly." Believing that rigorous science and widespread public education are basic requirements for long-term conservation, Dr. Payne founded Ocean Alliance for the purpose of carrying out both these global missions. Ocean Alliance has research partnerships in South America and a research vessel, *Odyssey* (a 93-foot, steel, ocean-going ketch), that operates in all the world's oceans from her home base in Gloucester, Massachusetts.

Pelagic fish: These fish live near the surface or in the water column of coastal, ocean and lake waters, but not on the bottom of the sea or the lake. The marine pelagic environment is the largest aquatic habitat on earth, occupying 1,370 million cubic kilometers, and is the habitat for 11 percent of known fish species. The oceans have a mean depth of 4000 meters. About 98 percent of the total water volume is below 100 meters, and 75 percent is below 1000 meters. Marine pelagic fish can be divided into coastal fish and oceanic fish. Coastal fish inhabit the relatively shallow and sunlit waters above the continental shelf, while oceanic fish inhabit the vast and deep waters beyond the continental shelf. Pelagic fish range in size from small coastal forage fish, such as herrings and sardines, to large apex predator oceanic fishes, such as the Southern bluefin tuna and oceanic sharks. They are usually agile swimmers with streamlined bodies, capable of sustained cruising on long distance migrations. The Indo-Pacific sailfish, an oceanic pelagic fish, can sprint at over 110 kilometers per hour. Some tuna species cruise across the Pacific Ocean. Many pelagic fish swim in schools. Others are solitary, like the large ocean sunfish weighing over 500 kilograms, which sometimes drift passively with ocean currents, eating jellyfish.

Appendix D: Summit speaker bios

Gloucester's New Maritime Port Economy Summit

November 15 & 16, 2011

Gloucester, Massachusetts

Biographies for Panelists and Presenters

Steve Barrett

Mr. Stephen Barrett is the Director of Clean Energy at Harris Miller Miller & Hanson, and a LEED Accredited Professional. He has nearly 20 years of experience in environmental and regulatory consulting. His background is in marine science and regulation, and he began his career at the Massachusetts Office of Coastal Zone Management. As a consultant, he has been involved with environmental impacts assessments for beach nourishment, desalination, submarine cables, coastal habitat restoration, coastally-sited combined cycle power plants, and offshore renewable energy. Most recently, Mr. Barrett has been focusing exclusively on renewable energy and sustainable development initiatives, including in the siting, design and financial analyses of wind, solar, tidal, and geothermal projects, and sustainability planning. He has recently worked for the City of Gloucester in reviewing land-based wind projects. He was born and raised in Gloucester, but now lives with his family in Concord, Massachusetts.

Dr. David Burke

Dr. David Burke received a B.S. degree from the U.S. Naval Academy and a Ph.D. in Ocean Engineering from the Massachusetts Institute of Technology. He served in the US Navy for 23 years, retiring with the grade of Captain. While in the navy, he was involved in design and development of submarines and propulsion systems. Following his naval service, he joined Draper Laboratory, serving as VP Engineering. After leaving Draper Laboratory, he joined MIT, teaching subjects in ship structural and propulsion system design. Prior to retirement from MIT, he served as Program Manager, for the Center for Environmental Sensing and Modeling program in Singapore. He and his wife Barbara are now retired and living in Gloucester, MA.

Harlan Doliner

Harlan Doliner is an environmental and maritime attorney practicing at the Boston office of Verrill Dana LLP, and an adjunct professor for the Law Schools at Boston College and Roger Williams University. He is the current president of the Marine & Oceanographic Technology Network and Vice-Chairman for Governmental Relations for the Environmental Business Council of New England. Harlan's practice includes maritime security and marine technology issues; coastal project development; environmental risk-assessment and management; regulatory permitting, compliance and enforcement defense; transaction risk evaluation and support; hazardous waste site reuse and the full spectrum of air, water and land use issues and permitting.

From 1983 - 1998, Mr. Doliner was a lead counsel in the federal, state and administrative matters dealing with the clean-up of Boston Harbor, including negotiating the required water-borne

transport of personnel and materials to and from Deer Island. From 1986-1993, he was a lead counsel in the legislative, state and administrative matters relating to the proposed co-generation facility at Quonset Point, Rhode Island. An officer in the U.S. Coast Guard Auxiliary since 2001, Harlan's duties include Commander, Auxiliary Division 5 and the pre-arrival marine safety and security screening of foreign flag vessels for Sector Boston Port State Control. In 2004, Harlan was a member of one of six 4-person Coast Guard Auxiliary teams representing the United States in the International Search and Rescue Competition.

Successfully completing the course and examination administered by the British Standards Institution, Mr. Doliner is certified in the implementation of ISO-14000 series environmental management systems. Educated at Johns Hopkins and at Boston College Law School, Mr. Doliner is admitted to practice in Massachusetts state and federal courts, and before the US Supreme Court. In 2006, publisher ReedLogic released the DVD Coastal & Maritime Security and Environmental Compliance in the Post 9/11 World featuring Mr. Doliner. Harlan's peers elected him a Massachusetts SuperLawyer in 2004-2011; and a New England SuperLawyer in 2007, 2009, 2010 and 2011.

Kevin Hively

Kevin Hively is the President and founder of Ninigret Partners (NP). Ninigret Partners is a business advisory & economic development consulting firm with offices in Providence, RI and Washington, DC. Ninigret Partners has a diverse set of experiences involving waterfront development and management, marine trades and marine technology. Past projects have included development of Industrial waterfront management strategies, conceptual design of technology parks involving marine bioscience and marine technology, aquaculture incubators, marine trades, megayacht facilities, recreational water uses, and economic benchmarking for the water dependent sector of the economy.

Prior to forming Ninigret Partners he was a member of the Global Leadership Management Team for Telesis, the strategy consulting arm of Towers Perrin. Prior to Telesis, Mr. Hively was Director of Policy for the Governor of Rhode Island. He also served as Vice Chair of the Rhode Island State Planning Council.

Brian Hodder

Brian Hodder is a Project Manager at MIT working on utility-scale energy storage designed to be used for both storage and anchoring for floating energy harvesting platforms - wind, wave, and ocean current. Brian has been involved with the energy industry since 2000, first with an energy trading company where he gained exposure to power, natural gas and emission allowances, and later with a start-up natural gas retailer, and a start-up solar charge controller company that arose out of the Ignite Clean Energy competition at MIT. Following a period of consulting to the energy storage project he was hired to help move the project forward, with specific responsibilities that include identifying potential sites for deploying this technology. He has also participated on an expert panel established by the American Society of Mechanical Engineers to develop an "Energy Scorecard" to evaluate the U.S. energy sector. Brian has a B.S. in Public Policy ('83) and an MBA ('88) both from Cornell University.

Tim Jackson

Tim is an Industrial Technology Advisor with the National Research Council of Canada's Industrial Research Assistance Program, based in Saint John, New Brunswick. NRC-IRAP is Canada's National program for providing R&D support to innovative small and medium-sized enterprises. With the program since 2002, he has sectoral responsibility for its delivery to the aquaculture and biotechnology sectors in the province of New Brunswick and provides business and technical advice to clients in the Atlantic Region and Nationally. He also currently serves as President of the Aquaculture Association of Canada. He sits on a number of National and Regional and Provincial advisory committees related to the aquaculture and biosciences sectors. He has a B.Sc. in Marine Biology and an M.Sc. in Zoology and for the past 19 years has been employed in the private, university, provincial, and federal government sectors in the areas of aquaculture production improvement, genomics, forensic biology, the culture of marine finfish, and biotech applications in the aquaculture industry. With respect to New England, Tim worked for 2 months at the Canadian Consulate in Boston in 2010 on expanding their aquaculture and marine biotech network and previously worked with the Consulate and the University of New Hampshire on improving Canada-US collaboration on offshore aquaculture technology development.

Michael Jones

Michael is President of The Security Network and also of the affiliated The Maritime Alliance. Michael is also President of ProFinance Associates, Inc., an investment banking firm headquartered in San Diego that has focused on the security industry since its inception in 1985. ProFinance was the originator and Michael was Chair of the Securing New Ground conference which is focused on the "Business of Security" and takes place in NYC each Fall.

The goals of the Maritime Alliance are to organize the San Diego maritime technology community as a formal cluster and to reach out nationally and internationally to promote development and rapid adoption of innovative maritime technologies and collaborative business opportunities.

Michael has sat on a number of corporate Boards of Directors nationwide. In San Diego, Michael also sits on the Advisory Board of the Entrepreneurial Management Center and the Advisory Board for the College of Engineering, and lectures in the Business School at San Diego State University, and sits on the Board of the San Diego chapter of the Marine Technology Society.

Michael was born in Germany and grew up in Arizona. He earned a Masters Degree from the Johns Hopkins University School of Advanced International Studies. His graduate studies included a year in Bologna, Italy; a year at the Catholic University in Lima, Peru; and internships at the International Atomic Energy Agency in Vienna and at the European Community headquarters in Brussels. He speaks five languages. He is a graduate of the FBI Citizens' Academy and a member of the FBI InfraGard program.

Dr. Pierre F.J. Lermusiaux

Dr. Lermusiaux is an Associate Professor of Mechanical Engineering and Ocean Science and Engineering at MIT. He obtained an Ir./B. in Mechanical Engineering from Liege Univ. in 1992 and a Ph. D. in Engineering Sciences from Harvard University in 1997. He has held a Fulbright

Foundation Fellowship, was awarded the Wallace Prize at Harvard in 1993, and presented the Ogilvie Young Investigator Lecture in Ocean Engineering. at MIT in 1998. He was awarded the MIT Doherty Chair in Ocean Utilization (2009-2011) and the 2010 Ruth and Joel Spira Award for Distinguished Teaching by the School of Engineering at MIT. He has made outstanding contributions in data assimilation, as well as in ocean modeling and uncertainty predications. His research thrusts include understanding and modeling complex physical and interdisciplinary oceanic dynamics and processes. With his group, he creates, develops, and utilizes new mathematical models and computational methods for ocean predictions and dynamical diagnostics, for optimization and control of autonomous ocean observation systems, for uncertainty quantification and prediction, and for data assimilation and data-model comparisons. He has participated in many national and international sea exercises. He has served on numerous committees, and has organized several major meetings. He is associate editor in three journals. He has more than sixty refereed publications.

Dr. Molly Lutcavage

Dr. Molly Lutcavage is Director of the Large Pelagics Research Center, and Research Professor, University of Massachusetts Amherst. Along with her colleagues, Lutcavage helped develop pop-up satellite tagging methodologies for large marine animals, and has authored over 60 peer-reviewed research papers. Much of her research has involved research partnerships with commercial and recreational fishermen. Her bluefin tagging and ecological research program includes collaborations with US, Canadian, and Mediterranean researchers and fishermen, and supports many graduate student and postdoctoral projects. Since 1979, Dr. Lutcavage has also headed numerous studies on sea turtle ecology, physiology, and conservation. She is a member of the SSC of Climate Change Impacts on Top Predators, the International Union for Conservation of Nature Sea Turtle Specialists group, and has served on the U.S. Scientific Advisory Committee for International Commission for the Conservation of Atlantic Tunas since 1995, and the Science and Statistics Committee of the Western Pacific Fisheries Management Council since 2008.

Ann Molloy

Ann Molloy was born and raised in Gloucester. After several years of traveling around the country and the world, she settled back in Gloucester to help run her family business, down the Fort, which was purchased by her Grandfather in 1920. The business has changed and adapted to the times, over the years. Ann is now in charge of Marketing and Sales for the Neptune's Harvest division of Ocean Crest Seafood's, which came about as a way to fully utilize 100% of the Fish, by turning the gurry (everything that's left after you fillet a fish) into an organic fertilizer.

Dr. Valerie Nelson

Valerie Nelson is the Director of the Water Alliance, a coalition of advocates for and experts in 21st Century water management innovations. The Alliance is committed to a restoration of the Water Commons and use of integrated infrastructure that mimics and works with nature at all scales. Dr. Nelson is Chair of the Decentralized Systems Advisory Committee at the National Decentralized Water Resources Capacity Development Project hosted by WERF, and served two terms on the Gloucester City Council. She was the Director of the Lighthouse Preservation Society and was a Lecturer and Visiting Assistant Professor at the Harvard Kennedy School of

Government and M.I.T. Nelson's degrees in Economics include a B.A. from Harvard University, M.Sc. from London School of Economics, and PhD from Yale University.

Dr. Roger Payne

Roger Payne is best known for his discovery in 1967 that humpback whales sing songs. Since that time he has led over 100 expeditions to all oceans, and studied every species of baleen whale in the wild. Roger has pioneered many of the benign research techniques now used in more than 60 countries to study free-swimming whales. He has participated in numerous international meetings regarding conserving whales and trained many of the current leaders in whale research, both in America and abroad. He has appeared in over 40 documentary films for television, a few of which he has presented and/or written himself. He co-wrote and co-directed the IMAX film WHALES. An award-winning film about his work - Life Among Whales - is currently being screened worldwide. Roger also publishes technical articles and writes for general audiences.

Roger's honors and awards include a knighthood in the Netherlands, a MacArthur Fellowship, the similar Lyndhurst Prize Fellowship, the Albert Schweitzer medal of the Animal Welfare Institute (shared with his first wife, Katy Payne), the Joseph Wood Krutch medal of the Humane Society of the U.S., the James Duggan Memorial Award of the American Littoral Society, the University of Massachusetts Writing and Society Award, a United Nations (UNEP) Global 500 award, the Emmy for Best Interview (for his interview with Charlie Rose, in One-On-One With Charlie Rose). He was a finalist in 2006 and 2008 for the Indianapolis Prize and the 2007 winner of Oxford University's Dawkins Prize.

Donald W. Perkins

Don Perkins has served as the Gulf of Maine Research Institute's President & CEO since 1995. Don manages GMRI's evolution as a strategic science, education, community institution catalyzing solutions to the complex challenges of ocean stewardship and economic growth in the Gulf of Maine bioregion.

Don brings an eclectic mix of private sector and not-profit sector experience to GMRI. Prior to joining GMRI, he instructed at the Hurricane Island Outward Bound School, directed the Marin Conservation Corps in California, served as a financial advisor to Native American tribes at Tribal Assets Management, and managed the operations of Binax, Inc., a medical diagnostics company.

Don has been active in the marine resource arena on multiple levels. He currently serves as a director with the Gulf of Maine Lobster Foundation and the Maine Innovation Economy Advisory Board. He previously co-chaired the Governor's Ocean Energy Task Force and served on the boards of the Gulf of Maine Ocean Observing System, Gulf of Maine Council on the Marine Environment, the Maine Department of Marine Resources Advisory Council, and the Maine Legislature's Task Force on the Development of Aquaculture. Outside the marine market, Don has served on the Board of Directors of MMG Insurance since 2005.

Don holds a B.A. in Anthropology from Dartmouth College and a M.B.A. from the Stanford University Graduate School of Business. His joys are his family, an early morning swim, and a day climbing, sailing, or skiing.

Appendix E: Organizations that attended the summit

The Maritime summit was very well attended and broadly representative of people connected to maritime industries in Gloucester and the region at large. There were approximately 80 attendees on the first day and around 50 on the second, with roughly half of each of the attendees on each day someone whose work was based in Gloucester. Keypad polling was used on each day to collect information on who was attending the event and their perception of the impact of the summit.

On both days, the greatest number of attendees identified their occupation as “Other”, with the next highest industry areas being Fisheries, Education/Training, and Marine/Ocean Science Research respectively. More than half of people said that access to the ocean was essential to their work and 80% said it was at least important. On the second day, nearly 65 to 70% of responders stated that there is “strong potential for the development of Maritime or Marine Science or Technology based industries in Gloucester.” More than 80% responded that the summit definitely increased their understanding of the types of activities occurring in these fields and more than 70% responded that the summit had definitely developed their understanding of how the Port of Gloucester could support growth in the maritime economy.

BioAtlantech

Cambridge Innovation Center

Cat Cove Marine Lab and Hatchery

Canadian Consulate General in Boston

Cape Ann Business Incubator

City of Gloucester Community Development Department

City of Gloucester Office of the Mayor

City of Salem, Massachusetts

Clean Energy HHMS

Coastal Zone Research Institute, NB, Canada

Draper Laboratory

Epsilon Associates

Massachusetts Executive Office of Energy and Environmental Affairs

Fusionview LLC

F/V Angela Rose

Gloucester City Council

Gloucester Economic Development and Industrial Corporation

Gloucester Education Foundation

Gloucester Fisheries Commission
Gloucester Fishing Community Preservation Fund
Government of New Brunswick, Canada
Gulf of Maine Research Institute
Harvard University
Hively Associates
Harris Miller & Hanson Inc.
Homarus, Inc.
Intershell
Large Pelagics Research Institute
Massachusetts Executive Office of Energy and Environmental Affairs
Massachusetts Export Center
Massachusetts Office of Coastal Zone Management
Maritime Alliance
Maritime Gloucester
Massachusetts Seaport Advisory Council
Maritime Ocean Technology Network
Massachusetts Institute of Technology
Massachusetts Institute of Technology Sea Grant
MassDevelopment
Metropolitan Area Planning Council
Montagnino Real Estate
Mortillaro Lobster Company, Inc.
Mt. Auburn Associates
Neptune's Harvest
Nexus Environmental Partners
Northeast Coastal Zone Management
Northeastern Massachusetts Aquaculture Center
National Oceanic and Atmospheric Administration
National Research Council of Canada

New England Whale Research Center
Newburyport Clean Tech Center
Ninigret Partners
Ocean Alliance
Ocean Crest Seafoods Inc; Neptune's Harvest
Ocean Genome Legacy Project
Phil Bolger and Friends, Inc
ProFinance Associates, Inc.
Proteus Industries
Rose Seafood Industries, Inc.
Salem State University
San Diego Maritime Alliance, Seabotix
Small Business Administration
United States Commercial Service
United States Department of Labor
University of Massachusetts Amherst
University of Massachusetts Boston
Urban Harbors Institute
Worldstove

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