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North Shore Blue Economy Phase I: Findings & Vision Forward

EXECUTIVE SUMMARY

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OVERVIEW

The North Shore's history, economic base and culture are built around the ocean and the quality of life it provides. Traditional maritime industries including fishing, tourism, seafood processing and boat building are woven into the regional identity. Today, innovation across industry, science and technology is expanding how we think about the maritime environment to also include new and emerging industries such as marine robotics, ocean sensing, marine biotechnology, aquaculture, offshore wind and coastal resilience design, engineering and construction.

> Blue Economy: The sustainable use of ocean resources for economic growth, improved livelihoods and jobs and ocean ecosystem health.

Terminology has changed to reflect this broader understanding—instead of referring to the "Maritime Economy," we now talk about the "Blue Economy," which is defined by the World Bank as "The sustainable use of ocean resources for economic growth, improved livelihoods and jobs and ocean ecosystem health[1]." While our maritime economy has been studied for decades, exploring our North Shore Blue Economy is an approach to view our ocean as a resource that can generate economic growth, while also addressing and improving ecosystem health that supports long-term sustainability for the region. Accordingly, the goal of the North Shore Blue Economy initiative over the next ten years is to build and implement a resilient, sustainable, equitable and integrated Blue Economy network which builds upon our strengths and positions the region to capitalize on emerging opportunities in the Blue Economy.

A FOUNDATION TO BETTER UNDERSTAND THE NORTH SHORE'S COMPETITIVE POSITION IN THE BLUE ECONOMY

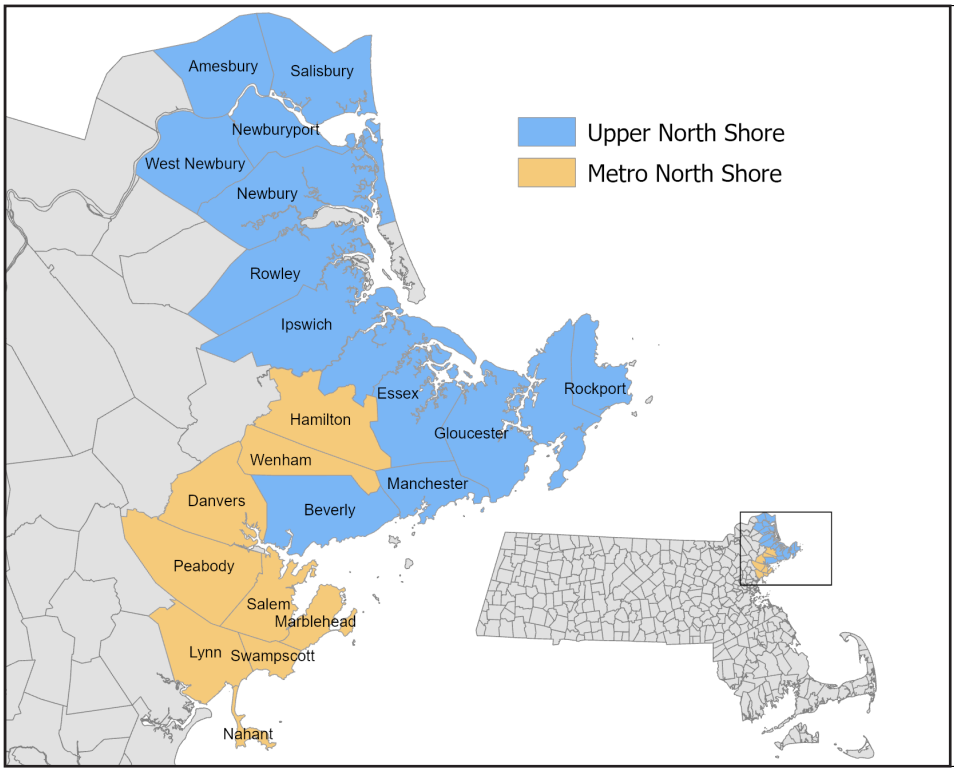
The experience of other regions across the state and nation makes it clear that regional economic development efforts that build on existing strengths are best positioned to achieve success and prosperity. The Blue Economy is becoming recognized as an important driver of jobs, innovation and economic growth globally (OECD, United Nations Goal 14), nationally (US Senate Oceans Caucus, NOAA 2021-2025 Blue Economy Strategy, US Economic Development Administration), in Massachusetts (Seaport Economic Council) and regionally (South Coast, Cape Cod). Now is the time to collectively mobilize the North Shore region. This report offers a foundation for business and community leaders to understand our competitive position in the sectors that make up the North Shore Blue Economy.

This study provides a comprehensive baseline assessment that quantifies the regional economic base, identifies leading and emerging industry clusters, provides a profile of the current regional population and workforce, and describes the composition, size and growth opportunities for Blue Economy businesses. The Project Team also engaged nearly 300 stakeholders to assess their perceptions of regional strengths and challenges, their visions for developing a vibrant Blue Economy and the steps needed to achieve those visions. The report shares findings, four interconnected opportunities to develop resilient, sustainable, and equitable Blue Economy strategies and a vision forward to catalyze and capitalize upon them.

[1] World Bank Group (2017). http://www.worldbank.org/en/news/infographic/2017/06/06/blue-economy

GEOGRAPHY

For the purposes of this study, the North Shore is defined as 21 primarily coastal communities, from Nahant in the south to the New Hampshire state line. These communities are home to an estimated 435,065 people, comprising 56% of Essex County and 6.4% of the Commonwealth[2]. Overall, the North Shore region is strongly tied economically to the Greater Boston area. However, an analysis of regional commuting patterns shows that there are "Metro North Shore" communities, where the majority of workers commute to Greater Boston and "Upper North Shore" communities, which have more inter-commuting relationships within the North Shore than with Greater Boston. This differentiation is perceived as a regional strength, in that it has both a strong coastal "self-sufficient" economy, as well as communities with a "front door" to Greater Boston's finance, life science and technology innovation economy.



KEY FINDINGS: DEMOGRAPHIC & ECONOMIC BASELINE ANALYSIS

The regional population is growing. The region's population grew by 4.9% from 2010 to 2019 and is projected to grow by 7.8% between 2010 and 2040.

The workforce is highly educated. North Shore residents age 25 and older possess high levels of education, with 42.2% having earned at least a Bachelor's degree. However, some of the region's most populated communities have the lowest levels of educational attainment, including Lynn, Peabody and Gloucester.

Residents have high incomes. The median household incomes of 16 of the region's 21 communities exceed the statewide median of $81,125.

[2] U.S. Census Bureau, 2015–2019 ACS 5-year estimates

There is a large number of workers moving into and out of the region for work on a daily basis. Local opportunities that match these workers' skills or new ideas that incubate regional opportunities present an opportunity to keep the region's most highly-skilled workers employed in the region.

Housing is a challenge. While the aforementioned bode well for economic growth and job creation, the high cost of housing in the area and the lack of affordable rental units in many North Shore communities presents a major challenge for economic growth and for attracting young families to the region.

The region's overall industry profile is similar to the national economy, but the region has competitive advantages relative to the nation as a whole. North Shore industry clusters that have a location quotient (LQ) above 1.0 means the region is more specialized in this industry than the nation as a whole. The region is most specialized in the Fishing and Fishing Products industry cluster, as well as several technology-based industry clusters such as Aerospace & Defense, Medical Devices, and IT & Analytics. These industries, along with other regionally specialized and emerging industries (e.g., Biopharmaceuticals, Marketing, Design, Publishing) show competitive advantage and highlight opportunities for growing and promoting the region's Blue Economy in both traditional and tech-oriented Blue Economy sectors.

Industry Cluster	LQ	Employment
Fishing/Fishing Products	11.2	900
Aerospace Vehicles & Defense	8.4	6,921
Biopharmaceuticals	4.7	1,782
Medical Devices	4.7	1,762
IT & Analytics	2.9	4,861
Education/Knowledge Creation	1.9	8,181
Marketing, Design, Publishing	1.6	3,631
Food Processing and Mfg.	1.5	2,281
Performing Arts	1.2	980
Lighting & Elec. Equipment	1.2	483
Downstream Chemical Products	1.1	400
Financial Services	1.1	2,851

SOURCE Emsi, 2020

The strength of our North Shore Blue Economy is a combination of mature and emerging specialized industry clusters and opportunities in both traditional maritime industries and technology-based industries not always perceived as being connected to the ocean.

THE NORTH SHORE'S BLUE ECONOMY

The Blue Economy, as defined in this assessment, includes six primary sectors[3,4]: Coastal Tourism & Recreation, Living Resources, Marine Transportation, Marine Construction, Ship & Boat Building & Repair and Offshore Minerals.

- These sectors employ 16,485 workers and account for 7.9% of the total jobs in the region.
- Coastal Tourism & Recreation accounts for the vast majority of employment, with 87% of the total number of Blue Economy jobs, followed by Living Resources (8.4% of total) and Marine Transportation (2.9% of total)[5].

Sector	Jobs 2020	Proportion 2020	# Change 2004-2020	% Change 2004-2020
Coastal Tourism & Recreation	14,350	87.0%	2,920	25.5%
Living Resources	1,393	8.4%	-517	-27.1%
Marine Transportation	474	2.9%	242	103.8%
Marine Construction	172	1.0%	15	13.6%
Ship & Boat Building & Repair	81	0.5%	38	90.0%
Offshore Minerals	16	0.1%	-54	-77.2%
Total:	**16,485**	**100%**	**2,644**	**19.5%**

- Blue Economy jobs grew faster than the regional economy as a whole; from 2004 to 2020, the number of people working in the Blue Economy grew by 19.5% in the North Shore (+2,644 jobs), which compares to 12.2% growth for all industries in the region over this period.
- The majority of job gains were in the Coastal Tourism & Recreation sector (+2,920), while job losses were experienced in the Living Resources (-517) and Offshore Minerals (-54) sectors.

The Living Resources sector is a regional strength in terms of its size, history and specialization. However, employment in the sector declined 27% between 2004 and 2020. This is consistent with other available data regarding the decline of the fishing fleet on the North Shore. Moving forward, coordinated and sustainable seafood business strategies that harness the region's assets, experience, expertise and access to ocean resources are needed to revolutionize this sector, which is foundational to many other elements of the regional Blue Economy.

While Coastal Tourism & Recreation represents 87% of the employment, it also represents the lowest average annual wage ($24,979), with most employment based in service jobs with no direct connection to the sustainable use of ocean resources. In comparison, the average annual wage for Living Resources ($75,924), Marine Construction ($72,055) and Ship & Boat Building & Repair ($64,268) are two to three times the average salary for a worker in the Coastal Tourism & Recreation sector. It will be important going forward to tease out sustainable Blue Economy jobs within the Coastal Tourism & Recreation sector (e.g., boat dealers, marinas, marine supplies, restaurants promoting local seafood, eco tours) and focus regional strategies around leveraging opportunities in those sectors.

[3] The six sectors comprise 23 industries in the Economics - National Ocean Watch (ENOW) data series (https://coast.noaa.gov/digitalcoast/tools/enow.html) as defined by their North American Industry Classification System (NAICS) code. Data from the Census Bureau's American Community Survey (ACS) were also used.

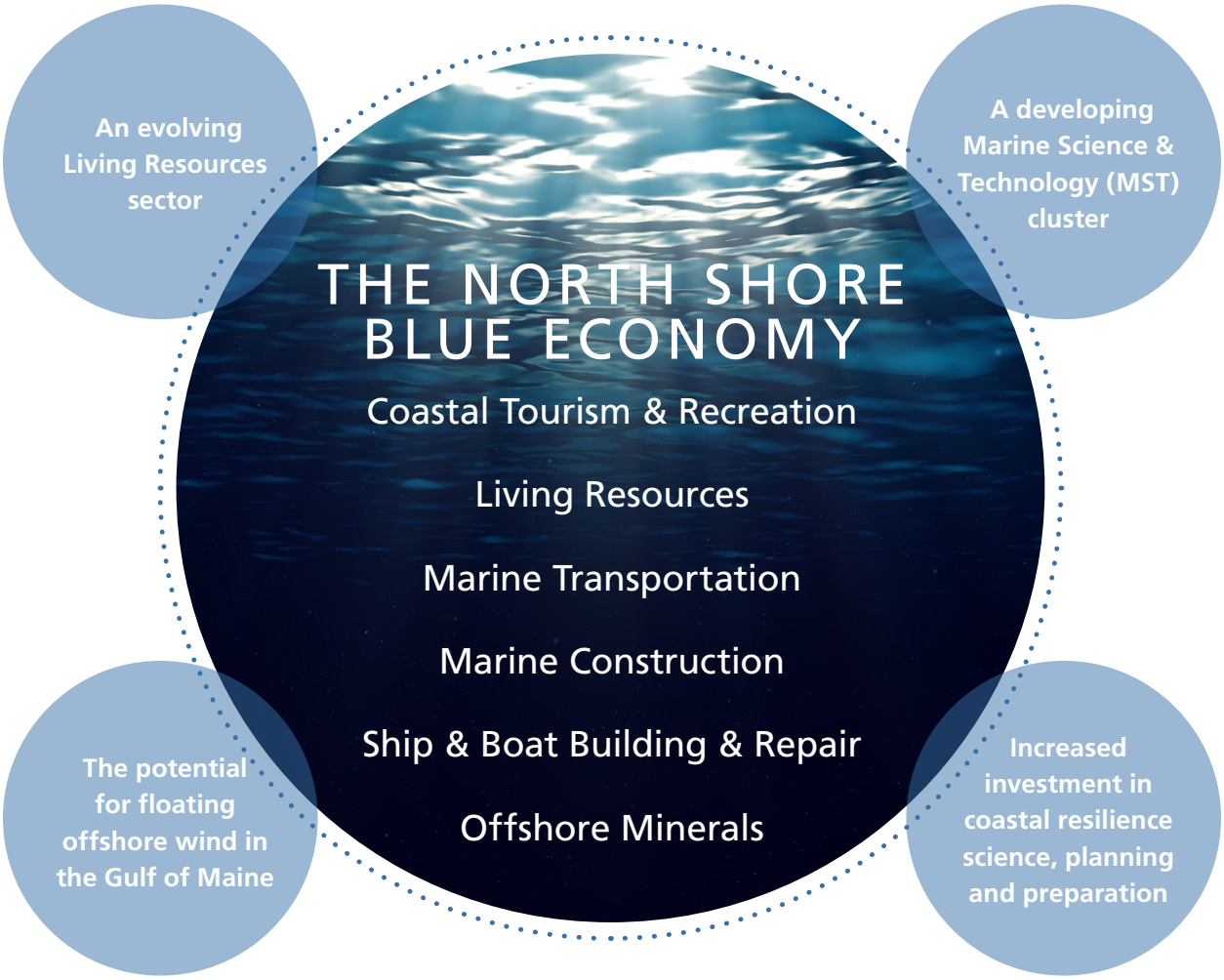
[4] See Appendix D in the full report for a list of the 23 ENOW industries within the six sectors.

[5] The number of jobs reported in the Living Resources sector is likely an undercount, because many of the workers in this sector, particularly seafood processing workers, are hired as contract workers through employment services agencies and are therefore not accounted for in the Living Resources data. These workers are included in the Temporary Help Services sector, which cannot be broken out to identify employees working in the Living Resources sector.

New areas, such as offshore wind or marine genomics, are only now being captured in employment and wage data, but are anticipated to be evolving opportunities moving forward. Climate change is a threat, but we have an opportunity to seize increased investments being made by state and federal government and to demonstrate leadership and innovation by incorporating climate resilient approaches into our Blue Economy strategies.

Nearly 300 regional stakeholders reported that a thriving Blue Economy must have better coordinated planning, investment strategies, targeted workforce training and marketing. Discussion around the tangible steps we can take to achieve prosperous and sustainable Blue Economy success revolved around doing a better job of 1) Planning: developing a coordinated plan for the region, mapping our assets and assessing business models; 2) Investing in infrastructure (dockage, transportation, housing) while retaining our unique culture; 3) Engaging young people and attracting new workers by developing targeted workforce training in our strength sectors; and 4) Marketing and promoting the region's successes, assets and vision forward, while creating a regional brand that all can envision themselves being a part of.

Nonprofit and Public Institutions play a crucial role in our regional Blue Economy. These organizations and institutions produce research that drives innovation, implement and manage marine and coastal regulations, educate our children and the public, and convene dialogues and support action. While not fully captured in our economic data, these organizations are critical to the work ahead. This report makes it clear that the North Shore Blue Economy ecosystem is populated, at every level, with enterprises doing important work that contributes to the regional Blue Economy.



FOUR INTERCONNECTED OPPORTUNITIES TO GROW THE NORTH SHORE BLUE ECONOMY

are Tied to the Region's Existing Strengths and Emerging Growth Prospects

1. An evolving Living Resources sector: Regional support of innovation and coordination in sustainable approaches to harvest healthy groundfish populations and build markets for underutilized fish species can reinvigorate the industry. In addition, continued support for the lobster fishery as it responds to pressures of climate change and gear restrictions may help continue the growth and infusion of jobs and revenues that lobstering has seen in the last decade, while exploratory research and pilot projects with shellfish and kelp aquaculture could diversify seafood resources and revenues. Additional areas to expand the Living Resources sector include, but are not limited to, seafood and value-added processing, food science research, innovations in the seafood supply chain network and marine biomaterials science.

2. A developing Marine Science & Technology (MST) cluster: Innovation often occurs at the intersection of existing industry clusters. Sustainable seafood management, ocean research and engineering, biomanufacturing, marine genomics, drone applications and big data management are ripe for new networks and expansion in the region. Access to diverse laboratory, coastal and marine environments, relatively affordable and available office space, and easy rail connections to and from Boston positions the region's developing MST sector to thrive. Capacity in MST also positions the region as a destination for training, research and development and ocean application. The connection to Boston's life science, technology and investment communities is a critical factor in growing MST partnerships and supporting opportunities for homegrown MST workers within the region rather than having them commute outside the region.

3. The potential for floating offshore wind in the Gulf of Maine: Offshore wind will soon be a major new industry in the United States. State-level incentives and mandates have created a market of about 30 gigawatts of nameplate capacity at the time of this report. Northeast States are exceptionally well-positioned to benefit from offshore wind, since they have the most offshore wind potential, the cheapest costs of deployment and the potential for substantial economic benefits[6,7]. The North Shore's potential role in the emerging offshore wind market is evolving, but we, as a region, must ensure a seat at the table for coordinated decision-making and be in a position to seize the opportunities. Potential opportunity to support offshore wind development includes boat repair and maintenance services, ocean engineering, construction workers, boat captains, marine sensing and monitoring technologies and the use of fishing/lobstering fleets for cooperative research and support, among other opportunities.

4. Increased investment in coastal resilience science, planning and preparation: A rising sea level represents a significant threat to coastal ecosystems, communities and infrastructure through land loss, altered habitats and increased vulnerability to coastal storms, nuisance flooding and damaging wave actions such as erosion. The Commonwealth, the federal administration and the region are making strategic funding, policy, training and infrastructure investments. The North Shore must continue to seek creative ways to live with water, innovate around resilient best practices in coastal design, architecture, engineering and construction and be aware of and compete for robust federal funding strategies with a suite of collaborators, to safeguard our ports, properties and people.

[6] Beiter, P., Musial, W., Kilcher, L., Maness, M., & Smith, A. (2017). An Assessment of the Economic Potential of Offshore Wind in the United States from 2015 to 2030 (No. NREL/TP-6A20-67675). National Renewable Energy Lab. (NREL), Golden, CO (United States).

[7] Musial, W., Heimiller, D., Beiter, P., Scott, G., & Draxl, C. (2016). 2016 Offshore Wind Energy Resource Assessment for the United States (No. NREL/TP-5000-66599). National Renewable Energy Laboratory (NREL), Golden, CO (United States).

VISION FORWARD: A RESILIENT, SUSTAINABLE & EQUITABLE NORTH SHORE BLUE ECONOMY

This report aims to help local leaders to better understand the region's competitive position in the sectors that make up the regional Blue Economy. The analysis offers a foundation upon which to build resilient, sustainable and equitable economic development and community engagement strategies. We envision strategies that can both advance ocean-related economic interests and the ocean ecosystem health on which regional economies depend. The work of leadership begins with capacity building. Phase II will focus on how to apply Phase I findings to advance four broad targets:

1. Grow the North Shore Blue Economy Network. A Network of a diverse, regionally-representative thought leaders across Blue Economy sectors will provide coordinated advisory leadership, inclusive community engagement and serve as a hub for creative economic development and engagement strategies. The Network will collaboratively design, guide and inform: (a) strategy development, (b) funding opportunities and (c) research needs.

2. Develop workforce training and education to drive Blue Economy job creation. Integrated partnerships between regional research and higher education institutions, government and nonprofit enterprises and workforce incubators will be designed and catalyzed to shape and meet these new employment opportunities. By coordinating workforce development with economic development, we aim to open career pathways with a strong living wage that supports a high quality of life and serves to retain the talent we train.

3. Brand and market the North Shore's vision of a resilient, sustainable and equitable Blue Economy. Promote the region's successes and demonstrate Blue Economy activities and assets to attract new businesses, entrepreneurs, investors, scientists and engineers to areas of opportunity, as well as help the existing and traditional working waterfront enterprises succeed and expand in this larger market.

4. Fundraise and increase access to capital that will foster entrepreneurship and incubate Blue Economy enterprises and initiatives. Develop a cross-sector coordinated and targeted portfolio of state, federal and private funding opportunities to advance the North Shore Blue Economy and the infrastructure that supports its growth.

LEADERSHIP

The NSBE Initiative is led by the University of Massachusetts Amherst Gloucester Marine Station. A Steering Committee of representatives from the Gloucester Economic Development and Industrial Corporation, Cape Ann Chamber of Commerce, City of Gloucester, North Shore Technology Council, North Shore InnoVentures and Essex County Community Foundation provided support for this study and served in an advisory role. Additional funding support was provided by the Commonwealth of Massachusetts. Economic analysis was led by the University of Massachusetts Dartmouth Public Policy Center and completed by Springline Research Group.