

Feasibility Study for the Ocean Campus Center

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EXECUTIVE SUMMARY

The Marine and Environmental Education Alliance (MEEA), a 501(c)(3) organization, conceived the idea of an Ocean Campus Center (OCC), a new post-secondary school with a curriculum designed to provide technical training along with knowledge of the environments in which students may work. The school is proposed to be located in Marshfield, MA and serve the communities of the South Shore, South Coast, Cape Cod, and the Islands.

The school is in the early stages of development, but the industry and education leaders involved have determined the school's focus will likely be on the recreational marine industries; commercial marine industries; offshore energy and renewable energy; the traditional marine technology industry; environmental remediation industries (specifically those working with water or in marine/coastal/freshwater environments); and water and wastewater management industries. A strong alignment and partnerships with industry and with local institutions of higher education will ensure the ongoing relevance and quality of the curriculum and offer students industry-recognized professional certificates and academic credit towards an associate's degree and, perhaps, lead to a bachelor's degree for those interested in continuing their education.

To gauge the proposed school's viability, i.e., document the need for the proposed training and a supply of students oriented to these careers, MEEA and its board, with funding from the Massachusetts Technology Collaborative (MTC), contracted with the Urban Harbors Institute (UHI) of the University of Massachusetts Boston to conduct a feasibility study. The feasibility study was designed to help inform the development of the Ocean Campus Center, specifically providing answers to the following questions:

1. Is there a need for this type of a school on the South Shore – in terms of meeting marine and environmental industry sector needs and providing local training opportunities?
2. What other similar educational institutions/programs are in existence, what do they offer, and what are their target markets?
3. What are the characteristics of the current and expected future workforce?
4. What Southeastern Massachusetts companies might have an interest in and need for the graduates of an Ocean Campus Center program?
5. What do businesses identify as potential types of technical jobs, and what are the required/desired skills and training of people who fill those positions?
6. What might program graduates expect in terms of job opportunities, salaries, and advancement opportunities?
7. What would employers want a program to have in order for them to view it as reputable?
8. What are the size and characteristics of the pool of potential students from the South Shore?
9. What do current students and recent graduates of similar programs think of their educational experience and their resulting employment opportunities?

These questions were answered by:

- Conducting an analysis of other existing training programs in Massachusetts and New England
- Obtaining state and federal data pertaining to workforce characteristics and industry demand

- Identifying businesses that might be interested in the offerings of the Ocean Campus Center and conducting interviews with many of those businesses to gain insight into their training needs
- Obtaining state and federal data about local high schools and regional vocational technical schools, including data about the student populations and their plans following graduation
- Conducting interviews with high school and vocational school guidance counselors to obtain insights about program offerings and student interest
- Surveying students and graduates of Massasoit Community College's non-credit Recreational Marine Technician Certificate program (offered on its Canton, MA campus) pertaining to their experiences with the program, their experience seeking employment, and their reasons for participating in the training program

Key Findings

- There is a need for the Ocean Campus Center. Industries identify training needs both for existing employees and for potential hires. Guidance departments support local and affordable options for those students looking to continue their education in the marine trades. A review of existing similar training programs reveals that none in the area (with the exception of Community Colleges) offer any type of associate's degree program combining technical training and environmental education. Further, other existing programs are considerably more limited in scope than those proposed by the Ocean Campus Center.
- There is a large potential pool of students for the Ocean Campus Center. Potential students will likely come from among the thousands of area high school students who pursue something other than a 4-year college program following high school graduation. Additionally, there is an unknown but potentially significant number of people interested in changing careers who may be interested in retraining opportunities provided by the Ocean Campus Center. Lastly, the Ocean Campus Center can meet the needs of those already working in technical fields by providing real-time training designed to maintain employment or lead to career advancement.
- Employment opportunities exist for Ocean Campus Center graduates, but job growth is not anticipated to increase equally across all fields and positions. Training that targets growing fields and positions might lead to greater employment rates for program graduates. In those fields not experiencing much new growth, training may help to fill vacancies left by those leaving the industry, e.g., through retirement or a career change. Even with the best training program, however, there are external factors that will affect employment rates for program graduates. Examples of such external factors include (1) the economic climate – when the nation or region experiences difficult economic times, growth in many industries is slowed and/or unpredictable, and (2) industry wages – some entry-level positions pay less than the expectations of potential employees; and in some areas of Massachusetts, the high cost of living makes it difficult for employees to accept entry-level wages. This can make it difficult to find and retain good employees.
- The success of the Ocean Campus Center will depend on the types of programs offered, and the quality of those programs. It is critical that technical training opportunities be real-world and provide substantial hands-on training for students. This will require appropriate space and equipment in the classrooms, well-qualified teachers, and curricula designed to expose students to industry conditions. Several industries pointed out the importance of real-world hands-on training. In particular, the recreational marine industry identified the lack of this type of

functional training as a weakness in many existing training programs.

- Collaborations and partnerships will be fundamental to the success of the Ocean Campus Center. Collaborations with high schools will help to inform curriculum design and recruitment of students. Collaboration with industry representatives will help to inform curriculum design as well as provide internships and jobs for students. Partnerships with existing training programs, e.g., professional organizations and manufacturers who provide training and certifications, will help to provide local training with important cost savings to area businesses. Affiliations with community colleges and other academic institutions will provide an important link for students looking for academic credit or an associate's degree. Additionally, affiliation with institutions of higher learning will provide Ocean Campus Center students with resources such as career services.

Key Recommendations

- Training programs offered at the Ocean Campus Center should provide students with technical training that is "real-world" and "hands-on," and should be based on the needs expressed by businesses, students, and high schools.
- Efforts should be made to collaborate with other existing training entities, e.g., The American Boat and Yacht Council, Mercury University, the Northeast Maritime Institute, National Marine Electronics Association, the U.S. Coast Guard, the Occupational Safety and Health Administration (OSHA), to offer their programs locally to Ocean Campus Center students. Local manufacturer certification was especially important for employees and job-seekers in the recreational marine industry.
- The Ocean Campus Center should continue to work with Massasoit Community College and other academic institutions to allow students to earn academic credit for their studies. Additionally, the career services at local collaborating colleges and universities will be vital to helping Ocean Campus Center students find jobs.
- The Ocean Campus Center should work closely with industries and businesses to develop curricula, create internships, arrange employment relationships, obtain equipment, and provide important trainings and certifications locally.
- The Ocean Campus Center should foster relationships with area high schools to develop programming that helps bring high school graduates to the next level in terms of employability and academic achievement, e.g., through agreements to allow some high school credits to count toward Ocean Campus Center degrees. These relationships will also assist with student recruitment through job fairs, field trips, presentations to students and faculty, etc.
- When planning the curriculum, the Ocean Campus Center should design training to meet the needs of those looking to obtain the positions shown to be experiencing growth, e.g., Captains, Mates, and Pilots of Water Vessels; Environmental Engineering Technicians; Environmental Science and Protection Technicians; Sailors and Marine Oilers; Biological Technicians.
- Efforts should be made to secure shoreside facilities to provide access to the coast and ocean for certain training activities such as vessel handling, water quality testing, etc.
- Programs for *existing* employees in the marine trades should be offered in winter months to avoid the busy New England boating season, and should be short intense courses rather than spread out over several months. Seasonality is not as much of a concern for other sectors.

- Program timing should be considerate of student time and costs, i.e., full-time programs should not be so long as to cause financial hardship for those who are unable to work while attending the program. Guidance counselors emphasize that many of the targeted high school graduates will need to work while they pursue post-secondary training and education.
- The Ocean Campus Center should provide students with options ranging from long (1-2 year) programs leading to an associate's degree, and shorter (a few days or a few hours, depending on the subject matter) training options that meet student and industry needs.
- Technical courses offered by the Ocean Campus Center should include training in electronics, electrical systems, ROV operation, boat handling, boat varnishing, boat painting, engine repair, refrigeration systems, plumbing, fiberglass repair, basic tow and salvage methods, hydraulics, groundwater sampling, soil sampling, hazardous waste handling, general science, environmental science, and workplace readiness. The Ocean Campus Center should also offer short courses that lead to industry-recognized certifications which are needed by existing employees and/or can make potential employees more marketable. Examples include: OSHA (Confined Space, HAZWOPER), STCW, IPC, TWIC, USCG (Captain License), and SCUBA. Broad programming attracting not only traditional students, but also catering to employee and industry needs will enhance the reputation and relevance of the school.
- Work with representatives from emerging industries such as those engaged in offshore renewable energy, to determine whether or not training programs should be developed to meet any upcoming need.

INTRODUCTION

Employers in the marine and environmental industries widely express an unmet need for well-trained technical workers – especially for those positions that do not require a college degree.

The Marine and Environmental Education Alliance (MEEA), a 501(c)(3) organization, conceived the idea of an Ocean Campus Center (OCC), a new post-secondary school with a curriculum designed to provide technical training along with knowledge of the physical and regulatory environments in which students might work. The school is proposed to be located in Marshfield, MA and serve the communities of the South Shore, South Coast, Cape Cod, and the Islands.

The school is in the early stages of development, but the industry and education leaders involved have determined the school's focus to be on the recreational marine industries; commercial marine industries; offshore energy and renewable energy; the traditional marine technology industry; environmental remediation industries (specifically those working with water or in marine/coastal/freshwater environments); and water and wastewater management industries. A strong alignment and partnerships with industry and with local institutions of higher education will ensure the ongoing relevance and quality of the curriculum, as well as offer academic credit towards an associate's degree and, perhaps, lead to a bachelor's degree for those students interested in continuing their education.

To gauge the proposed school's viability, i.e., document need for the proposed training and a supply of students oriented to these types of careers, MEEA and its board, with funding from the Massachusetts Technology Collaborative (MTC), contracted with the Urban Harbors Institute (UHI) of the University of Massachusetts Boston to conduct a feasibility study. The feasibility study was designed to help inform the development of the Ocean Campus Center, specifically providing answers to the following questions:

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These questions were answered through the following tasks:

Review of Existing Training Programs

- Conduct research to gather information and data on existing programs (in post-secondary private, public, and professional organizations and institutions offering courses and training) with a focus on the New England region. This research will help to understand and evaluate competing programs and identify potential collaborators, as well as inform the design and development of the Ocean Campus Center and its programs. (Informs Questions 1 and 9 above)

Characterizing Demand for Technical Workers

- Research industry and government sources to compile information and data on the targeted workforce characteristics (types of positions, educational/training/required skills, size of workforce by position, growth prospects, etc.) for each of the target ocean industry sectors. (Informs Questions 2 and 9 from above)
- Conduct an inventory of existing businesses in Southeastern Massachusetts that are in one of the targeted industry sectors. (Informs Question 1, 3, 4, 5, and 6 from above)
- Conduct interviews with multiple representatives from a cross-section of each of the ocean industry sectors. (Informs Questions 1, 3, 4, 5, and 6 from above)

Characterizing Potential Students

- Obtain School Profiles from the high schools on the South Shore (and beyond, if needed) and the Commonwealth's technical high schools to identify the numbers and percentages of graduates who do not go on to four-year colleges. (Informs Questions 1 and 7 from above)
- Interview guidance department heads in area high schools. Gather additional information on the numbers and characteristics of students who might be interested in an educational program leading to employment in the marine industries, establish the most productive ways to recruit them, and gain insight into the features of a program that would be most attractive and beneficial to potential students. Also, determine if there is a means to gauge interest in the program among the targeted student population. (Informs Questions 1, 7, and 8 from above)
- Engage with Massasoit Community College to summarize their experiences to date with their marine trades training programs and gather information about and from current and former students through surveys. (Informs Questions 1 and 8 from above)

The Feasibility study was conducted during 2012, and was guided by the input of a steering committee whose membership included:

- Maryellen Brett, Executive Director, South Shore Workforce Investment Board
- Captain Michael R. Burns Jr., Director, Center for Maritime and Professional Training
Massachusetts Maritime Academy
- Brian J. House, President/CEO, Moran Environmental Recovery
- Robert Kispert, Director of Cluster Development, Massachusetts Technology Collaborative
- Ed Lofgren, MEEA Board & Massachusetts Marine Trades Association, 3A Marine Service, Inc.
- Scott Metzger, Senior Vice President, Emergency Services, Clean Harbors, Inc.
- Jeffrey Rosen, Senior Scientist/Statistician, Tetra Tech, Inc .
- Elaine Stewart, Dean, Workforce Development and Community Education, Massasoit
Community College

Conclusions from the feasibility study indicate an existing and projected demand for skilled technical employees and an ample supply of potential students from area public and technical high schools, existing businesses, and career changers. Additionally, state, federal, and industry data, along with interviews of local businesses, identified areas of training and coursework common to multiple industries, as well as technical training unique to specific industries.

Assuming that the Ocean Campus Center capitalizes upon opportunities to collaborate and design curricula that meet industry needs, its students have great potential to obtain employment or to advance in existing jobs. The key to the school's success will be to work closely with the targeted industries, institutions of higher learning, workforce investment boards, and high schools to develop training and educational opportunities that meet industry and student needs.

METHODS

To fully understand how the observations and conclusions of the feasibility report were obtained, it is necessary to review the methods employed for the various tasks performed as part of the study. The geographic area for the feasibility study was defined as the communities of Massachusetts's South Shore, South Coast, and Cape Cod and the Islands.

Existing Training Programs

The purpose of this task was to identify existing schools and training programs that might: (1) already offer what is proposed by the Ocean Campus Center, (2) be potential collaborators of the Ocean Campus Center, and/or (3) provide insights for program design and content.

The database of training programs (delivered electronically to MEEA as part of this report) was developed through internet research, interviews, and reviews of industry publications. The primary area of geographic focus was New England, though programs outside of New England were included if they were of particular relevance and value to the purposes of the study. The programs included in the review are those that offer training relevant to the Ocean Campus Center's primary fields of interest: recreational marine industries; commercial marine industries; offshore energy, renewable energy, and traditional marine technology industry; environmental remediation industries (specifically, those working with water or in marine/coastal/freshwater environments); and water and wastewater management industries. A catalog of all reviewed programs is in Appendix A.

Industry and Government Sources of Information Regarding Workforce Characteristics and Industry Demand

The purpose of this task was to obtain state, federal, and industry data and information about the workforce characteristics and industry demand for the sectors and positions targeted by the Ocean Campus Center. Data were drawn from the Office and Management and Budget (OMB), U.S. Bureau of Labor Statistics (BLS), and American Boat Builders and Repairers Association (ABBRA). Data compiled included:

- Information about the number of employees (by industry type) and number of establishments (by industry type), from the BLS's State and County Employment and Wages database (Quarterly Census of Employment & Wages - QCEW). The QCEW data is organized using OMB's North American Industry Classification System (NAICS) codes. The database was queried to generate reports for Barnstable, Bristol, Dukes, Nantucket, Norfolk, and Plymouth counties.

- Information about the number of employees (by job title) and hourly and annual wage information (by job title) from the BLS's Occupational Employment Statistics (OES) Survey, which was queried by Standard Occupational Classification (SOC) codes. Unlike the QCEW database, which is organized by county, the OES database is organized by county subdivisions, i.e., specific groupings of cities and towns known as New England City and Town Areas (NECTAs) and New England City and Town Area (NECTA) Divisions. The OES database was queried by relevant NECTA Area and NECTA Division for southeastern Massachusetts.
- Wage information published in the ABBRA regional wage report.
- Occupational profile data from the 2012-2013 Occupational Outlook Handbook (OOH), produced by the BLS. These profiles include information about what workers do, the work environment, education and training requirements, pay, job outlook, similar occupations, and contacts for additional information.
- National employment projection information (employment in 2010 (base year) and 2020 (projected year), numerical and percent change in employment, and job openings due to growth and replacements) from the BLS's Employment Projections (EP) program for 2010-2020.
- Long-term state and selected Workforce Investment Area (WIA) employment projection information (employment in 2010 (base year) and 2020 (projected year), numerical and percent change in employment, and average annual job openings) for 2010-2020; similar short-term state and selected WIA employment projections for 2011-2013.

The type of establishments, the relevant job titles, and appropriate occupational profiles were selected by the UHI team from the population of options based on careful review of the definition for each.

Existing Relevant Businesses

The purpose of this task was to identify businesses, primarily in southeastern Massachusetts, that: (1) might employ individuals trained at the Ocean Campus Center, and (2) could provide insights about local industry training needs.

The UHI team created a database (delivered electronically to MEEA as part of this report) of approximately 365 companies involved in one of the targeted industry sectors: recreational boating, commercial marine services, marine transportation, marine technology, research, offshore energy, environmental remediation, water quality testing, and/or wastewater treatment. Information about those companies, organized by sector, is in Appendix B.

The database was developed based on interviews with industry association and government agency personnel and a search of online resources, e.g., Massachusetts Marine Trades Association, Marinas.com, yachtworld.com, and MOTN.org.

Industry Interviews

This task involved conducting interviews with a representative sample of businesses in each of the targeted industry sectors to obtain key information about their training and employment needs, their companies and employees, e.g., types and numbers of positions, advancement paths, desired and required skills, wage scales, and their thoughts about the potential curriculum and value of the Ocean Campus Center concept. While a handful of interviews were conducted in person, most were conducted by telephone, with a few by email.

For some sectors (offshore renewable energy), the population size was small enough so that an interview was sought with every company identified in the sector. For larger industry sectors such as water quality and recreational marine, an effort was made to obtain information that was representative both of the varying sizes and geographic distribution of the businesses in the sector. Attempts were made to reach more than 180 businesses, resulting in 97 interviews. Call success rates varied by sector:

- Recreational Marine: 43 interviews/181 businesses (24%)
- Commercial Marine: 4 interviews /9 businesses (44%)
- Environmental Services: 12 interviews /53 businesses (23%)
- Marine Technology: 11 interviews /28 businesses (39%)
- Offshore Energy: 5 interviews /9 businesses (55%)
- Research: 2 interviews /4 businesses (50%)
- Transportation: 9 interviews /24 businesses (38%)
- Water Quality: 10 interviews /53 businesses (19%)
- Commercial Fishing: 1 interview/unknown number of businesses

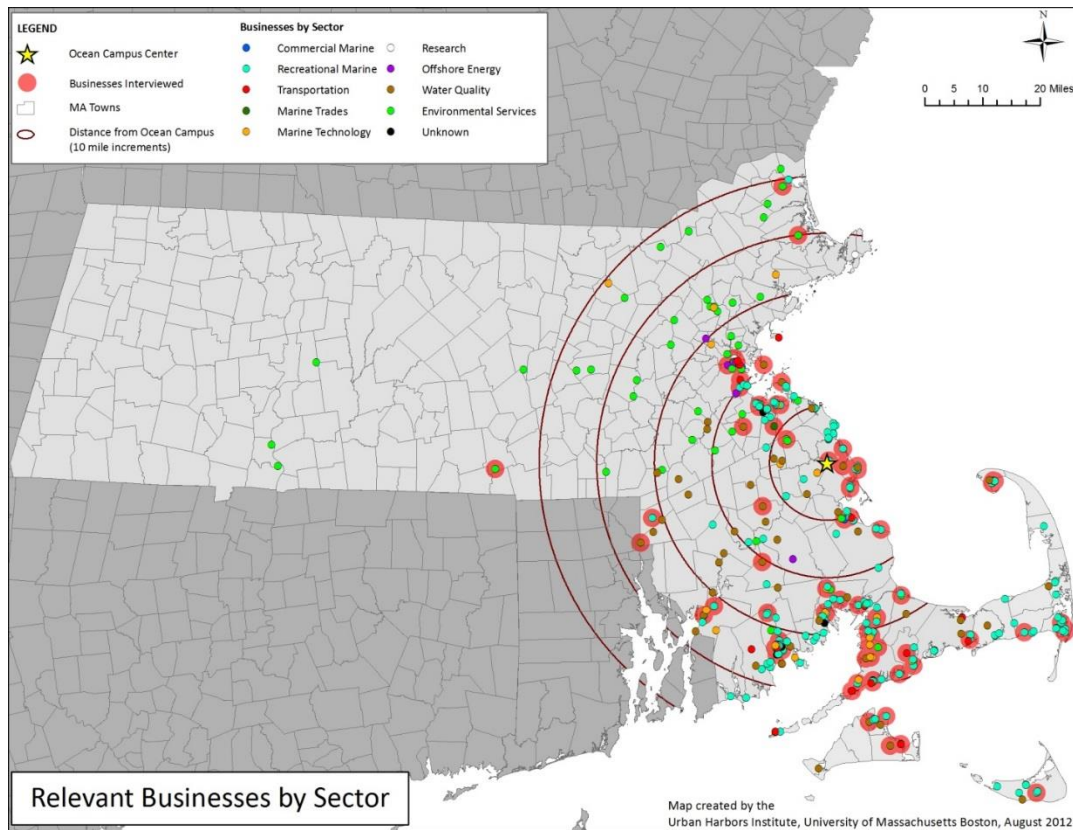


Figure 1: Approximately 374 businesses were identified for the purposes of this feasibility study. More than 180 of the businesses were contacted for an interview, resulting in 97 successful interviews.

School Profiles

The purpose of this task was to obtain school profiles from the public high schools in the study area and the Commonwealth's regional vocational technical high schools to identify the numbers and percentages of graduates who do not go on to four-year colleges and, therefore, might be among the potential students for the OCC.

School profile information for every public high school in the study area and all 30 regional vocational technical high schools in the state was obtained from:

- The Massachusetts Department of Elementary and Secondary Education's Student Information Management System (SIMS), which provides information on the intentions of high school graduates as of the end of the 2010-2011 school year
- The National Student Clearinghouse, which provides information about the enrollment of Massachusetts public high school graduates into institutions of higher education within 16 months of graduating high school (for the high school class of 2010)

Guidance Department Interviews

The purpose of this task was to interview guidance department heads in area high schools to:

- Gather information on the numbers and characteristics of students who might be interested in an educational program leading to employment in the targeted industries;
- Establish the most productive ways to recruit graduating high school students;
- Gain insight into the features of a program that would be most attractive and beneficial to potential students; and
- Determine if there is a means to gauge interest in the program among the targeted student population.

Interviews were conducted with 15 guidance departments in Chapter 74-approved vocational technical education programs and public high schools which have the highest percentage of graduates pursuing post-secondary options other than a four-year college (as reported in the SIMS data).

Student Surveys

The purpose of this task was to obtain information from current students (class of 2012) and graduates of Massasoit Community College's non-credit Recreational Marine Technician Certificate program (offered on its Canton, MA campus) pertaining to their experiences with the program, their experiences seeking employment, and their reasons for participating in the training program.

The survey of current students was administered during class in the spring of 2012. Seven students were present and completed the survey.

A survey was mailed to approximately 144 graduates of the Marine Trades certificate program in April, 2012. Twelve of those surveys were returned as undeliverable, for a successful delivery rate of 132 surveys. Due to a low response rate (N=7) from the first mailing, a second mailing was conducted in June of 2012, with an invitation for survey respondents to enter a raffle for a \$50 VISA card. An additional 9 people responded to the second mailing, for a total of 16 responses (a 12% response rate).¹

¹ One of the most likely reasons for the low response rate was due to the timing of the survey. Early spring is one of the busiest seasons for those engaged in boat maintenance. Graduates of the program who are now employed in the marine trades may have been working over-time to get boats repaired and in the water for the boating

Copies of the surveys can be found in Appendix C. Though this response rate is low, the students provided many useful insights into the program and job market.

The results of the surveys are in a database delivered electronically as part of this project. More detailed information about survey responses can be found in Appendix C.

IS THERE A NEED FOR THE OCEAN CAMPUS CENTER?

The Ocean Campus Center's intent to offer associate's degrees and certificate level technical training for marine and environmental technologies may be unique. Few, if any, post-secondary technical training programs give attention to courses or training on the environmental conditions or environmental issues related to the particular industry. Likewise most environmental science programs provide very little in the way of hands-on technical training. There is little direct competition from existing training programs in the area; and in fact, many entities offering training may be interested in collaborating with the Ocean Campus Center to reach a larger audience. Conversations with guidance counselors at area high schools and a review of their curricula revealed a growing recognition of the importance and interrelationship between knowledge of environmental sciences and technical training. Furthermore, interviews with industry professionals and guidance department personnel noted a need for training programs that will make their graduates more employable, enjoy greater job satisfaction, and potentially lead to further academic achievement. The key to the Ocean Campus Center's success, however, will be directly related to the types of courses and programs it offers. More specifically, the Ocean Campus Center's training must match industry needs and meet industry standards or it will fall short of its goals to prepare its students for successful employment.

Competition & Collaboration

A review of training programs in New England shows a variety of different training program models ranging from vocational programs in high schools, continuing education programs (often run by professional associations) for those employed in industries that require ongoing training, and training for those looking to enter an industry, including programs that result in an associate's degree as well as programs offering certificates of completion. Most of these programs, with the exception of high school programs, are highly focused on a specific industry or training element, with very few programs offering a diverse range of technical training, and fewer still, complementing the technical training with instruction in environmental sciences. (A spreadsheet of training programs has been delivered electronically to MEEA as part of this report. Details about many of the programs can also be found in Appendix A).

The degree to which the Ocean Campus Center will compete with any of these existing programs depends on the specific curriculum to be offered at the Ocean Campus Center. Moreover, the review of other programs identified several professional organizations and private businesses, i.e., manufacturers, that offer trainings which would likely be of interest and value to Ocean Campus Center students. Efforts to collaborate with these

There is little direct competition from existing training programs in the area. The OCC's distinguishing strengths are its focus on technical careers in marine and environmental industries, its foundational and potential industry partnerships, and its recognition of the added value that knowledge in the environmental sciences has for future success and advancement in these careers.

season. Despite the low response rate, the information gathered from these 16 responses provides useful insight about the program and the people who participated in it.

existing training entities, e.g., The American Boat and Yacht Council, Mercury University, the Northeast Maritime Institute, the U.S. Coast Guard, the Occupational Safety and Health Administration (OSHA), to offer all or a portion of their programs at the Ocean Campus Center might be beneficial to Ocean Campus Center students and to the financial wellbeing of the school.

The Ocean Campus Center's distinguishing strengths are its focus on technical careers in marine and environmental industries, its foundational and potential industry partnerships, and its recognition of the added value that knowledge in the environmental sciences has for future success and advancement in these careers.

Partnerships such as those with existing training entities will be critical to the success of the Ocean Campus Center; however, other partnerships already under development will provide additional benefit to the Ocean Campus Center, setting it apart from other training programs in New England. For example, ongoing communication with Massasoit Community College, which runs many professional training courses, will provide the school with a highly desired opportunity for students to gain academic credit for their studies. Additionally, the career services at local collaborating colleges and universities will be vital to helping Ocean Campus Center students find jobs.

Partnerships with industry, such as those already existing with the Massachusetts Marine Trades Association and the Massachusetts Technology Collaborative are also fundamental to the success of the Ocean Campus Center. Not only can industry representatives help develop curricula that will make its students more desirable upon graduation, such partnerships will also likely facilitate job placements for program graduates. Many businesses interviewed were receptive to student internships which will help to make Ocean Campus Center programs more "real-world" and "hands-on." Industry partnerships may also help with the provisioning of equipment, field trips, and guest lectures. The majority of industry representatives noted in interviews that hands-on, real-world training is critical to the successful employment of program graduates.

Lastly, partnerships with area high schools can help the Ocean Campus Center develop programming that brings high school graduates to the next level in terms of employability and academic achievement. These partnerships will also help with student recruitment to the Ocean Campus Center programs.

Industry Needs

While some positions, e.g., dock hand, or businesses do not require prior technical training, and some specific technical skills, e.g., boat painting, are relatively easy to train on-the job, these types of positions are in the minority. Instead, employers are more often looking for new employees that already possess specific technical skills, licenses, and certifications – as well as basic qualities that make for good employees, e.g., timeliness, good work ethic, flexibility, and sense of responsibility.

While industries have many different technical training needs, interviews with industry representatives identified competencies and skills that seem to have common appeal among more than one sector. These areas of shared interest include:

- OSHA trainings (specifically: 10 hour, 30 hour, and 40 hour classes – including maritime; and Hazardous Waste Operations and Emergency Response (HAZWOPER))
- Computer literacy skills (database management, spreadsheet development and maintenance, word processing)
- Geographic Information Systems (GIS) skills (gathering data and creating maps)
- Navigation (on land and at sea – including the use of GPS devices)

- Vessel handling (ranging from basic classes to USCG Captains licensing)
- Basic overviews in mechanical, electrical, and plumbing systems (including common troubleshooting strategies)
- Basic classes in environmental science
- Basic classes in job readiness (work ethic, time management, job expectations)

Some of the specific sector needs identified through industry interviews include:

Recreational Marine (Businesses in this category provide services to recreational boaters. More specifically, this category includes marinas, tow and salvage services, boat yards, recreational boat builders, boat sales, service and repair shops, and mooring service providers.)

- Manufacturer certification(s) such as Yamaha, Mercury, Volvo-Penta, and Garmin
- Real-world, hands-on mechanical training, either through a high-quality training program or at another job
- Training to promote a good attitude/work ethic
- Cross-training so employees can serve multiple functions
- Boat handling, including Captain licenses for those in the tow and salvage business
- General mechanical and/or inboard/outboard training
- Boat systems training (electrical, refrigeration, plumbing)
- Training that includes internships
- General electrical training
- SCUBA Diving certification
- Hydraulics training
- Rigging (though it should be noted that some businesses believe rigging can be taught on the job)
- Fiberglass training
- Assembling – in the context of boat building
- Programs whose timing does not conflict with busy times in the industry, i.e., high activity times from the spring through the fall, and times that are flexible and/or realistic so that employees are not out of work for long periods of time.

Industries identified competencies and skills of importance to multiple sectors as well as training needs unique to each industry.

It is worth noting that marinas without boat repair and hauling services, and the vast majority of small boat yards (1-2 employees) indicated they would not need technical training for their employees.

Transportation (Businesses in the transportation sector focused on those transporting people, and included ferry companies, whale watch companies, research vessels, and tour boats.)

- Manufacturer training
- General mechanical training

- Boat handling (including captain license training)
- Registered seaman Z card documentation
- STCW marine safety certification
- Troubleshooting and field maintenance of mechanical and electronic components
- Flexibility in terms of class timing for busy times when students might not be able to attend classes due to work demands

Commercial Marine (This sector is comprised of shipyards and businesses such as machine shops that manufacture and repair vessel components. Businesses in this sector also include those that construct new vessels, maintain and repair existing vessels, sell engine parts, and haul out vessels.)

- Training (including manufacturer training) to improve electrician familiarity with marine practices and materials, e.g., water tight, hanging wiring
- Safety training including OSHA-10, Maritime Industry and OSHA-30 Maritime Industry
- Training in welding, including trainings in different metals, gases, and techniques, as well as underwater welding (specifically mentioned were Tungsten inert gas (TIG) welding (not stick) and gas tungsten arc welding (GTAW))
- Training to straighten shafts and props, cut keys, and operate machines (including machines that are manually controlled as opposed to computer controlled)
- Training programs that are hands-on (especially for skills such as painting, fiberglass work, mechanical work, and rigging)
- Training to reflect the growing complexities with computers and electronics

Offshore Renewable Energy (Businesses in this sector include those that install/repair offshore renewable technology including cables.)

- Training for boat captains
- Training for back deck specialists, called Junior Systems Technicians
- Training for ROV pilots and technicians (see the International Marine Contractors Association (IMCA) requirements)

Marine Technology (Businesses in this industry are engaged in the manufacturing and testing of instruments or their components.)

- IPC-A-610 Certification: “Acceptability of Electronic Assemblies” the most widely used inspection standard for PWB manufacturing and assembly for commercial electronics; accept/reject criteria for soldered connections for all classes of manufacturing. (IPC used to stand for the Institute of Printed Circuits, but is now the name of a training company.)
- J-STD-001 Certification, “Requirements for Soldered Electrical & Electronic Assemblies”
- Boat operator licensing
- Training to service equipment in the field (including dealing with issues such as bio-fouling), much of which is solar powered

- Training to understand satellite or cellular transmission of data

Commercial Fishing (Businesses in this sector include wild fish harvesting and aquaculture.)

- Training in new technologies such as computer software for reporting landings and catch area information for stock attribution
- Business skills
- Retraining for displaced fishermen looking to apply their skills in new industries

Water Quality (Businesses in water supply or wastewater disposal including those who treat, test, monitor, and manage wastewater and drinking water.)

- Training in support of obtaining treatment operator licensing
- Continuing education classes to maintain licenses
- Classes available during working hours and during the work week

Environmental Services (Businesses in this sector range from small one-person consulting firms, to mid-sized local establishments involved in wetlands restoration, groundwater remediation, and hazardous waste removal and disposal, to large-scale companies with several thousand employees involved in site remediation and emergency spill response on a national and even international level.)

- Safe Boater Courses, such as those offered by the U.S. Coast Guard or U.S. Power Squadrons
- OSHA 40-hr Hazardous Waste Operator Training (HAZWOPER) training and OSHA Confined Space training

Industry interviews stressed the importance of technical skills, but many businesses acknowledged that an employee with technical skills and an understanding of the consequences of environmental impacts, and knowledge of environmental regulations and processes would be valuable in terms of ensuring that the company's activities are in compliance with environmental regulations and meet any industry "green" standards.

While the interviews for this feasibility report yielded a great deal of information (see more detailed summaries of interviews in Appendix D), the Ocean Campus Center must continue communications with industries as programming is developed to ensure that industry needs are met effectively.

WHO WOULD ATTEND OCEAN CAMPUS CENTER PROGRAMS?

The Ocean Campus Center's student body will depend on the types of programs the facility offers. Potential students could include recent graduates of high school or vocational school programs, those looking to change careers, and those already employed in a technical position seeking to upgrade or expand their skills.

Recent High School and Vocational School Graduates

There are 46 public high schools within the communities in southeastern Massachusetts and on Cape Cod. According to the Massachusetts Department of Elementary and Secondary Education's SIMS database, more than 31 percent (3,418 out of 10,845) of students completing studies at these schools (class of 2010-2011) have plans other than attending a four-year college, i.e., attend a two-year college

or other (less than four-year) post-secondary institution, or enter the workforce. The percentages of such students among the high schools range from 53 percent (New Bedford) to just over 3 percent (Cohasset). The vast majority of those not attending a four-year college plan to attend a two-year public college. Just over 7 percent of those not planning to attend a four-year college plan to work instead (See Appendix E for the breakdown by school). Similar data are available for the 11 regional vocational technical high schools in the region, showing a higher percent, though smaller absolute number (more than 64 percent, or 1,376 out of 6,138 students) who plan on doing something other than attending a four-year college, i.e., attend a two-year college or other (less than four-year) post-secondary institution, or enter the workforce. The percentages of such students among the vocational technical schools range from 80.6 percent (Old Colony regional Vocational Technical School) to 31.5 percent (Norfolk County Agricultural). About half of these students intend to enroll in a two-year public college and a much higher percent as compared with public high schools enter the workforce (23.2 percent). These numbers show that as many as 4,794 students finishing high school programs in 2011 intended to do something other than go to a four-year college. Obviously, only a fraction of these students may be interested in careers associated with the Ocean Campus Center, but even if only two percent of these students showed interest in the Ocean Campus Center, this would be approximately 100 potential students.

Another set of statistics revealing the post-secondary pursuits is compiled by the National Student Clearinghouse, which reports on the enrollment of Massachusetts public high school graduates into institutions of higher education within 16 months of graduating high school. On average, 27 percent (2,954 out of 10,942) of students from southeastern Massachusetts and Cape Cod public high schools (class of 2009-2010) were attending a two-year college within 16 months of high school graduation. Percentages ranged from 62 percent (Provincetown) to 5 percent (Cohasset). Almost all (except for 0.2 percent) of these students were enrolled in a public two-year college, and all but one percent of these were a community college (See Appendix E for the breakdown by school). On average, a higher percent (54 percent) of students from regional vocational technical high schools are enrolled in a two-year college a year after graduating from high school, with the schools ranging from 93.2 percent (Franklin County Regional Vocational Technical) to 53.4 percent (Norfolk County Agricultural).

Both the state and national data, as well as interviews with area guidance counselors, reveal that there are ample numbers of high school graduates from area communities pursuing post-secondary options in line with those to be offered by the Ocean Campus Center, i.e., two-year career-oriented educational programs or specialized training for entry into the workforce. High school guidance counselors were universally hesitant to suggest a number or percent of their graduates who might be interested in the programs to be offered by the Ocean Campus Center, but they were very positive about the school's potential attractiveness to students. Several counselors commented that, based on their experiences with other programs, students familiar with the targeted industries, e.g., those from coastal communities, are most likely to be interested, and that efforts to familiarize graduating students with the opportunities afforded by the Ocean Campus Center and in the associated industries is key to attracting interest and for recruitment. Guidance counselors concurred that a high-quality training program that incorporates environmental studies and has close ties with industries is appealing and should be very competitive among the options available to their students.

Guidance counselors from the regional vocational technical high schools, in particular, were very supportive of the relative affordability of a nonprofit Ocean Campus Center and of the possibility of students earning credit toward an associate's degree while pursuing technical training and industry-recognized certifications.

Guidance counselors from the regional vocational technical high schools also suggested that students enrolled in programs related to the marine trades and environmental technology fields (of which there are many) will be particularly good candidates for the Ocean Campus Center. Those programs and schools include:

Marine Service Technology

- Cape Cod RVTHS
- Plymouth South HS
- Upper Cape Cod RVTHS

Environmental Science & Technology

- Blue Hills RVTHS
- Southeastern RVTHS
- Upper Cape Cod RVTHS

Electronics

- Blackstone RVTHS
- Blue Hills RVTHS
- Old Colony RVTHS
- South Shore RVTHS
- Tri-County RVTHS
- Plymouth HS
- Weymouth HS

Drafting

- Blackstone RVTHS
- Blue Hills RVTHS
- Bristol-Plymouth RVTHS
- Greater New Bedford RVTHS
- Old Colony RVTHS
- Plymouth South HS
- Taunton HS

- Weymouth HS
- Dighton-Rehoboth Regional HS

Engineering Technology

- Blue Hills RVTHS
- Greater New Bedford RVTHS
- Southeastern RVTHS
- Tri-County RVTHS
- Upper Cape Cod RVTHS
- Quincy HS

Diesel Technology

- Greater New Bedford RVTHS

Metal Fabrication & Joining Technologies

- Blue Hills RVTHS
- Bristol-Plymouth RVTHS
- Cape Cod RVTHS
- Greater New Bedford RVTHS
- Old Colony RVTHS
- Plymouth South HS
- Southeastern RVTHS
- South Shore RVTHS
- Tri-County RVTHS
- Quincy HS
- Silver Lake Regional HS

Guidance counselors interviewed encourage the Ocean Campus Center to work closely with the high school guidance departments, high school career centers, and students in developing and marketing its programming. They also encourage industry representatives to make an effort to convey to schools, prospective students, and parents the career opportunities in the marine trades and environmental technology fields. Counselors noted that parents of students will be particularly interested in the credentials that can be earned and the career opportunities that will be available. Regional vocational technical high schools continually seek partnerships with businesses related to their programs and these relationships are likely to contribute to student interest in the Ocean Campus Center. Additionally, articulation agreements with high schools whereby students can obtain college credits for classes taken in high school, are valuable to attracting interest in post-secondary programs.

Interviews with employers in the recreational marine industry confirmed that high school and regional vocational school graduates do acquire valuable relevant skills through these programs, but emphasize the importance of additional hands-on training and experience for success in the workplace.

Career Changers

More than 50 percent of the students enrolled in Massasoit’s Recreational Marine Technician Certificate program in the spring of 2012 (4 out of 7), and 25 percent of program graduates (4 out of 16) enrolled in the program at least in part to explore a possible change in careers. The fact that more than half of the class of 2012 was interested in a career change may be tied to the current economy and high unemployment rate.

Existing Employees

Representatives from the various industry sectors made it clear that the Ocean Campus Center would be useful not only in terms of training potential employees, e.g., career changers and recent high school graduates, but also for training existing employees.

According to the BLS’s QCEW database (queried by NAICS code, i.e., industry), there were, as of 2011, approximately 12,803 employees in environmental technology and marine trades jobs within Barnstable, Bristol, Dukes, Nantucket, Norfolk, and Plymouth counties. These numbers are even higher (26,340 employees) in the BLS’s OES database (queried by SOC code, i.e., occupation), for the geographic regions (NECTA Divisions) in southeastern Massachusetts and Cape Cod (specifically Barnstable Town, MA Metropolitan NECTA; Boston-Cambridge-Quincy, MA NECTA Div.; Brockton-Bridgewater-Easton, MA NECTA Div.; New Bedford, MA Metropolitan NECTA, Taunton-Norton-Raynham, MA NECTA Div.; and Nantucket Island & Martha’s Vineyard nonmetropolitan area) (See Appendix F for specific job titles and numbers of employees).

In addition to career changers and recent high school graduates, the Ocean Campus Center can also provide important programs for those already employed in technical positions. State and Federal data indicate a large potential pool of students from various industry sectors.

While the employment categories used by the QCEW and OES databases do not perfectly align with the potential offerings of the Ocean Campus Center (some jobs may be beyond the scope of the Ocean Campus Center’s training, and some jobs require advanced degrees), some number of these employees will certainly need additional training to succeed in their current positions or advance within their industries. The Occupational Outlook Handbook developed by the BLS provides specific information about the types of training needed for various positions and should be consulted to identify the types of employees who might benefit from programs of the Ocean Campus Center. Particularly relevant sections of the Handbook can be found in Appendix G.

WHAT IS THE EMPLOYMENT OUTLOOK FOR OCEAN CAMPUS CENTER GRADUATES?

Massachusetts’ Forgotten Middle-skill Jobs: Meeting the demands of a 21st century economy (2010), a report by the National Skills Coalition, finds that middle-skill jobs—defined as those that require more than a high school diploma but not a four-year degree—represent the largest share of jobs in Massachusetts (44 percent) and a substantial share of future job openings. Many of these workers will be young people entering the job market from school, but the majority has been in the workforce already and needs access to education and training opportunities. The mission of the Ocean Campus

Center is perfectly aligned with this finding, appealing to and offering programs accessible to both recent high school graduates and those who have been in the workforce.

Employment Outlook

Job growth is not anticipated to increase equally across all fields considered by this study. Some technical fields are experiencing greater growth than others, and training that targets these fields is likely to lead to greater employment opportunities for program graduates. In those fields not projected to experience as much new growth, training may help to fill vacancies left by those leaving the industry, e.g., through retirement or a career change. Even with the best training program, however, there are external factors that will affect employment rates for program graduates. Examples of such external factors include:

- The economic climate – When the nation or region experiences difficult economic times, growth in many industries is slowed. Comments from the survey of Massasoit program participants suggested that many felt their employment possibilities were limited due to the poor economic conditions at the time of the survey. Interviews with industry representatives in the commercial and recreational marine and environmental services industries reported that recent economic conditions have made it difficult to grow their businesses or predict future hiring needs. Those involved in recreational vessel repairs noted increased business in difficult economic times because more people were fixing their existing boats rather than buying new ones.
- Industry wages – In some areas of Massachusetts, the high cost of living makes it difficult for employees to accept entry-level wages. This was particularly apparent on Cape Cod and on the Islands where interviews with the recreational boating industry noted difficulties finding someone who could afford to live in the area at the wages being offered. This may be true even in more affordable areas of the state. Potential employees in the recreational marine industry seemed disappointed in the entry-level wages, as reported in the survey of Massasoit program participants.

Job growth is not increasing uniformly across all sectors. The Ocean Campus Center should concentrate on those jobs and industries expected to see growth in the near future.

While external factors will influence the employment of program graduates to some extent, the Ocean Campus Center can take steps to ensure that it is providing students with the skills most in demand by employers, targeting industries expecting growth, targeting industries that express a need for better local training programs, and offering training and certifications required as a condition of employment.

In terms of industries experiencing growth, occupational projections for the decade 2010-2020 from the Commonwealth of Massachusetts (<http://lmi2.detma.org/Lmi/projections.asp>, identified in Table 1 below) show significant growth for Captains, Mates, and Pilots of Water Vessels (18.65 percent, or 144 jobs), Environmental Engineering Technicians (27.86 percent, or 180 jobs), Environmental Science and Protection Technicians (21.5 percent or 204 jobs), Sailors and Marine Oilers (21.7 percent or 115 jobs), Biological Technicians (20.81 percent or 1,062 jobs), Chemical Technicians (19.64 percent, or 470 jobs), Helpers – Electricians (14.85 percent, or 232 jobs), Hazardous Materials Removal Workers (19.93 percent, or 301 jobs), and Surveying and Mapping Technicians (18.49 percent, or 113 jobs). Interviews with representatives in the environmental technology industry confirm the State projections for Environmental Engineering Technician positions, with several businesses noting they anticipate having to hire in the near future. Interviews with representatives of the renewable energy industry also suggest significant potential opportunities for technicians working on offshore energy projects. The

potential of offshore renewable energy industry, however, has yet to be realized in the United States and the timeframe for training, while it may be imminent, is not entirely known. These are industries and opportunities with growth potential the Ocean Campus Center may wish to target.

The State projects moderate growth for Motorboat Mechanics and Service Technicians (10.43 percent or 122 jobs), Riggers (9.2 percent, or 24 jobs), Electrical and Electronics Repairers, Commercial and Industrial Equipment (5.74 percent, or 85 jobs), Bus and Truck Mechanics and Diesel Engine Specialists (3.86 percent, or 152 jobs), Motorboat Operators (4.69 percent, or 6 jobs), and Automotive and Watercraft Service Attendants (0.42 percent, or 11 jobs). This data along with interviews conducted suggest that these fields may also be productive for Ocean Campus Center training programs. Interviews with recreational marine industry representatives (whose technical positions are not well-captured by the State data) suggest moderate growth (2-4 employees) for some companies, while other companies work to maintain the employment levels they currently have. Many in this industry noted the impacts of the economy on hiring, and stated that future employment needs would depend on the state of the economy. In addition, interviews suggest that the local recreational marine industry is in need of a program that offers students training that is both real-world and hands-on.

The State projects minimal employment declines for Water and Wastewater Treatment Plant and System Operators (-0.45 percent, or -11 jobs). Despite negative growth for this occupation, jobs will still become available due to replacement needs. Water and Wastewater Treatment Operators are projected to have an average of 63 annual job openings; however, all of these openings will come from replacement needs and not occupational growth. Based on short-term projections from 2011-2013 (available in Appendix I), however, the State projects this occupation will experience slight growth (0.19 percent, or 10 jobs). The Massachusetts Department of Environmental Protection (DEP) regulates the number of treatment operators required for each treatment plant, based on the various size characteristics and operation level of the plant. Every two years a treatment plant must submit a scorecard to DEP, including activity levels and current staffing, suggesting that even in economically difficult times, this industry will remain stable and in need of at least replacement workers over time.

Overall, based on the 2010-2020 occupation projections for the State, over this time period approximately one-third of total average annual job openings will come from growth (new positions) and two-thirds of the job openings will be replacement positions. This same point is made by the South Shore Workforce Investment Board (WIB) in its [Annual Profile for South Shore Workforce Area](#) (May 2010), which notes most job openings in the near-term will be the result of replacement demand and not growth. In fact, 78% of the nearly one million projected net new job openings statewide will occur because of replacement associated with retirement, labor force withdrawal, and occupational changes. This same point was made by some interviewees in the recreational marine and water quality industries who noted that many existing employees were reaching retirement age. In addition, comparison between the most current employment statistics and the 2010-2020 employment projections indicates that approximately half of the selected occupations are either on track to meet 2020 projections or have already exceeded these projections.

Table 1: Projected employment rates for Massachusetts. (“N/A” indicates that data are not available.)

SOC Code Detailed Occupation	Detailed Occupation Title	Employment		Employment change, 2010-2020		Average Annual Openings		
		2010	2020	Number	Percent	Total	Growth	Replacements
Architecture and Engineering Occupations								
17-2121	Marine Engineers and Naval Architects	152	194	42	27.63	7	4	3
17-3023	Electrical and Electronics Engineering Technicians	7,034	7,592	558	7.93	190	56	134
17-3024	Electro-Mechanical Technicians	1215	1340	125	10.29	35	12	23
17-3025	Environmental Engineering Technicians	646	826	180	27.86	30	18	12
17-3027	Mechanical Engineering Technicians	1,520	1,700	175	11.48	47	18	29
17-3031	Surveying and Mapping Technicians	611	724	113	18.49	23	11	12
Life, Physical, and Social Science Occupations								
19-4021	Biological Technicians	5,103	6,165	1,062	20.81	278	106	172
19-4031	Chemical Technicians	2,393	2,863	470	19.64	81	47	34
19-4091	Environmental Science and Protection Technicians, Including Health	949	1,153	204	21.5	60	20	40
Farming, Fishing, and Forestry Occupations								
45-2093	Farmworkers, Farm, Ranch, and Aquacultural Animals	473	466	-7	-1.48	14	0	14
45-3011	Fishers and Related Fishing Workers	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Construction and Extraction Occupations								
47-3013	Helpers - Electricians	1,562	1,794	232	14.85	64	23	41
47-4041	Hazardous Materials Removal Workers	1,510	1,811	301	19.93	70	30	40
47-4071	Septic Tank Servicers and Sewer Pipe Cleaners	746	831	85	11.39	28	8	20
Installation, Maintenance, and Repair Occupations								
49-2021	Radio, Cellular, and Tower Equipment Installers and Repairers	N/A	N/A	N/A	N/A	N/A	N/A	N/A
49-2092	Electric Motor, Power Tool, and Related Repairers	146	147	1	0.68	1	0	1
49-2093	Electrical and Electronics Installers and Repairers, Transportation Equipment	N/A	N/A	N/A	N/A	N/A	N/A	N/A
49-2094	Electrical and Electronics Repairers, Commercial and Industrial Equipment	1,480	1,565	85	5.74	44	8	36
49-3031	Bus and Truck Mechanics and Diesel Engine Specialists	3,938	4,090	152	3.86	101	15	86
49-3051	Motorboat Mechanics and Service Technicians	1,170	1,292	122	10.43	42	12	30
49-9096	Riggers	261	285	24	9.2	7	2	5
49-9098	Helpers - Installation, Maintenance, and Repair Workers	1,424	1,549	125	8.78	77	12	65
Production Occupations								
51-2022	Electrical and Electronic Equipment Assemblers	6,284	7,242	958	15.25	187	96	91
51-2031	Engine and Other Machine Assemblers	217	250	33	15.21	7	3	4
51-2091	Fiberglass Laminators and Fabricators	N/A	N/A	N/A	N/A	N/A	N/A	N/A
51-8031	Water and Wastewater Treatment Plant and System Operators	2,451	2,440	-11	-0.45	63	0	63
Transportation and Material Moving Occupations								
53-5011	Sailors and Marine Oilers	530	645	115	21.7	35	12	23
53-5021	Captains, Mates, and Pilots of Water Vessels	772	916	144	18.65	43	14	29
53-5022	Motorboat Operators	128	134	6	4.69	6	1	5
53-6031	Automotive and Watercraft Service Attendants	2629	2640	11	0.42	87	1	86

An important opportunity available to the Ocean Campus Center is in assisting current employees to keep their jobs or advance in their fields by offering classes that result in required certifications and skill

upgrades, such as ongoing OSHA certifications, manufacturer trainings for those in the recreational marine industry, and continuing education opportunities for those in the water quality industry.

Wages

Ocean Campus Center program graduates will be eligible for a range of wages, depending on the career sought and the level of training achieved. The American Boat Builders and Repairers Association (ABBRA) collects data specific to boat building and repairing. Data for New England show that the highest wages were for general managers (\$81.71/hour), and the lowest wages were for dockhands (\$7.40/hour). These wages are not averages for those positions, but instead represent the highest and lowest wages for those positions. On average, according to industry interviews, those engaged in recreational marine trades can expect to earn \$10/hour with minimum training, \$20/hour or more with some level of training (as mechanics, boat builders, and fiberglass workers) and \$30/hour or more as certified mechanics. In the commercial marine sectors, interviews suggest that riggers make the most per hour (\$70) while assemblers, machinists, and painters can expect to start at \$10-12/hour. Mechanics and welders with training can expect to make between \$20-35/hour.

Interviews provided insights into wages offered by local businesses. In addition, the BLS collects wage data as part of its Occupational Employment Statistics (OES) Survey, organized by SOC code. Table 2 presents a broader picture of what a graduate of the Ocean Campus Center might expect to earn. Wages vary considerably, and generally correspond to the level of training required for a position. For example, automotive and watercraft service attendants earn slightly more than \$10/hour, but their position requires little training. Most technicians working in mechanics or electronics make \$20-30/hour reflecting some level of advanced training. These numbers represent average wages – it is important to note that starting salaries can be much lower and will increase as employees become more skilled and receive certain trainings and certifications.

Table 2: Hourly and annual wages in Massachusetts

SOC Code Detailed Occupation	Detailed Occupation Title	Average Hourly Wage State-wide (\$)	Average Yearly Wage State-wide (\$)
Architecture and Engineering Occupations			
17-2121	Marine Engineers and Naval Architects	38.77	80,640
17-3023	Electrical and Electronics Engineering Technicians	28.10	58,440
17-3024	Electro-Mechanical Technicians	25.44	52,920
17-3025	Environmental Engineering Technicians	21.78	45,300
17-3027	Mechanical Engineering Technicians	25.42	52,860
17-3031	Surveying and Mapping Technicians	21.74	45,220
Life, Physical, and Social Science Occupations			
19-4021	Biological Technicians	21.67	45,080
19-4031	Chemical Technicians	28.42	51,630
19-4091	Environmental Science and Protection Technicians, Including Health	19.28	40,100

SOC Code Detailed Occupation	Detailed Occupation Title	Average Hourly Wage State-wide (\$)	Average Yearly Wage State-wide (\$)
Farming, Fishing, and Forestry Occupations			
45-2093	Farmworkers, Farm, Ranch, and Aquacultural Animals	14.61	30,380
45-3011	Fishers and Related Fishing Workers	15.20	31,610
Construction and Extraction Occupations			
47-3013	Helpers – Electricians	16.67	34,670
47-4041	Hazardous Materials Removal Workers	19.71	41,000
47-4071	Septic Tank Servicers and Sewer Pipe Cleaners	19.87	41,330
Installation, Maintenance, and Repair Occupations			
49-2021	Radio, Cellular, and Tower Equipment Installers and Repairers	23.45	48,780
49-2092	Electric Motor, Power Tool, and Related Repairers	19.06	39,650
49-2093	Electrical and Electronics Installers and Repairers, Transportation Equipment	24.69	51,350
49-2094	Electrical and Electronics Repairers, Commercial and Industrial Equipment	26.16	54,410
49-3031	Bus and Truck Mechanics and Diesel Engine Specialists	23.58	49,050
49-3051	Motorboat Mechanics and Service Technicians	22.10	45,960
49-9096	Riggers	25.54	51,040
49-9098	Helpers - Installation, Maintenance, and Repair Workers	14.69	30,560
Production Occupations			
51-2022	Electrical and Electronic Equipment Assemblers	16.41	34,130
51-2031	Engine and Other Machine Assemblers	19.60	40,770
51-2091	Fiberglass Laminators and Fabricators	20.41	42,450
51-8031	Water and Wastewater Treatment Plant and System Operators	23.55	48,980
Transportation and Material Moving Occupations			
53-5011	Sailors and Marine Oilers	19.29	40,110

SOC Code Detailed Occupation	Detailed Occupation Title	Average Hourly Wage State-wide (\$)	Average Yearly Wage State-wide (\$)
53-5021	Captains, Mates, and Pilots of Water Vessels	27.29	56,760
53-5022	Motorboat Operators	23.25	48,370
53-6031	Automotive and Watercraft Service Attendants	10.89	22,640

RECOMMENDATIONS

The Ocean Campus Center responds to an expressed and documented need for educating and training technicians for the marine trades and environmental services industries. As reported, training needs are not uniform across all industry sectors and student types. Programming for the Ocean Campus Center should be developed to meet specific needs, and take into consideration the following recommendations:

Location

- The site selected for the Ocean Campus Center is well positioned to serve the region. Its one known limitation, however, may be its lack of water access. Interviewees from several industries noted the importance of on-water instruction and exposure to real-world situations. While some water access scenarios can be created in the classrooms with technology, others, e.g., docking or driving a boat, taking water samples, require actual marine or aquatic settings. The Ocean Campus Center should make arrangements with its business (and perhaps municipal) partners to utilize existing waterfront facilities for on-water or waterfront-related training. This has multiple advantages for both the school and the business partner(s).

Timing

- Programs for *existing* employees in the marine trades should be focused on winter months to avoid the busy New England boating season, and should be short intense courses rather than courses spread out over several months. Seasonality is not as much of a concern for the other industry sectors.
- Programs should be offered in a logical sequence so that skills build upon one another.
- Programs for potential new employees should be offered regularly and, if possible, coincide with any important hiring times in the industries.
- Program timing should be considerate of student time and costs, i.e., full-time programs should not be so long as to cause financial hardship for those who are unable to work while attending the program.

Affiliation/Collaboration

- It would be highly advantageous for students and for the competitive position of the Ocean Campus Center for its programs to be affiliated with an accredited academic institution where credit can be offered and students can work toward an academic credential, e.g., an associate's degree.

- Relationships with local high schools and vocational schools should be fostered to support recruitment (via visits to schools, open houses, and field trips for classes) and to help inform curriculum design. Articulation agreements allowing students to apply high school courses to Ocean Campus Center offerings for credit will help attract students from high school programs.
- Industry and professional organization representation, including Workforce Investment Boards, should be included in program design, program outreach, and curriculum development. The relationships with industries will help build awareness of the Ocean Campus Center, lend it credibility among the industries, and improve job-placement potential. Industry representatives may serve as spokespeople for the Ocean Campus Center, helping prospective students become familiar with career possibilities and training requirements. Partnerships with industries can help Ocean Campus Center programs be more “real-world” by supporting internships, guest lectures, and field trips.
- Collaboration with manufacturers should be a priority in terms of having local manufacturer trainings and securing equipment. Manufacturer trainings were cited by the recreational marine industry as one of their top training needs. Currently, many businesses send their employees to trainings out-of-state, incurring high costs for travel and lodging. Local manufacturer trainings would greatly benefit the recreational marine industries by reducing costs associated with these highly desired programs.
- In sectors where annual training is required, e.g., water and wastewater treatment, the Ocean Campus Center should partner with professional organizations to offer those trainings locally. Some professional organizations and government entities offer trainings that, while not required, are highly desired by employees, e.g., ABYC, USCG, OSHA. Those professional organizations and government entities could also provide their trainings as part of the Ocean Campus Center’s programming.

Content

- While an associate’s degree might be appealing to some (especially recent high school graduates), others may be looking for shorter training opportunities that lead to a specific certification but do not require many months of training. The Ocean Campus Center should provide students with a variety of options – a longer, structured program leading to an associate’s degree, and shorter training options that meet specific real-time needs of the students and industries.
- Offer certification classes that are important for existing employees and can make potential employees more marketable. Examples include: OSHA (Confined Space, HAZWOPER), STCW, IPC, TWIC, USCG (Captain License), and SCUBA.
- Consider offering technical classes that train people in electronics, electrical systems, ROV operation, boat handling, boat varnishing, boat painting, engine repair, refrigeration systems, plumbing, fiberglass repair, basic tow and salvage methods, hydraulics, groundwater sampling, soil sampling, and hazardous waste handling.
- Consider offering non-technical classes in general science, environmental science, and employee skills.
- Ensure that classes are “high-quality,” “hands-on,” and relate to the “real-world.” This can be accomplished through close collaboration with industries (to provide guidance on curriculum

development), access to adequate and appropriate equipment, and professional instructors with recognized training and experience.

- Offer local manufacturer trainings by companies including Yamaha, Evinrude, Volvo Penta, Mercury, and Garmin.
- Provide classes for marine technicians offering a broad overview of multiple types of engines.
- Look to in-state schools such as the Motoring Technical Training Institute (MTTI), and to out-of-state schools such as the New England Institute of Technology (Rhode Island) and the Universal Technical Institute (UTI) in Florida for guidance on what does and does not work well and quality of facilities. These schools were cited more than once by guidance counselors and industry representatives.
- Consult the Massachusetts Department of Education's Vocational Technical Education Frameworks for guidance in developing Ocean Campus Center programming. Those that match the skills described by the industry representatives include: Environmental Science and Technology; Electronics; Engineering; Robotics and Automation; Metal Fabrication and Joining Technologies and Drafting. These frameworks present competencies for the high school level, but the six strands (Safety Health Knowledge and Skills; Technical Knowledge and Skills; Embedded Academic Knowledge and Skills; Employability Knowledge and Skills; Management and Entrepreneurship Knowledge and Skills; Technological Knowledge and Skills) are a useful way of thinking about and organizing more advanced technical education and training offerings and accurately reflect the characteristics that industry representatives reported looking for in employees.
- Review the Massachusetts Career Development Education framework with its three domains (academic-technical, personal/social, workplace readiness) to help inform Ocean Campus Center programming.

Equipment/Space Needs

- Ensure that classes have appropriate equipment for excellent hands-on and real-world training. Many employers note that such training is very important in new hires, and minimized the need to spend time training or retraining employees.
- Work with manufacturers to obtain equipment for classroom spaces.

Future Planning

- There are a number of offshore renewable energy developers and related companies that provide services such as power cable planning and installation poised in the region in anticipation of a major investment in offshore renewable energy. While no offshore wind projects have yet been built off the northeast (or any U.S.) coast, there are projects in different stages of the planning and regulatory process ranging from Cape Wind's 130 turbines, slated to start construction in 2013 to the expressed interest by developers in the region's designated Wind Energy Areas, which could see the development of as much as 6 GW of wind generation. Should these projects become reality, the developers anticipate there will be a need for "hundreds" of technicians. Companies that have been involved in Europe's offshore energy development have devised their own training programs which they expect to replicate here, and are open to partnerships. Access to the water for training will be important.

- Aquaculture is growing in southeastern Massachusetts and may present another industry with training opportunities. Roger Williams University offers aquaculture classes for those interested in getting into the industry. An extension of that program could be offered through the Ocean Campus Center.
- As the Ocean Campus Center develops a reputation for strong training programs, it may wish to consider expanding its role in order to conduct and disseminate research, compile industry information regarding best practices, and serve as a general convener of industry, education, and community-focused events.

CONCLUSIONS

Data from various state, federal, and industry reports, along with insights from local businesses and high school guidance departments indicate a clear need for local technical training opportunities, and a potentially large pool of students from high schools, businesses, and other industries.

The Ocean Campus Center is in a unique position to work with area high schools, institutions of higher learning, industry representatives, professional organizations, and manufacturers to provide training programs to meet industry needs *and* student needs in southeastern Massachusetts.

The potential for Ocean Campus Center training opportunities are not limited to the training of new employees. One of the common themes from interviews with industry representatives was the need for local high-quality training opportunities for those already working in the sectors. The training needs varied by sector and within sector, and included those ranging from specific certification courses, e.g., certifications in boat handling and navigation, safety training, hazardous waste operation, wastewater management, manufacturer standards for boat equipment, etc., to informational programs, e.g., industry standard updates, what it means to be a marine technician, etc., and programs that teach specific skills, including skill review and updates, e.g., welding, boat handling, boat engine repairs, workplace readiness, etc.

Beyond establishing a need for the training programs envisioned by the Ocean Campus Center, the interviews of industry representatives and high school guidance counselors, and the scan of similar schools, yielded a wealth of specific insights and guidance on what would be most useful in terms of meeting their needs. They include:

- The Ocean Campus Center should consider offering a range of classes and courses of study that provide students with options including associate's degrees (or credits toward a degree); certificates (it is important that these certificates be recognized by the respective industries); industry-required licenses and certifications; and training contact hours. Some of the offerings should incorporate existing classes currently offered at other venues, e.g., manufacturer certifications, OSHA trainings, etc.; however there are also opportunities to work with industries to create new offerings such as new certificate programs and associate's degrees.
- Some sectors have very specific technical training needs, but there are many courses or training topics relevant to the needs of multiple industries. For example, a Geographic Information System (GIS) class has appeal for the marine research sector and the environmental response sector. Further, a GIS course is appropriate as a certificate program or as part of larger course of study leading to an associate's degree. Some of these classes of broad interest might also be offered at the Ocean Campus Center through collaboration with a community college or university.

- Some sectors have specific needs in terms of timing. As the Ocean Campus Center considers the types of programs it will offer, thought should be given to industry timing preferences and course order, recognizing that needs may differ in terms of existing employees and people looking to enter the field.
- Those that mentioned a need for the Ocean Campus Center also mentioned the importance of having programs of very high quality. The definition of “high quality” may differ from sector to sector, but often included terms such as “real-world” and “hands-on.”

Through strategic collaborations and careful attention to program design, the Ocean Campus Center has the potential to make an important contribution to fulfilling industry training needs, provide a gateway for new employees into these industry sectors, improve the quality and breadth of available training and education and, in doing so, set the standard for the training of marine and environmental technicians.