U.S. Department of Transportation

Maritime Administration

Diverse Mariner Workforce Recruitment Strategy

December 2024

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Message from the Administrator

The Maritime Administration is pleased to provide this *Diverse Mariner Workforce Recruitment Strategy*. This strategy may be used to assist the six State Maritime Academies and the United States Merchant Marine Academy in improving the representation of women and underrepresented minorities in the next generation of U.S. Merchant Marine officers.

An afloat workplace must be safe and free from discrimination of any kind. To promote this environment, we are committed to creating a workforce more representative of America's large and diverse population. Our strategy identifies initiatives to assist in improving diversity at the maritime academies that graduate almost 1,000 officers every year. This is just one of many steps we are taking to foster shipboard cultures free of discrimination and harassment of any kind.

Many studies have shown that companies and organizations that are more diverse outperform their peers. The maritime industry similarly benefits from greater diversity. For months at a time, a vessel is a mariner's workplace as well as their home. Developing a mariner workforce that reflects the diversity of America improves the work-life aspects of living and working onboard, while also enhancing the overall performance of the crew.

The maritime industry is vital to our national security and economic prosperity. Every American, whether they live near the water or not, benefits from a strong U.S. Merchant Marine. Improving the mariner workforce is an "all-hands-on-deck" effort that requires action and cooperation from public and private organizations.

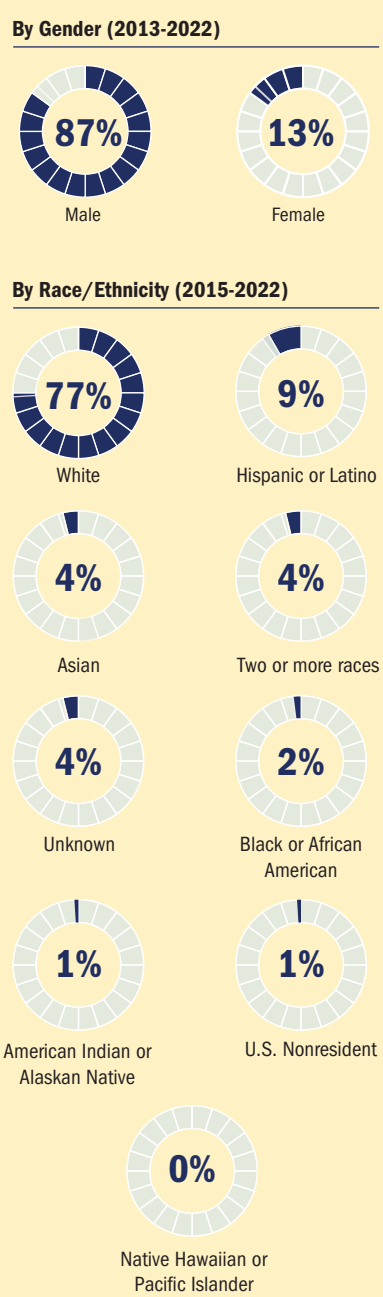
We are exceptionally grateful for those across the government, both Federal and State, and within the private sector who continue to develop the mariner workforce to meet the needs of today and are preparing for future challenges ahead.

Sincerely,

Ann C. Phillips
Maritime Administrator

At a Glance

Figure 1
Total Mariner Credentialing Program Enrollment at the Maritime Academies, by Gender and by Race/Ethnicity.



Total mariner credentialing program enrollment, by gender (Cohort Years 2013-2022) and by race/ethnicity (Cohort Years 2015-2022); source: Volpe Center, using Integrated Postsecondary Education Data System (IPEDS) and maritime academy data.

The U.S. Department of Transportation's Maritime Administration (MARAD) is responsible for fostering, promoting, and developing the maritime industry of the United States to meet the Nation's economic and security needs. The agency also supports the generation of a consistent supply of qualified and well-trained merchant mariners to crew U.S.-flagged vessels.

At the direction of Congress, MARAD developed the *Diverse Mariner Workforce Recruitment Strategy* to assist the State Maritime Academies (SMA) and the U.S. Merchant Marine Academy (USMMA) in improving the inclusion of women and underrepresented communities in the next generation of the mariner workforce.[1] As the SMAs and USMMA develop entry level merchant marine officers, this report focuses on lawfully improving the diversity of credentialed officers entering the mariner workforce.

This *Diverse Mariner Workforce Recruitment Strategy* used a data-centric approach to:

1. Evaluate past trends for a baseline of current demographics, and

2. Formulate initial action items to enhance the diversity of graduates from the six SMAs and USMMA (hereafter, collectively referred to as the maritime academies throughout this strategy).

In general, the available data shows stagnation and, in some instances, a slight decline, in the trend of overall diversity in gender, race, and ethnicity across the total student populations at the maritime academies.[2] As noted in Figure 1, the percentage of female students enrolled in the mariner credentialing program across all maritime academies has steadily remained at approximately 13 percent since 2013, while the percentage of underrepresented groups has likewise remained relatively unchanged since 2015.

1 In response to Section 3533, Ensuring Diverse Mariner Recruitment, of the James M. Inhofe National Defense Authorization Act for Fiscal Year 2023 (Public Law 117-263), https://www.congress.gov/bill/117th-congress/house-bill/7776.

2 The terms female and male are used throughout this document to maintain consistency with how the data has been collected by the data sources. Additional information on the use of key terms and phrases can be found in *An Evaluation of Diversity at the Nation's Maritime Academies*.

The technical course of study, regimented lifestyle, and general unfamiliarity with a merchant mariner career path are only some of the many challenges for the maritime academies to recruit and retain students, especially females and underrepresented minorities.

This strategy is the first of its kind and serves to establish a baseline to build a more robust course for enhanced collaboration with the maritime academies to address both data collection to assess and initiatives to improve diversity. For example, although state maritime academies fulfill statutory requirements by collecting and reporting statistical data to the U.S. Department of Education's Integrated Postsecondary Education Data System (IPEDS), it is reported in aggregate format for the entire student body. Accordingly, there is no unique historical data for students enrolled in their merchant marine officer preparation program, which is essential for meaningful assessment of trends.

This report documents MARAD's initiative to help coordinate a national effort to increase diversity across the nation's maritime academies. MARAD will seek to establish a maritime academies recruitment and retention improvement team which will evaluate current marketing and outreach activities, seek input from affinity groups for future enhancements, and use data analytics to prioritize outreach programs. Additionally, the team will explore federal and state resources for financial incentives and loan forgiveness or repayment programs for students.

An educational institution's cohort year is based on a six-year graduation rate. Therefore, this strategy will be re-evaluated triennially to assess the progress made at improving diversity at the applicant, admittee, enrollee, and graduate phases. Detailed descriptions of the scope and methodology can be found in *An Evaluation of Diversity at the Nation's Maritime Academies* and its accompanying *Institutional Profiles* by the Volpe National Transportation Systems Center (Volpe Center). As this is the first *Diverse Mariner Workforce Recruitment Strategy,* the report is intended to take a holistic view of the maritime academies using quantitative data and is not intended to represent a comprehensive analysis.

Introduction

The mariner workforce is vital to our national security and economic prosperity. U.S.-flagged vessels carry 90 percent or more of military cargo when the U.S. is involved in an extended armed conflict overseas.[3] It is, therefore, vital that an adequate number of U.S. merchant mariners remain available to sustain a surge in delivering military cargo. Further, merchant mariners are integral to maintaining the supply chain and promoting national economic prosperity. Of the goods that the U.S. imports and exports, approximately 68 percent by weight and 41 percent by value move by water transportation and through our national port system.[4] Additionally, merchant mariners moving domestic cargo contribute billions to the national economy and provide an efficient, environmentally sound transportation of goods. The nation's maritime industry as well as the public-at-large have an interest in ensuring that qualified, well-trained, and credentialed merchant mariners are available to crew U.S.-flagged vessels.

A Maritime Workforce Working Group (MWWG) in 2017 determined that full activation of the surge sealift fleet, concurrent operations of the commercial U.S.-flagged fleet, and sustained military sealift operations would require 13,607 sealift-qualified mariners.[5,6] The MWWG identified 11,768 actively sailing, credentialed merchant mariners, while in comparison, the average monthly employment of seafaring mariners was 25,915 in 1980.[7] This most recent estimation represents a deficit of 1,839 credentialed merchant mariners needed to crew vessels for sustained military sealift operations, while optimistically assuming that all merchant mariners would be both available and willing. This deficit critically hinders the United States' global response to armed conflicts or national emergencies because the ability to meet strategic sealift needs is dependent on having a sufficient number of available and willing credentialed merchant mariners.

One of the goals for the Maritime Administration (MARAD) is to strengthen the nation's mariner workforce. Improving the diversity of the mariner workforce is a vital step to meeting this goal. A mariner workforce representative of the large and diverse U.S. population will promote a workplace of choice that is free of discrimination, sexual assault, sexual harassment, and other prohibited behaviors that hinder a respectful work environment. To help ensure that there are readily available credentialed merchant mariners, MARAD created the *Mariner Workforce Strategic Plan* to address merchant mariner recruitment, training, and retention.[8] This *Diverse Mariner Workforce Recruitment Strategy* aligns with the strategic plan's goal to create a more diverse mariner workforce that fosters a welcoming work environment to both retain qualified mariners and also attract new personnel.

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3 See "Cargo Preferences for U.S.-Flag Shipping," CRS Report R44254, October 30, 2015, Congressional Research Service, accessed August 1, 2024, https://crsreports.congress.gov/product/pdf/R/R44254.

4 See "Freight Facts and Figures," U.S. Department of Transportation, Bureau of Transportation Statistics, accessed August 1, 2024, https://data.bts.gov/stories/s/Moving-Goods-in-the-United-States/bcyt-rqmu.

5 See "Maritime Workforce Working Group Report," U.S. Department of Transportation, Maritime Administration, accessed August 1, 2024, https://www.maritime.dot.gov/sites/marad.dot.gov/files/docs/mariners/1026/mwwg-report-congress-finalr3.pdf.

6 A "sealift-qualified mariner" is defined as an individual who is capable of serving in the Ready Reserve Force fleet who holds: 1) a current and valid unlimited tonnage or unlimited horsepower oceans Merchant Mariner Credential (MMC) without limitations and meets the required international standards; 2) a current and valid Transportation Worker Identification Credential (TWIC); and 3) has maintained their proficiency by sailing aboard large, oceangoing ships during the last 18 months.

7 See *The Annual Report of the Maritime Administration for Fiscal Year 1980*, U.S. Department of Commerce, Maritime Administration, accessed August 1, 2024, https://www.maritime.dot.gov/sites/marad.dot.gov/files/2022-07/maradannualreport1980.pdf.

8 See *Mariner Workforce Strategic Plan – FY 2023 to FY 2027: Strengthening the Recruitment, Training, and Retention of Credentialed American Mariners*, U.S. Department of Transportation, Maritime Administration.

There are multiple career accession paths for individuals to become credentialed merchant mariners and be part of the mariner workforce. Some of these paths include colleges and universities, Centers of Excellence for Domestic Maritime Workforce Training and Education, maritime training centers, maritime labor unions, and non-profit organizations. The U.S. has seven institutions of higher education whose primary mission is the training of merchant marine officers. MARAD has direct responsibility for the operation of one Federal service academy, the U.S. Merchant Marine Academy (USMMA), and administers that program in accordance with the requirements of 46 CFR Part 310 Subpart C. In addition, MARAD has designated six institutions as "State Maritime Academies" (SMA) and provides program oversight and financial support in accordance with the provisions of 46 CFR Part 310 Subpart A.

Figure 2:
Federal Service Academy and State Maritime Academies

Federal Service Academy

United States Merchant Marine Academy

State Maritime Academies

California State University Maritime Academy

Great Lakes Maritime Academy

Maine Maritime Academy

Massachusetts Maritime Academy

State University of New York Maritime College

Texas A&M Maritime Academy

On average over a five-year period, these seven institutions of higher education (hereafter, collectively referred to as the maritime academies throughout this strategy unless specified) annually graduate 961 merchant mariners credentialed for international service. The maritime academies are the primary source of training and for providing diverse officers to the U.S. Merchant Marine. Improving diversity at the maritime academies will strengthen the overall mariner workforce and help ensure the next generation of merchant mariners reflects the diversity of the U.S. population.

As SMAs receive Federal financial assistance, MARAD ensures that SMAs comply with Federal requirements for recruitment and enrollment. Further, each educational institution implements its own diversity strategy to meet the unique institutional needs. From these considerations, MARAD seeks to support active diversity efforts at the maritime academies in collectively developing a more diverse mariner workforce.

Strategy Overview

This *Diverse Mariner Workforce Recruitment Strategy* supports the *Mariner Workforce Strategic Plan* and is the first step in MARAD's collaborative effort with the maritime academies to develop a student body that better reflects the diverse population of the U.S., which will promote greater diversity within the Nation's mariner workforce. To initiate a coordinated approach to promoting greater diversity, there needs to be a better understanding of the current state of the student population at the maritime academies using data and analysis. MARAD collaborated with the Volpe National Transportation Systems Center (Volpe Center) to facilitate the collection of information and data from the maritime academies and provide key findings and analysis.

Detailed descriptions of our scope and methodology can be found in *An Evaluation of Diversity at the Nation's Maritime Academies* and its accompanying *Institutional Profiles* by the Volpe Center.[9] As this is the first *Diverse Mariner Workforce Recruitment Strategy,* the strategy is intended to take a holistic view of the maritime academies using quantitative data and is not intended to be a comprehensive analysis.

Though intrinsically linked, it is important to distinguish the differences, and the unique challenges, between recruiting, admitting, enrolling, and graduating students who will make up the mariner workforce. This means the maritime academies' contribution to a more diverse mariner workforce is represented by each of their graduating classes. This four-to-six-year process originates with an applicant pool. From this pool, the applicants must be granted admission to attend and ultimately choose to enroll in the institution amongst other choices and priorities. Finally, the enrolled students must successfully complete both an academic course of study for their college degree and a U.S. Coast Guard (USCG)-approved mariner training program so they can graduate from the maritime academy with a Merchant Mariner Credential (MMC) and be part of the mariner workforce.[10]

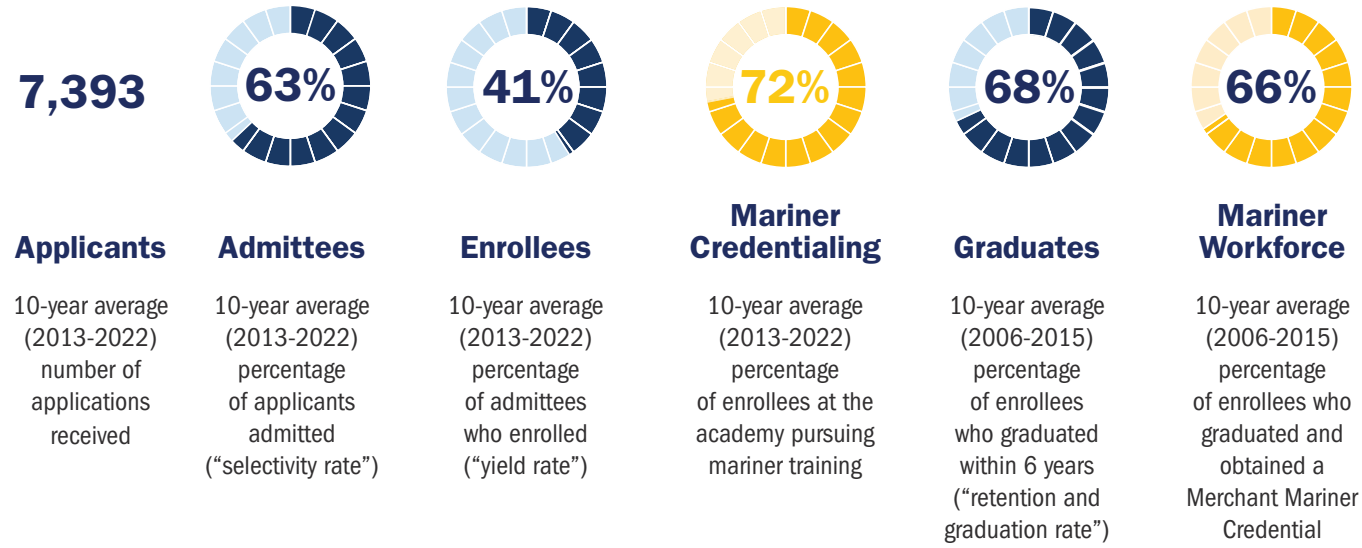
9 See *An Evaluation of Diversity at the Nation's Maritime Academies,* Report DOT-VNTSC-MARAD-23-01, September 2023, U.S. Department of Transportation, Volpe National Transportation Systems Center.

10 This strategy uses the term Merchant Mariner Credential (MMC). Although the use of the legacy phrase "USCG license" or "license" remains common within the maritime industry, the U.S. Coast Guard's (USCG) National Maritime Center (NMC) formally uses the term Merchant Mariner Credential when they centralized its Mariner License Document (MLD) program and changed its name to the Merchant Mariner Credentialing (MMC) program in 2008.

Figure 3:
Accession into the Mariner Workforce by Attending the Maritime Academies, from Applicant to Graduate

The data is organized into the four major phases of a student's journey at every educational institution: applicant, admittee, enrollee, and graduate. This strategy explores the maritime academies' student population throughout the process from application to graduation using data to support decision-making as well as policy and strategy development. At each step from admission to graduation, there are different challenges that hinder the development of a diverse graduating cohort. The findings illustrate the challenges that the maritime academies currently face in their ability to achieve a graduating class that better reflects the gender, race, and ethnic diversity of the U.S. population.

Figure 4:
10-Year Total Averages for Applications, Selectivity, Yield, Graduation, and Credentialing at the Maritime Academies



Together, the maritime academies graduate approximately 961 merchant mariners credentialed for international service each year (2018-2022)

The 10-year average number of applications (Cohort Years 2013-2022), rates for admissions (Cohort Years 2013-2022), Enrollees (Cohort Years 2013-2022), mariner credentialing program Enrollees (Cohort Years 2013-2022), Graduates (Cohort Years 2006-2015), and graduates with a Merchant Mariner Credential (Cohort Years 2006-2015), and the 5-year average number of graduates with a Merchant Mariner Credential with endorsements of unlimited tonnage/horsepower (Academic Years 2018-2022) across all the maritime academies which includes the Federal service academy and the six State Maritime Academies; source: Volpe Center, using Integrated Postsecondary Education Data System (IPEDS) and maritime academy data.

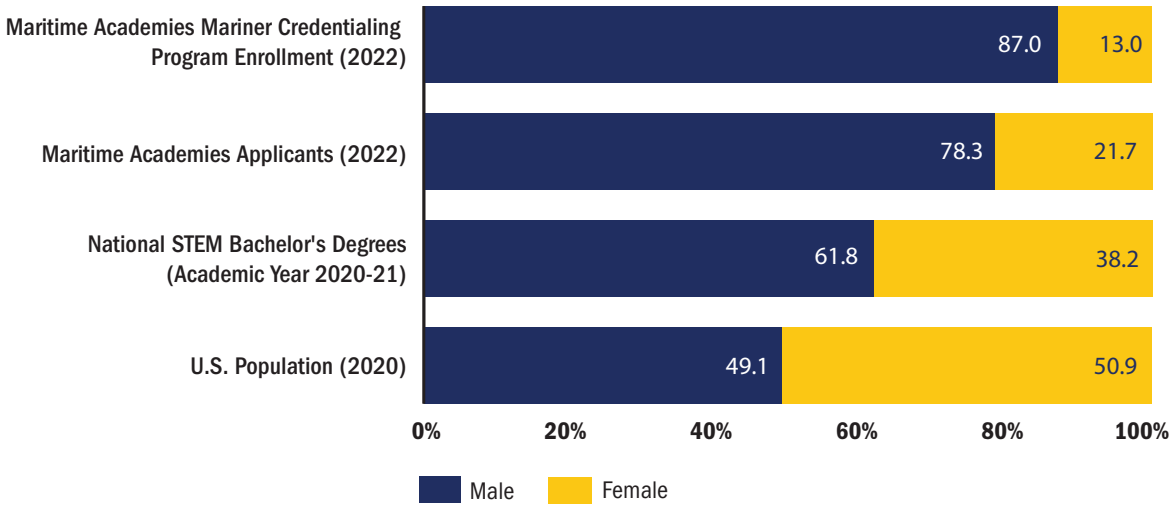
The *An Evaluation of Diversity at the Nation's Maritime Academies* contains information and data from the National Center for Education Statistics (NCES) that were compiled by the Volpe Center. The *Institutional Profiles* found in the Annex to Volpe Center's report provides a view of each maritime academy's applicant, admission, enrollment, and graduation statistics. Since not all students at a SMA are enrolled in a USCG mariner credentialing program, the NCES data was augmented with additional information from the SMAs to capture the key measures associated with those who will enter the mariner workforce. The *Institutional Profiles* form the baseline from which improvements may be measured in future years.

Applicants

The technical course of study, general unfamiliarity with maritime careers, and a regimented college experience are among the common challenges the maritime academies face in attracting a sufficiently diverse applicant pool of students headed for higher education institutions. A career as a professional mariner requires a strong understanding of Math and Science. As such, the current curriculum at the maritime academies is heavily focused on Science, Technology, Engineering, and Math (STEM) education.

The maritime academies, like many other colleges and universities, struggle to recruit females and underrepresented minorities into their STEM education programs. While approximately half of the U.S. population is male, a significant majority of students in STEM undergraduate programs nationwide are male (see Figure 5).[11]

Figure 5:
Maritime Academies Mariner Credentialing Program Enrollment, Maritime Academies Applications, STEM Bachelor's Degrees Nationwide, and U.S. Population Percentage Distribution, by Gender



Maritime academies mariner credentialing program enrollment (Cohort Year 2022), maritime academies applications (Cohort Year 2022), Science, Technology, Engineering, and Mathematics (STEM) bachelor's degrees conferred by postsecondary institutions nationwide (Academic Year 2020-2021), and U.S. population (2020 Census), by gender; source: Volpe Center, using U.S. Census Bureau, Integrated Postsecondary Education Data System (IPEDS), and maritime academy data, and the U.S. Department of Education, *Digest of Education Statistics*.

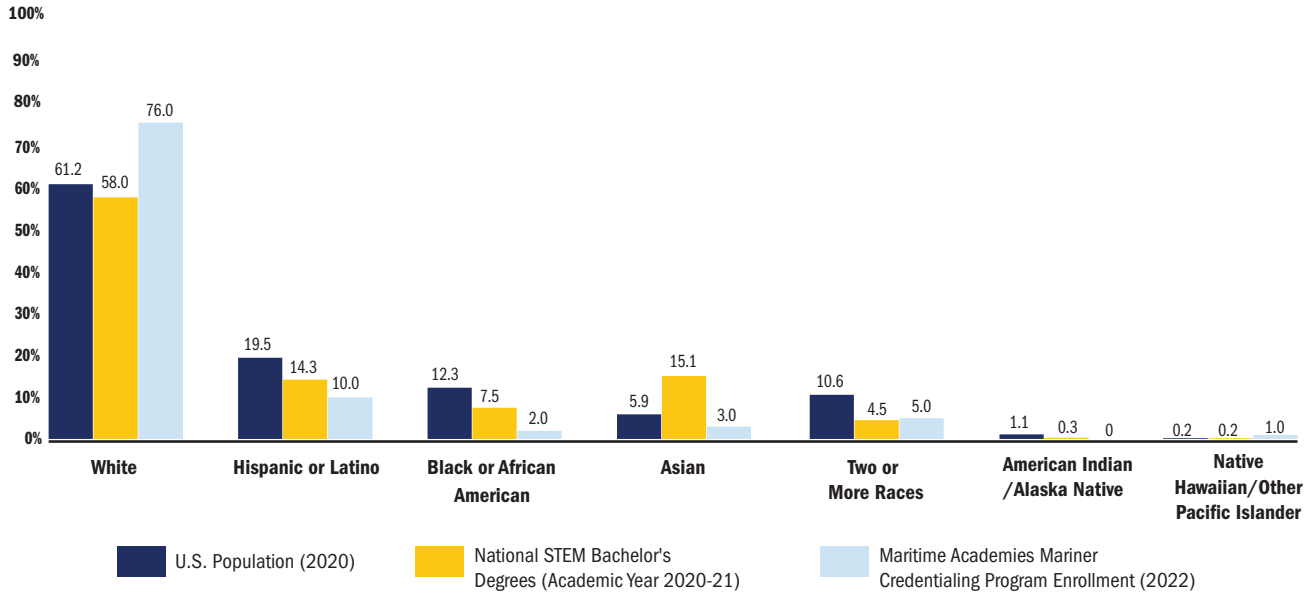
11 See "Table 318.45. Number and percentage distribution of science, technology, engineering, and mathematics (STEM) degrees/certificates conferred by postsecondary institutions, by race/ ethnicity, level of degree/certificate, and sex of student: Academic years 2011-12 through 2020-21," U.S. Department of Education, *Digest of Education Statistics*, accessed August 1, 2024, https://nces.ed.gov/programs/digest/d22/tables/dt22_318.45.asp.

As referenced in *An Evaluation of Diversity at the Nation's Maritime Academies,* the average percentage of female students within a cohort year applying to the maritime academies is 21 percent from 2013-2022. However, the total number of females applying to the maritime academies has increased 72 percent as compared to the total number of males applying which increased 64 percent within the same 10-year period. While the ratio between male and female students applying to the maritime academies has remained relatively constant, the steady increase in the number of females expressing interest in attending is a positive indicator. However, to benchmark with other educational institutions, the percentage of female applicants to maritime academies remains substantially lower than the national percentage in STEM undergraduate programs.

Similarly, all underrepresented minorities, except for Asians, are represented at a lower level in STEM majors than within the national population (see Figure 6). As colleges and universities seek a more diverse student body, students from underrepresented minority groups who may excel in math and science education are heavily recruited by competing institutions. This further increases the difficulty of developing a diverse student population at the relatively smaller maritime academies, which operate with more modest budgets for recruiting.

Encouraging more students to undertake a rigorous technical course of study is a nationwide initiative to ensuring technical competitiveness, a strong economy, and national security. The U.S. Department of Education's efforts, such as YOU Belong in STEM, which targets all students from pre-kindergarten to higher education, will help to encourage a greater percentage of the U.S. population to pursue STEM education.[12]

Figure 6:
U.S. Population, National STEM Bachelor's Degrees, and Maritime Academies Mariner Credentialing Program Enrollment Percentage Distribution, by Race/Ethnicity



U.S. population (2020 Census), Science, Technology, Engineering, and Mathematics (STEM) bachelor's degrees conferred by postsecondary institutions Nationwide (Academic Year 2020-21), and maritime academies mariner credentialing program enrollment (Cohort Year 2022), by race/ethnicity; source: Volpe Center, using U.S. Census Bureau, Integrated Postsecondary Education Data System (IPEDS), and maritime academy data, and the U.S. Department of Education, *Digest of Education Statistics*.

12 See "Science, Technology, Engineering, and Math, including Computer Science," U.S Department of Education, accessed August 1, 2024, https://www.ed.gov/stem.

Almost 81 percent of the student population at the maritime academies comes from within the state and the additional students from their nearby geographic region.[13] While race and ethnicity data are not available for applicants, it can be inferred that, at best, the ability for a SMA to seek a diverse student body is constrained by the state's own diversity and also that within its recruitment region.[14]

The student experience at a maritime academy is considerably different than other typical educational institutions and may further dissuade qualified candidates from any gender, race, or ethnicity from applying . The maritime academies follow a regimental construct for students. Regimental life for these students, formally called cadets or midshipmen, includes the need to wear uniforms, maintain grooming standards, and adhere to other structured and traditional standards that promote managerial and leadership skills.

However, this unique lifestyle of self-discipline and professionalism may not appeal to many individuals, which further deters interest in applicants. Additionally, students in a mariner credentialing program are subject to drug testing and background security investigations in addition to meeting rigorous medical and physical fitness standards. These standards are established by the USCG, as well as the Department of Defense Medical Examination Review Board (DoDMERB) and the Navy Bureau of Medicine and Surgery (BUMED) and not by the maritime academies.

Another common challenge associated with a maritime academy program for credentialing is that the students enrolled in the program have longer academic years and shorter vacation time compared to their counterparts enrolled in traditional four-year degree programs. Thus, right from the very start, students attending maritime academies must strive toward finding a better work-life balance which would later help them in their professional life as a mariner, physically separated from family and friends for extended periods of time. In meeting the national STEM enrollment or representation of the U.S. population, the maritime academies must attract and recruit a sufficient number of applicants to account for natural attrition through admissions, enrollment, mariner credentialing program completion, and graduation.

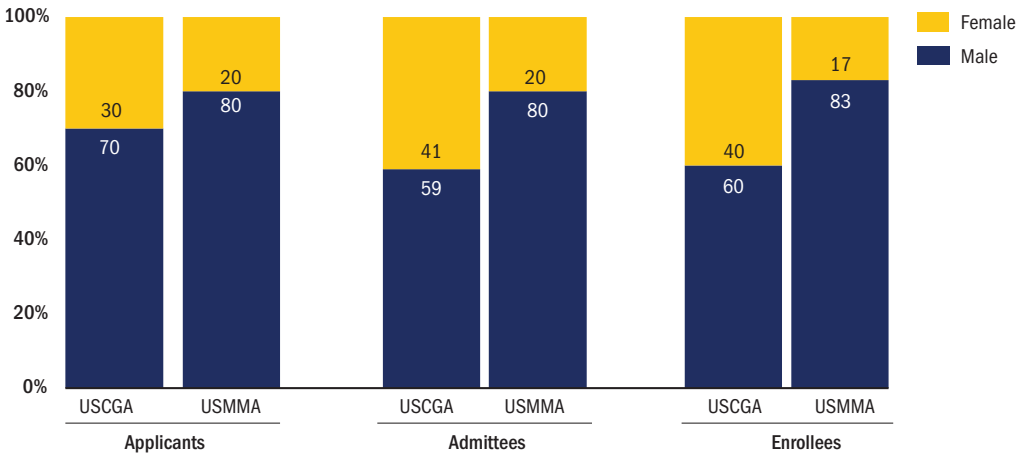
13 See "Where Students Come From and Where They Enroll," *An Evaluation of Diversity at the Nation's Maritime Academies*, Report DOT-VNTSC-MARAD-23-01, September 2023, U.S. Department of Transportation, Volpe National Transportation Systems Center.

14 In Integrated Postsecondary Education Data System (IPEDS), the number of applicants by gender is available while the number of applicants by race and ethnicity is not.

Admittees

Once the applicant pool is in place, similar to other colleges and universities, the admissions office at maritime academies must consider traditional criteria such as campus facility limitations, the applicant's academic aptitude, athletic skills, and ability to contribute to the institution and its community before offering admission. In addition to these criteria, there are other challenges that are typically included in offering admission at a maritime academy. For the USMMA, applicants are nominated to the Academy by a Member of the U.S. House of Representatives or Senate from their state of residence. Once a congressional nomination is secured, the applicant must compete for one of the approximately 400 appointments offered. The diversity of the applicant pool is controlled by the requirement for congressional nominations unlike other institutions that may take a more holistic approach. Figures 7 and 8 provide a comparison between USMMA and the U.S. Coast Guard Academy (USCGA), as both are Federal service academies of similar student population and offer courses with a maritime focus. Unlike the USMMA, the USCGA does not consider congressional nominations for admissions eligibility and admits students from all over the nation with no state-driven quotas. This enables the institution to admit cadets based on numerous mission-driven qualitative factors, including how an applicant may contribute to the entire campus and its student body. Additionally, the Secretary of Transportation has the authority to appoint up to 50 qualified applicants per year to the USMMA to promote demographic balance on campus over and above those admitted through the congressional nomination process.[15]

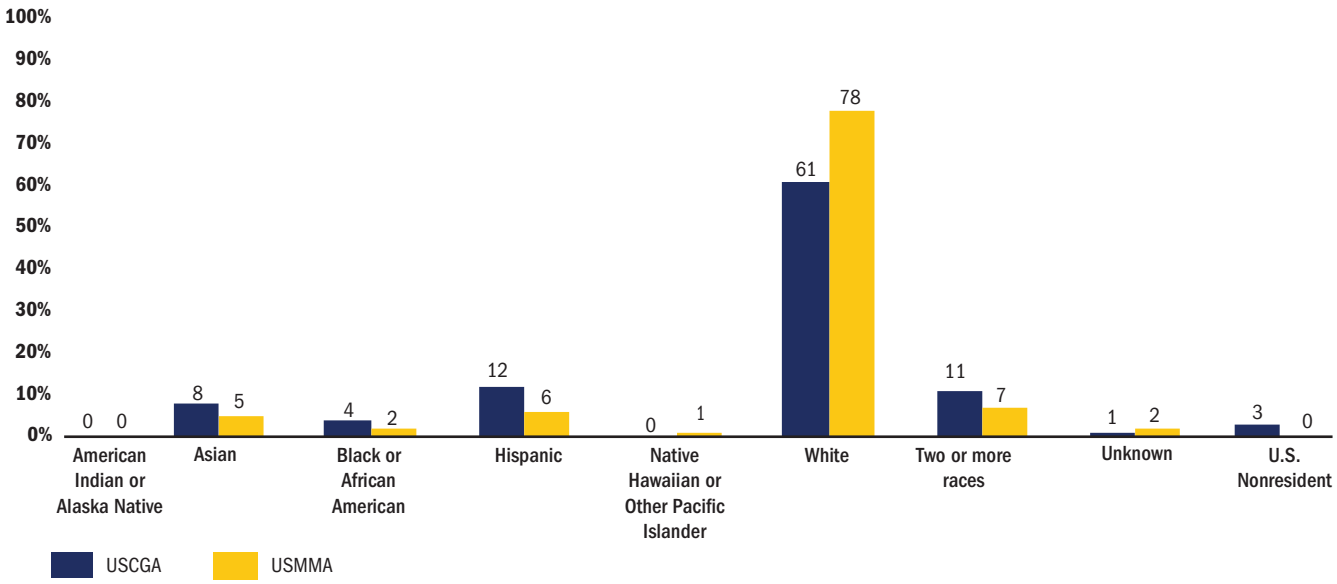
Figure 7:
Application, Admission, and Enrollment Rates at USCGA and USMMA, by Gender (Fall 2021)



Comparison of application, admission, and enrollment rates between U.S. Coast Guard Academy (USCGA) (Fall 2021) and U.S. Merchant Marine Academy (USMMA) (Fall 2021), by gender; source: Volpe Center, using National Center for Education Statistics (NCES) data.

15 For more information on appointments, see 46 U.S.C. 51302 and 46 U.S.C 51303, or see U.S. Merchant Marine Academy, https://www.usmma.edu/buildamerica/admissions/appointments.

Figure 8:
Comparison of Enrolled Students Between USCGA and USMMA, by Race/Ethnicity (Fall 2021)



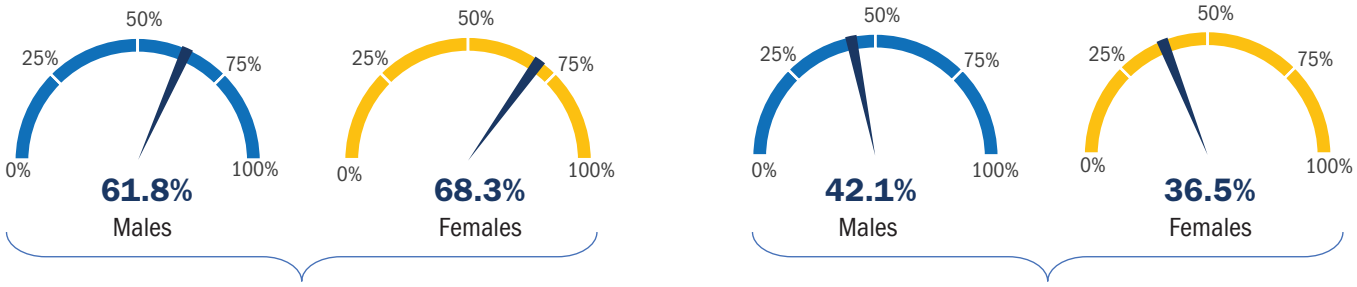
Comparison of enrollment rates between U.S. Coast Guard Academy (USCGA) (Fall 2021) and U.S. Merchant Marine Academy (USMMA) (Fall 2021), by race/ethnicity; source U.S. Department of Education, Integrated Postsecondary Education Data System (IPEDS) data.

SMAs do not require a nomination or appointment to attend; however, as illustrated in figures showing class enrollment by geography in the *Institutional Profiles*, these institutions predominantly draw from their in-state population and those from nearby states. While the ratio of male and female population is approximately the same within each state, the racial and ethnic diversity within the state in which SMAs are located vary considerably.

IPEDS does not report race and ethnicity for admitted students; however, gender is reported. The number of female students in a cohort year admitted to the maritime academies has increased by 73 percent over the past 10 years. However, the percentage of female enrollees within a cohort year admitted to the maritime academies averaged 23 percent with little notable change whereas the number of males in a cohort year admitted increased by 71 percent within the same 10-year period from 2013 to 2022.

The selectivity rate, or comparison between those who applied and are admitted, for the maritime academies for female applicants is 68 percent, which is slightly higher than the 62 percent for male applicants over the same 10-year period (see Figure 9). However, absent an increase in the percentage of female students applying to the maritime academies, the higher selectivity rate will do little to close the gap between male and female representation in the national maritime academy enrollment statistics.

Figure 9:
10-Year Total Average Selectivity and Yield Rates for the Maritime Academies, by Gender



Percentage of applicants that were admitted into the maritime academies, by gender ("selectivity rate")

Percentage of admittees who enrolled at the maritime academies, by gender ("yield rate")

10-year average selectivity and yield rates for the maritime academies (Cohort Years 2013-2022), by gender; source: Volpe Center, using Integrated Postsecondary Education Data System (IPEDS) and maritime academy data.

Enrollees

The enrollment of a diverse student body relies upon a student both accepting admission and registering in an academic program at the institution. Prospective students have many choices as to which institution they will attend and are often accepted at multiple colleges or universities. Even after selecting an institution, a student may disenroll and transfer to another college or university or pursue other ambitions. A student's continued enrollment at an institution may be based on the cost of attendance, academic performance, distance from home, choice of majors, future career opportunities, and countless other personal and professional influences. The maritime academies also face the same challenges when it comes to the actual enrollment and retention of their diverse, carefully selected, incoming class.

The average yield rate, or comparison between those who are admitted and are enrolled, for the maritime academies is 41 percent within the 10-year period from 2013 to 2022. While the selectivity rate was slightly higher for female enrollees than males, the yield rate is only 37 percent for females as opposed to 42 percent for males (see Figure 9). This means more males chose to enroll at the maritime academies than females, despite the higher admittance rate for females. With a yield rate lower than males, the overall ratio of females within a cohort enrolled at the maritime academies is unlikely to increase. Over the last 10 years, the ratio of female enrollees at the maritime academies and those enrolled in the mariner credentialing program have remained steady at approximately 21 percent and 13 percent respectively.[16]

16 See "Trends in Applications, Admissions, and Enrollment," An Evaluation of Diversity at the Nation's Maritime Academies, Report DOT-VNTSC-MARAD-23-01, September 2023, U.S. Department of Transportation, Volpe National Transportation Systems Center.

Mariner Credentialing Program Enrollees

It is important to highlight that students at USMMA, Great Lakes Maritime Academy, and Texas A&M Maritime Academy must obtain an MMC as part of the curriculum, while only a percentage of students at California State University Maritime Academy, State University of New York Maritime College, Massachusetts Maritime Academy, and Maine Maritime Academy are enrolled in a mariner credentialing program. Enrolling in the mariner credentialing program places additional requirements on the student to meet all USCG, and applicable International Maritime Organization (IMO) International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW), requirements to obtain an MMC, with applicable STCW endorsements, prior to graduation.

For SMA students enrolled in the mariner credentialing program, there are significant additional tuition costs associated with training onboard a training ship. These training cruises, typically held during the summer term, are both mandatory and necessary training experiences to meet the sea service requirements for issuance of an MMC.

To aid in offsetting the additional cost of attendance, MARAD may provide limited Federal financial assistance to SMA students who enroll in the Student Incentive Payment (SIP) Program.[17] In exchange for the SIP payments to be used for uniforms, tuition, books, and subsistence, enrollees make several commitments, the most important of which include serving as a merchant marine officer on U.S.-flagged vessels for at least three years and serving as a commissioned officer in the U.S. Navy Reserve (USNR) for at least eight years. In accordance with the National Defense Authorization Act (NDAA) of FY2024, MARAD's authority to provide the SIP incentive was doubled, increasing the total amount a student can receive from $32,000 to $64,000.[18]

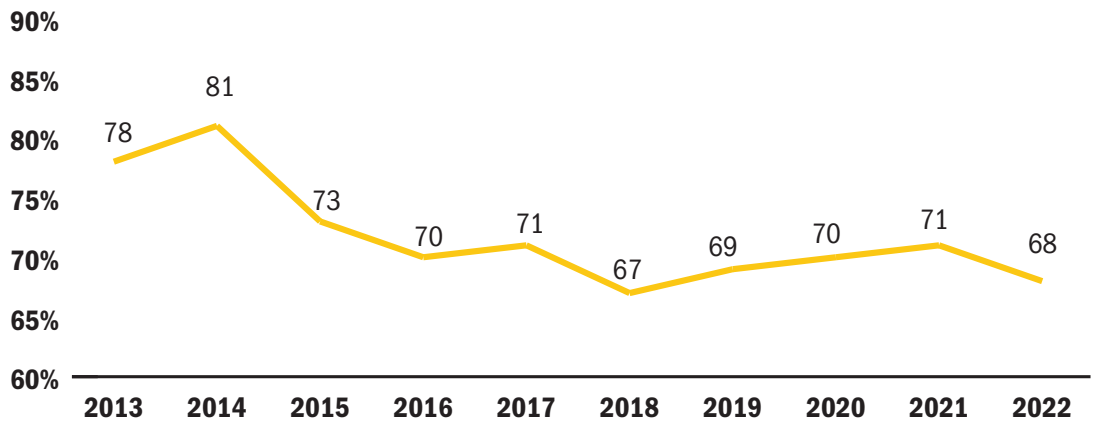
MARAD used its prior year funds to execute its new authority, which resulted in unprecedented 100% subscription by new enrollees during Academic Year 2023-2024. Future data analysis will assess the sustained impact of SIP enhancement on enrollment at SMAs.

Overall, since 2013, there has been a downward trend in the percentage and number of students enrolled in the mariner credentialing program at the nation's maritime academies. The decreasing trend in training aspiring merchant mariners negatively affects the overall mariner workforce, most notably the challenge of crewing vessels resulting from projected shortage of qualified mariners.

17 For further information on the Student Incentive Payment (SIP) Program, see: https://www.maritime.dot.gov/education/maritime-academies/student-incentive-payment-sip-program.

18 See Section 3501(b), Student Incentive Payment Agreements, of the National Defense Authorization Act for Fiscal Year 2024 (Public Law 118-31), https://www.congress.gov/bill/118th-congress/house-bill/2670.

Figure 10:
Mariner Credentialing Program Enrollment Rates at the Maritime Academies



Percentage of students enrolled in the mariner credentialing program at the maritime academies (Cohort Years 2013-2022); source: Volpe Center, using Integrated Postsecondary Education Data System (IPEDS) and maritime academy data.

Graduates

Graduation represents an accomplishment for both the student and institution marking the accession from college to career. However, a curriculum focused heavily on math and science knowledge can present academic challenges to students, especially if they did not receive adequate level of preparation during their secondary school education. Students who struggle with the academic rigors of a STEM major may need to switch to a less technical degree to maintain their enrollment and graduate. While this is common with educational institutions that offer STEM programs, the maritime academies provide limited options for switching over to less technical majors because their featured academic programs are strongly dependent on math and science skills. Additionally, a student who changes majors may no longer be able to meet the mariner training requirements to earn an MMC and become a professional mariner.

A student in a mariner credentialing program is effectively enrolled in a college/university undergraduate degree program and completing the USCG mariner training process concurrently. This means these students often take more academic course credits than students not enrolled in mariner credentialing courses. In addition to the educational institution's academic curriculum required for graduation, the mariner credentialing program includes requirements such as passing USCG knowledge and training examinations, meeting medical and physical standards, participating in random drug tests, and passing a security threat assessment (background check). In addition to these mariner credentialing program requirements, midshipmen at USMMA and SMA students enrolled in SIP also have several U.S. Navy requirements that must be met before graduation, such as passing physical fitness testing, completing the naval science curriculum, and meeting the BUMED medical requirements, such as body composition standards, for commissioning as an officer in the U.S. Navy Reserve.

The U.S. Department of Education notes that the overall graduation rate for four-year postsecondary institutions was 64 percent in 2020.[19] As shown in Figure 12, female and male students had an overall six-year graduation rate of 67 percent and 60 percent respectively. The *Institutional Profiles* in *An Evaluation of Diversity at the Nation's Maritime Academies* provides the graduation rate for each of the maritime academies. In general, the graduation rates at the maritime academies are similar to the national average; however, the data demonstrates that, except for those identifying as Asian and a small sample size for Native Hawaiians and Pacific Islanders, underrepresented minorities graduate at lower rates than those identifying as White (see Figure 13).

Figure 11:
Accession into the Mariner Workforce While at the Maritime Academies, from Enrollee to Graduate

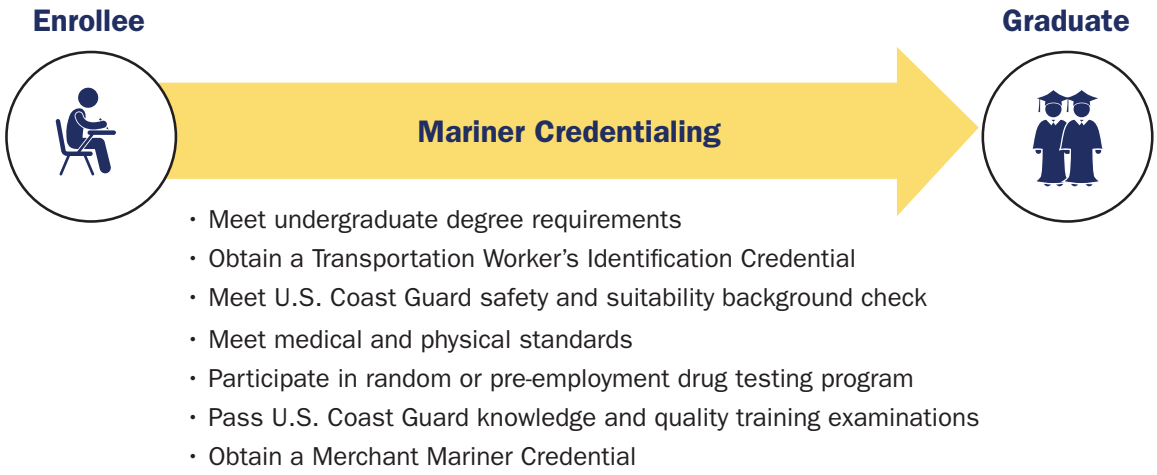
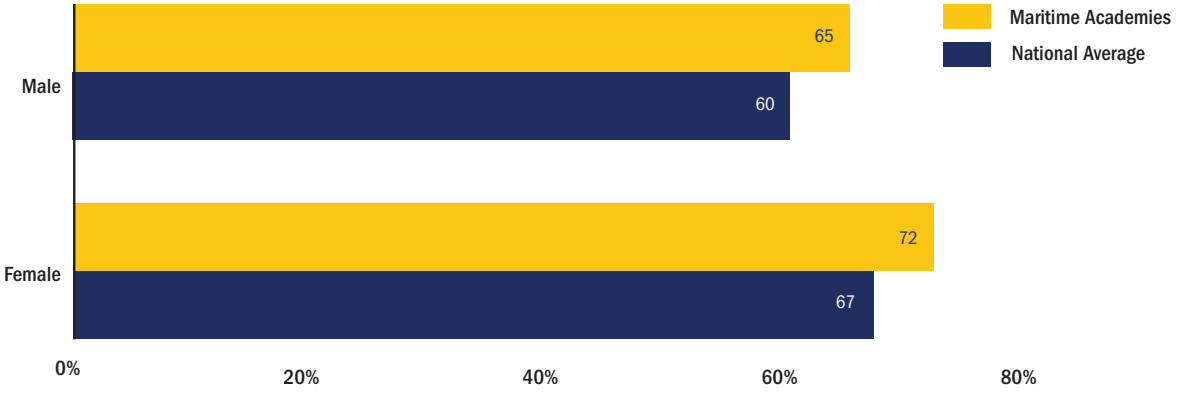


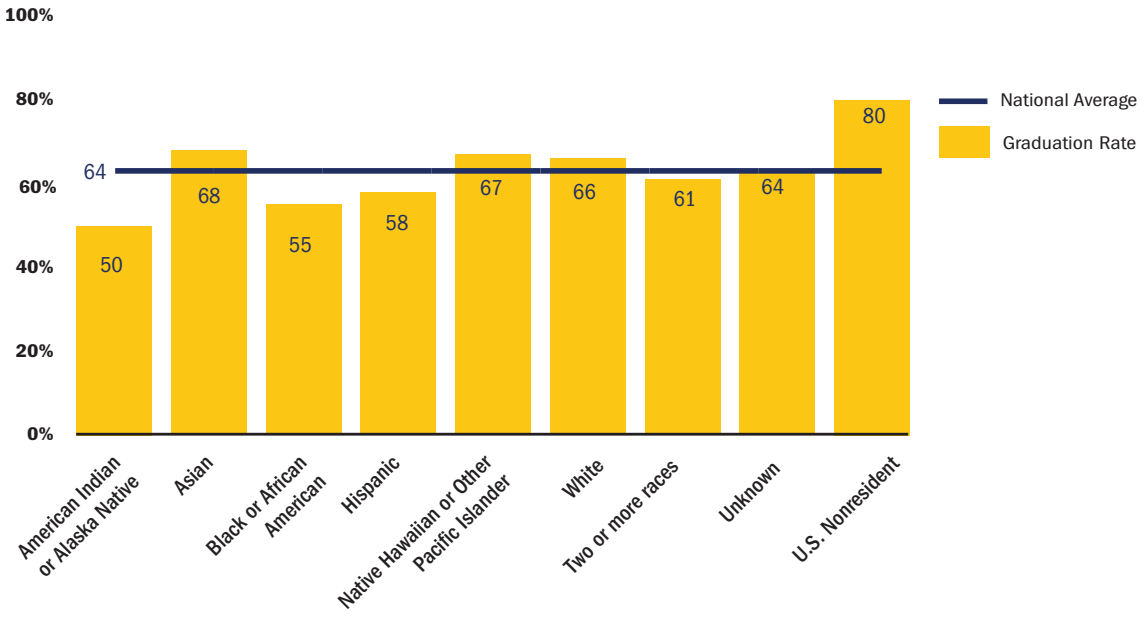
Figure 12:
Comparison of Graduation Rates Between the Maritime Academies and the Overall National Average, by Gender



Graduation rates at the maritime academies (Cohort Years 2006-2015) and the overall national average (2020), by gender; source: Volpe Center, using Integrated Postsecondary Education Data System (IPEDS) and maritime academy data and the U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics. Maritime academies are California State University Maritime Academy (Cal Maritime) (Cohort Years 2006-2015), State University of New York Maritime College (SUNY Maritime) (Cohort Years 2013-2015), Texas A&M Maritime Academy (Texas A&M Maritime) (Cohort Years 2006-2015), and the U.S. Merchant Marine Academy (USMMA) (Cohort Years 2006-2015). Data for Great Lakes Maritime Academy (Great Lakes Maritime), Maine Maritime Academy (Maine Maritime), and Massachusetts Maritime Academy (Mass Maritime) were insufficient for meaningful analysis and thus not included. The national average is based on "The Condition of Education 2022" by the National Center for Education Statistics published May 2022 and accessed August 1, 2024.

19 See "Undergraduate Retention and Graduation Rates" in *Condition of Education*, U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, accessed August 1, 2024, https://nces.ed.gov/programs/coe/indicator/ctr/undergrad-retention-graduation.

Figure 13:
Comparison of Graduation Rates Between the Maritime Academies and the Overall National Average, by Race/Ethnicity



Graduation rates at the maritime academies (Cohort Years 2006-2015) and the overall national average (2020), by race/ethnicity; source: Volpe Center, using Integrated Postsecondary Education Data System (IPEDS) and maritime academy data and the U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics. Maritime Academies are Cal Maritime (Cohort Years 2009-2015), SUNY Maritime (Cohort Years 2013-2015), Texas A&M Maritime (Cohort Years 2006-2015), and the USMMA (Cohort Years 2006-2015). Data for Great Lakes Maritime, Maine Maritime, and Mass Maritime were insufficient for meaningful analysis and thus not included. The national average is based on "The Condition of Education 2022" by the National Center for Education Statistics published May 2022 and accessed August 1, 2024.

Principal Challenges in Addressing Diversity at Maritime Academies

The process for an individual interested in joining the mariner workforce through the career accession path of attending one of the maritime academies is more complex than the typical college or university. While each maritime academy has its own unique challenges, there are common hindrances to successfully attracting applicants and retaining them as graduates. From a mariner workforce perspective, the following common hurdles affect each of the maritime academies:

Applicants

- Unfamiliarity with available options for a career as a merchant mariner.
- Unaware of SMAs/USMMA institutions.
- Unaware of the valued opportunities provided by SMAs/USMMA.
- Lack of personal interest in a math and science-focused occupation.
- Not confident in one's ability to complete a STEM curriculum.
- Lack of interest in undesirable locations/geographic regions, unless typically nearby metropolitan cities.

Admittees

- Unaware of institution's performance rating of students receiving employment offers upon graduation.
- Insufficient benefits and costs comparison choosing academic program to be a merchant mariner.
- Concerns regarding additional costs at SMAs due to required at-sea training for sea service amidst the general rising cost of tuition.
- Concerns regarding regimented/military-structured lifestyle in comparison with other colleges without such structured systems.

Enrollees

- Not fully prepared to complete a STEM curriculum.
- Not fully prepared to be in a career away from family and friends.
- Attrition to other academic programs, and even colleges, of less rigorous requirements.

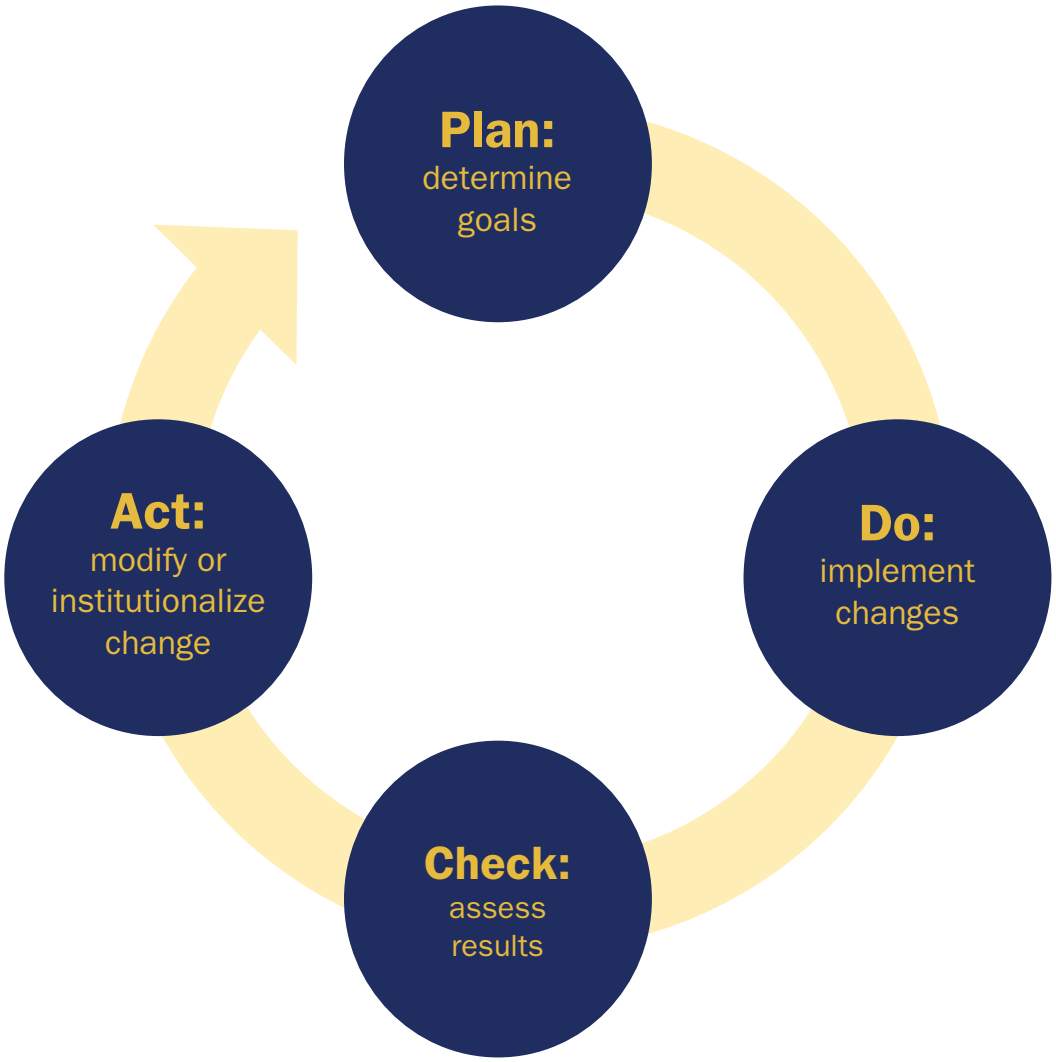
Graduates

- Completing the academic curriculum, in addition to satisfactorily completing all STCW requirements and passing USCG examinations to receive a Merchant Mariner Credential.
- Difficulties meeting USCG medical exam requirements.
- Graduates that do not receive Federal financial assistance may not choose a career afloat, despite receiving a Merchant Mariner Credential.

MARAD Initiatives to Improve Diversity at Maritime Academies

MARAD is dedicated to assisting the maritime academies in improving the diversity within their student body which will contribute toward a more diverse mariner workforce. Action items that MARAD undertakes must be made in conjunction with the maritime academies and reinforced or supported by leaders within the maritime industry. Further, these actions must be viewed from a systematic approach to increase the overall diversity of the mariner workforce as a whole and not focused on any single institution.

MARAD will establish a continual process of *Plan, Do, Check,* and *Act* to manage change and update this strategy.



Since a cohort year is based on a six-year graduation rate, this report will be re-evaluated triennially to assess the progress made at improving diversity at the applicant, admittee, enrollee, and graduate phases. The initial action items include:

1

Seek input from affinity groups.

The input from affinity groups will help to further identify problems and obtain recommendations for underrepresented minority outreach.

2

Establish a SMA/USMMA recruitment and retention improvement team.

The team would facilitate discussions to explore common challenges and barriers, compare best practices, share information, and develop opportunities to improve student diversity. Additional areas to explore would include student support services, faculty diversity, and availability of affinity groups.

3

Evaluate current marketing and outreach efforts that raise the visibility of a merchant marine career.

An assessment of the current outreach and marketing efforts will assist in identifying potential gaps in messaging, including return on educational investment, employment opportunities, and salaries.

4

Address gaps in data limitations and improve the use of data analytics to prioritize outreach programs, including partnering with the industry to introduce K-12 students to the maritime industry.

An evaluation is necessary to assess if current outreach programs are effectively reaching the diverse communities necessary to encourage applicants to the SMAs and USMMA. As multiple studies and reports have been conducted separately over the last several years, a more systematic method of collecting and analyzing data through a collaborative approach will help to understand the results.

5

Identify Federal and State resources that provide student financial aid for additional time to assist students that are unable to meet institutional degree and credentialing requirements within four years.

The additional time on campus would better prepare individuals who may not have had a robust secondary education or who may experience difficulty completing the degree or credentialing requirements within four years. This would improve the graduation rates at the maritime academies and lead to a more diverse mariner workforce pool. For example, the USMMA Sponsored Preparatory School Program provides the foundation for future success at the Academy and a pathway for appointment.

Conclusion

A diverse mariner workforce that fosters a welcoming work environment will strengthen the U.S. Merchant Marine and promote greater U.S. national security and economic prosperity. MARAD is mindful that the maritime academies each have their own recruitment strategies and ongoing lines of effort to address challenges unique to their institution and its regional priorities. This *Diverse Mariner Workforce Recruitment Strategy* report focuses on quantitative data to assess the current state demographics and establishes MARAD's plan to assist in a coordinated national effort to increase through lawful means diversity across the maritime academies.

The initial action items serve as a roadmap for using the gathered qualitative information while MARAD coordinates with the maritime academies as well as willing industry leaders to explore opportunities for improving the representation of female students and underrepresented minorities in the next generation of our mariner workforce.

There are challenging conditions outside direct control, such as limited diversity within a SMA's geographic region, a national deficit in the percentage of students pursuing a STEM education, and recruitment competition against larger colleges and universities for female students and underrepresented minorities. These challenges may change over time and require adjustments as needed and a re-evaluation of initiatives. However, MARAD will remain committed to bringing about meaningful and continual change to strengthen the mariner workforce through innovation and steadfast resolve. MARAD is dedicated to improving the diversity of the mariner workforce by leveraging collaboration and coordination with the maritime academies and industry leaders through a more inclusive national recruitment strategy.

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