



January 2014

U.S. MERCHANT MARINE

Maritime Administration Should Assess Potential Mariner-Training Needs

Why GAO Did This Study

The U.S. merchant marine—the nation’s domestic and oceangoing commercial ships and mariners—supports both U.S. commerce and national defense. MARAD, an agency within the Department of Transportation, is responsible for fostering, promoting, and developing the maritime industry; providing for the education and training of U.S. mariners; and studying all problems related to merchant-marine commerce and national-defense policies. Proper education and training of mariners is important to the success of the merchant marine.

The Coast Guard and Maritime Transportation Act of 2012 mandated that GAO review mariner training. This report examines (1) the availability of maritime training, (2) the availability of financial assistance for maritime training, and (3) MARAD’s actions to ensure mariners meet commerce and defense needs and industry stakeholder views on those actions. GAO analyzed documents and interviewed officials from MARAD, the Coast Guard, the Department of Defense, maritime-training providers, unions, and companies.

What GAO Recommends

GAO recommends that MARAD study and identify potential problems in ensuring that U.S. mariners are adequately trained to meet the needs of the entire maritime industry. The Department of Transportation did not agree or disagree with the recommendation.

View [GAO-14-212](#). For more information, contact Lorelei St. James at (202) 512-2834 or StJamesL@gao.gov.

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What GAO Found

Maritime training—for domestic waterway and oceangoing operations—is available through many public and private entities. These entities include the U.S. Merchant Marine Academy (USMMA), state maritime academies, community colleges, union-affiliated schools, and about 230 private sector schools. Private companies also provide training to their mariner employees, including training to operate the vessels in their domestic and oceangoing fleets.

A broad array of federal and non-federal financial assistance programs are available to help pay for maritime training. The Maritime Administration (MARAD) provides financial aid to academy students, GI Bill assistance is available to veterans, and the Department of Education provides loans and grants to college students. Maritime unions also provide assistance to their members, and maritime companies can provide assistance to their employees. Several industry stakeholders GAO interviewed stated that some prospective and current mariners could lack access to financial assistance. However, MARAD’s responsibility towards paying for training mainly extends to students at the USMMA and at the state maritime academies who receive student incentive-payment-program funds.

MARAD primarily supports the oceangoing maritime industry and its training needs. MARAD directly supports the oceangoing industry through subsidies for ships available for defense purposes and provides funding to the federal and state maritime academies. MARAD officials stated that they have not focused as much on the domestic commercial sector because they consider efforts to support military sealift requirements a higher priority for available budgetary resources. MARAD officials stated that they intend to conduct analyses of the domestic commercial maritime industry; however, the officials have not yet devoted the staff resources necessary to complete this effort and did not establish a time frame for completing this effort.

Some stakeholders GAO interviewed expressed concerns about MARAD’s focus on the oceangoing sector, especially as the maritime industry has evolved to predominantly serve domestic waterways. For example, officials from three maritime academies expressed the need for more information to develop courses to meet domestic industry requirements, and several company stakeholders expressed similar concerns about the academies’ lack of curriculums specifically tailored for the domestic sector. MARAD officials acknowledge that many mariners now prefer to work domestically and that this shift in preference, combined with the decline in the number of U.S. oceangoing ships, has resulted in fewer qualified mariners to meet U.S. oceangoing requirements. To address maritime industry issues, MARAD announced in September 2013 that it is developing a national maritime strategy. MARAD is also currently helping the Department of Transportation develop a national freight strategic plan, of which the maritime industry is a vital part. Studying potential training problems affecting the merchant marine’s ability to carry out specified national commerce and defense objectives to ensure economic growth and sealift support in times of war could provide information to maritime stakeholders and help MARAD meet its responsibilities.

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Abbreviations

AMO	American Maritime Officers
BLS	Bureau of Labor Statistics
CFR	Code of Federal Regulations
DOD	Department of Defense
DOT	Department of Transportation
GAO	Government Accountability Office
IMO	International Maritime Organization
IOMMP	International Organization of Masters, Mates and Pilots
Labor	Department of Labor
MAP-21	The Moving Ahead for Progress in the 21st Century Act of 2012
MARAD	Maritime Administration
MMC	Merchant Mariner Credential
MSC	Military Sealift Command
MSP	Maritime Security Program
NMC	National Maritime Center
Panel	The Panel on 21 st Century Freight Transportation
SIP	Student Incentive Payment
STCW	International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978, as amended
TWIC	Transportation Worker Identification Card
USC	United States Code
USMMA	United States Merchant Marine Academy
VA	Department of Veterans Affairs

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January 31, 2014

The Honorable John D. Rockefeller IV
Chairman
The Honorable John Thune
Ranking Member
Committee on Commerce, Science, and Transportation
United States Senate

The Honorable Bill Shuster
Chairman
The Honorable Nick J. Rahall, II
Ranking Member
Committee on Transportation and Infrastructure
House of Representatives

The U.S. merchant marine—the commercial ships of the United States and the mariners who operate them—contribute substantially to the U.S. economy. The maritime industry is a critical component of the U.S. freight transportation sector and contributes billions of dollars to the country’s national output. The merchant marine is also important for supporting national defense by providing ships and mariners to the U.S. military in times of national emergency and war. Proper education and training of mariners is important to the success of the merchant marine.

The statutory mission of the Maritime Administration (MARAD), within the Department of Transportation (DOT), is to foster, promote, and develop the merchant maritime industry of the United States.¹ The Secretary of Transportation’s general statutory authority relating to the U.S. merchant marine, delegated to MARAD, includes providing for the education and training of U.S. citizens for the safe and efficient operation of the U.S. merchant marine and ensuring that there is a sufficient pool of U.S. mariners to meet certain objectives relating to domestic and foreign commerce, national defense, and training, among other things.² The commerce objectives state that the U.S. should have a merchant marine sufficient to carry both the U.S. waterborne domestic commerce and a

¹46 U.S.C. § 109(a).

²46 U.S.C. §§ 50101, 51103(a).

substantial part of the waterborne export and import foreign commerce of the United States.³ The national defense objectives state that the U.S. merchant marine should be capable of serving as a naval and military auxiliary in time of war or national emergency.⁴ The training objectives provide, in part, that highly trained citizens of the United States should operate merchant marine vessels of the United States.⁵ MARAD has also been delegated the Secretary's statutory requirement to study all maritime problems arising in carrying out the merchant marine policies for commerce and national defense.⁶ The Coast Guard also plays a role in merchant marine training by regulating the training infrastructure; developing training standards; approving maritime schools, courses and instructors; and issuing credentials to mariners serving on merchant vessels of the United States.

The Coast Guard and Maritime Transportation Act of 2012⁷ mandated that GAO review mariner training. This report addresses the following objectives:

1. What is the availability of government (federal, state, and local) and private-sector entities that currently provide training to U.S. mariners?
2. What federal and non-federal financial assistance is available to mariners to help them meet training requirements?
3. What actions has MARAD taken to ensure there are trained mariners to meet commerce and national-defense needs, and what are the views of merchant marine stakeholders on these actions and on current and potential training issues?

To answer these objectives, we analyzed information about training requirements for U.S. mariners, including current regulations governing training for mariners working on both oceangoing and domestic commercial waterways. More specifically title 46 (Shipping) of the Code of

³46 U.S.C. § 50101(a)(1).

⁴46 U.S.C. § 50101(a)(2).

⁵46 U.S.C. §§ 50101(a)(4), 51101.

⁶46 U.S.C. §§ 50101, 50104.

⁷Pub. L. No. 112-113, § 414, 126 Stat. 1540, 1573.

Federal Regulations (CFR) contains the Coast Guard's training-related requirements for both oceangoing and domestic waterways.⁸ Oceangoing regulations include the implementation of the International Maritime Organization's (IMO) International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978, as amended (STCW). The Coast Guard published the final rule incorporating the IMO's 2010 amendments into its regulations on December 24, 2013.⁹ The rule was not published in time for our review.

We also reviewed information and data and interviewed officials from MARAD, the Coast Guard (part of the Department of Homeland Security), and the Military Sealift Command of the Department of Defense (DOD) about how training requirements are met and associated issues. We determined that the data were sufficiently reliable for our use. We used data for fiscal year 2012 from the Coast Guard on training providers and the number of course completions per year. We also used MARAD supplied data for fiscal years 2008–2012 on the number of academy graduates. For both data sets, we interviewed the responsible officials and discussed how they collect and process the data. We interviewed a range of knowledgeable stakeholders from a non-probability sample of U.S. maritime industry stakeholders, including 5 unions; 4 associations representing the maritime industry; and 21 training providers (these included 6 maritime academies, 4 union-affiliated schools, 5 maritime companies that provide training to their employees, and 4 for-profit and 2 non-profit training providers). We also interviewed 7 members of the Merchant Mariner Personnel Advisory Committee, which advises the Coast Guard on merchant marine personnel issues, such as training, qualifications, certification, and other issues. We selected these stakeholders because of their wide knowledge of, and roles in, multiple aspects of the maritime industry. We also conducted site visits to maritime industry facilities and training providers in the New York City and Houston, Texas, areas, which we selected based on the diversity and concentration of facilities and providers. The information from our site visits and interviews is illustrative and cannot be generalized to the

⁸See 46 C.F.R., Part 10 *Merchant Mariner Credential*, Part 11 *Requirements for Officer Endorsements*, Part 12 *Requirements for Rating Endorsements*, Part 13 *Certification of Tankermen*, and Part 310 *Merchant Mariner Training*.

⁹*Implementation of the Amendments to the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978, and Changes to National Endorsements*; Final rule; 78 Fed. Reg. 77796 (Dec. 24, 2013).

maritime industry and training providers. We also analyzed information provided by the federal agencies and industry stakeholders covering the past 5 years.

We conducted this performance audit from March 2013 through January 2014 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives. Appendix I contains a detailed description of our scope and methodology.

Background

The Merchant Marine Is a Vital Part of the U.S. Freight Network

The Moving Ahead for Progress in the 21st Century Act (MAP-21), enacted in 2012, established, among other things, a policy framework to improve the condition and performance of the national freight network to ensure that it provides the foundation for the United States to compete in the global economy.¹⁰ MAP-21 directed DOT to develop a national freight network and a National Freight Strategic Plan. In October 2013, the House Committee on Transportation and Infrastructure published the results of a panel it had created to examine the current state of U.S. freight transportation and how improving freight transportation can strengthen the U.S. economy.¹¹ The Panel on 21st Century Freight Transportation (the Panel) found that by optimizing the movement of freight across all modes of transportation, the freight industry helps ensure the health of the United States economy and the future of the nation's global competitiveness. The U.S. merchant marine plays a vital role in this network, and MARAD, the merchant marine's advocate in the

¹⁰Pub. L. No. 112-141, § 167, 126 Stat. 405, 468-472 (2012).

¹¹See *Improving the Nation's Freight Transportation System: Findings and Recommendations of the Special Panel on 21ST Century Freight Transportation*, House Committee on Transportation and Infrastructure, October 2013. The House Committee created the panel in April 2013.

federal government, is to assist DOT in developing the National Freight Strategic Plan. According to the Panel's report, over 75 percent of all U.S. international freight, by weight, moves by water. The inland waterways, moreover, transport more than 60 percent of U.S. grain exports, about 22 percent of domestic petroleum products, and 20 percent of the coal used to generate electricity. On the other hand, according to DOT, the *U.S.-flag*¹² fleet of 89 privately owned oceangoing vessels that are primarily or exclusively engaged in foreign trade now carries less than 2 percent of U.S. exports and imports. As a result, most U.S. international freight that moves by water is carried by foreign-flag vessels. To support the establishment of a national freight network and strategic plan, MAP-21 directs DOT to collect and analyze certain basic freight movement data, including freight moved through maritime ports of entry. Prior to the publication of the Panel's findings, MARAD announced in September 2013 plans to create a national maritime strategy. According to MARAD, the national maritime strategy will address issues related to the number and quality of U.S.-flag ships engaged in commerce internationally and domestically and the number of qualified U.S. mariners, among other things.

The Merchant Marine Serves the Domestic and Oceangoing Commercial Needs of the Maritime Industry

The U.S. maritime industry is diverse. As shown in figure 1, U.S. vessels and mariners operate in the world's oceans and U.S. domestic waterways¹³ and include many vessel types and sizes.¹⁴ Large oceangoing vessels operate between U.S. and international ports, while smaller vessels operate in inland waters. Vessels can be specialized—such as ships for carrying petroleum, chemicals, and liquefied gases; tug

¹²A *U.S.-flag vessel* is a commercial vessel, registered and operated under the laws of the U.S., owned and operated by U.S. citizens, and used in commercial trade of the United States. U.S.-flag vessels are registered in the United States and subject to additional U.S. laws and regulations to which foreign-flag vessels are not subject.

¹³In this report, we divide the commercial areas of maritime operation between oceangoing and domestic waterways because this is primarily how the different segments of the maritime industry and the federal agencies involved generally divide the commercial areas of maritime operation.

¹⁴The domestic waterways include the Great Lakes, inland waters, and western rivers. The term "western rivers" refers to the Mississippi River, its tributaries, South Pass, Southwest Pass, and other specified waterways and rivers. The term "inland waters" refers to navigable waters shoreward of the Boundary Lines as described in 46 C.F.R. Part 7 with certain exclusions such as the Great Lakes.

and towboats for towing or pushing barges containing grain and other bulk goods; or ferries for moving people and vehicles.

Figure 1: Examples of Vessel Types



Container vessel (oceans and near coastal)



Ferry boat (near coastal and inland waters)



Drilling platform (near coastal)



Barge (inland waters and western rivers)

Sources: MARAD and GAO.

Almost all of the U.S.-flag vessels operate in domestic waterways. According to the most recently available information from DOT, of the 38,700 privately owned U.S.-flag vessels available in 2011, 99.7 percent were registered to operate in the domestic waterways. In 2013, there were 89 U.S.-flag oceangoing vessels primarily or exclusively operating in foreign trade.

The Merchant Marine Provides Oceangoing Vessels and Mariners for National Defense

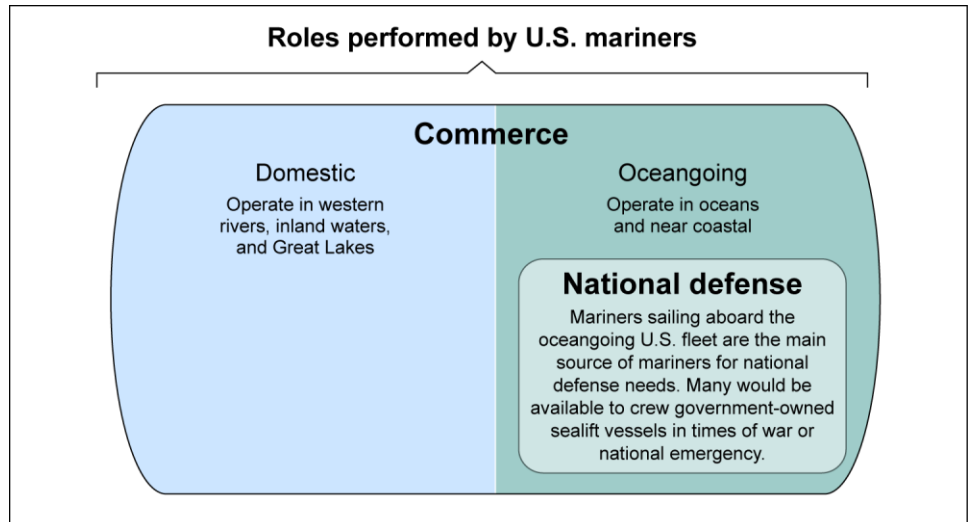
As demonstrated in figure 2 below, U.S. mariners perform a variety of roles in the maritime industry. During times of war and national emergency, the U.S. merchant marine serves as an auxiliary, transporting goods or material needed by the armed forces. Sealift is the process of transporting Department of Defense (DOD)¹⁵ and other federal agency equipment and supplies required during peacetime and war. Throughout the history of the United States, the merchant marine has been used to transport troops and supplies, including more recently for Operations Enduring Freedom and Iraqi Freedom. MARAD's Maritime Security Program (MSP) provides direct payment to companies for militarily useful U.S.-flag and U.S.-crewed oceangoing ships that are available upon DOD's request at times of war or national emergency. Vessel operators in this MARAD program receive this financial support to partially offset the higher operating costs of keeping these vessels under the U.S. flag and are also eligible to carry government preference cargoes.¹⁶ For fiscal year 2013, according to MARAD, Congress appropriated \$175 million to MARAD for the MSP providing participating vessels with \$3.1 million per year to offset this higher operating cost. In addition, cargo preference, which is designed to support a U.S.-flag commercial fleet for national defense purposes, generally requires that 100 percent of DOD cargoes, to the extent rates are not excessive or unreasonable, and 50 percent of the gross tonnage of all other government-generated cargo be transported on privately owned U.S.-flag vessels "to the extent those vessels are available at fair and reasonable rates for commercial vessels of the United States."¹⁷

¹⁵The Military Sealift Command (MSC) provides ocean transportation for the Navy and the rest of DOD. MSC reports to the U.S. Fleet Forces Command for Navy-unique matters, the U.S. Transportation Command for defense transportation matters, and the Assistant Secretary of the Navy (Research, Development and Acquisition) for procurement policy and oversight matters.

¹⁶According to MARAD, in 2010 it cost on average 2.7 times more to operate (as opposed to fuel or purchase) a U.S.-flag oceangoing vessel in foreign trade than to operate a foreign-flag vessel. See U.S. Department of Transportation, Maritime Administration, *Comparison of U.S. and Foreign-Flag Operating Costs* (September 2011).

¹⁷Until July 2012, federal statute provided that the transportation of food aid cargoes sponsored by the Secretary of Agriculture were subject to an additional 25 percent gross tonnage requirement on U.S.-flag vessels. MAP-21 repealed the additional 25 percent requirement leaving only the 50 percent requirement, which is the level that applies to all other non-DOD government-impelled preference cargoes.

Figure 2: Roles Performed by U.S. Mariners



Source: GAO analysis of federal regulations and MARAD information.

Complete, detailed data on active mariners is not available. Maritime industry stakeholders and federal agencies collect different types of data on U.S. mariners primarily related to their own segment of the industry or for different purposes. According to MARAD, some data, such as the number of mariners who work for maritime companies or the number of mariners who belong to unions, are considered business proprietary, and these organizations are reluctant to share these numbers with each other or the public. Other potential data—such as the number of mariners working in the domestic waterways, the number of non-union mariners, or the number of mariners who are not permanent employees of companies—are not currently widely collected. Similarly, government agencies closely related to the maritime industry currently do not track the entire maritime workforce, but focus on individual aspects of it. For example, according to Coast Guard officials, their data system tracks the number of credentials; however, mariners may hold more than one credential or they may not be active. MARAD relies on Coast Guard data to assess the number of mariners in the industry who would be qualified to work on oceangoing sealift vessels and has recently completed a study with the maritime unions assessing the number of mariners who are actively sailing on oceangoing vessels. At this time, however, MARAD’s analysis does not extend to mariners sailing in other parts of the industry. According to the Bureau of Labor Statistics’ (BLS) occupational outlook, which is based on industry and household reporting, nearly 80,000 people

were reported to be in water transportation occupations in 2010. While a majority of these workers were employed by companies working in the oceangoing or inland water transportation industry, some also worked in other venues, such as federal, state or local governments, educational establishments, or other activities.

Training Requirements for U.S. Mariners

Training requirements for U.S. mariners vary depending on circumstances, such as the mariner's role on the vessel, the area of operation, and the size of the vessel, but they are primarily subject to three types of training requirements:

- training pursuant to regulations for commercial operations in both oceangoing and domestic waterways,¹⁸
- military-specific training requirements for civilian mariners who sail aboard government-owned vessels or vessels on charter to DOD, and
- maritime company-specific training requirements.

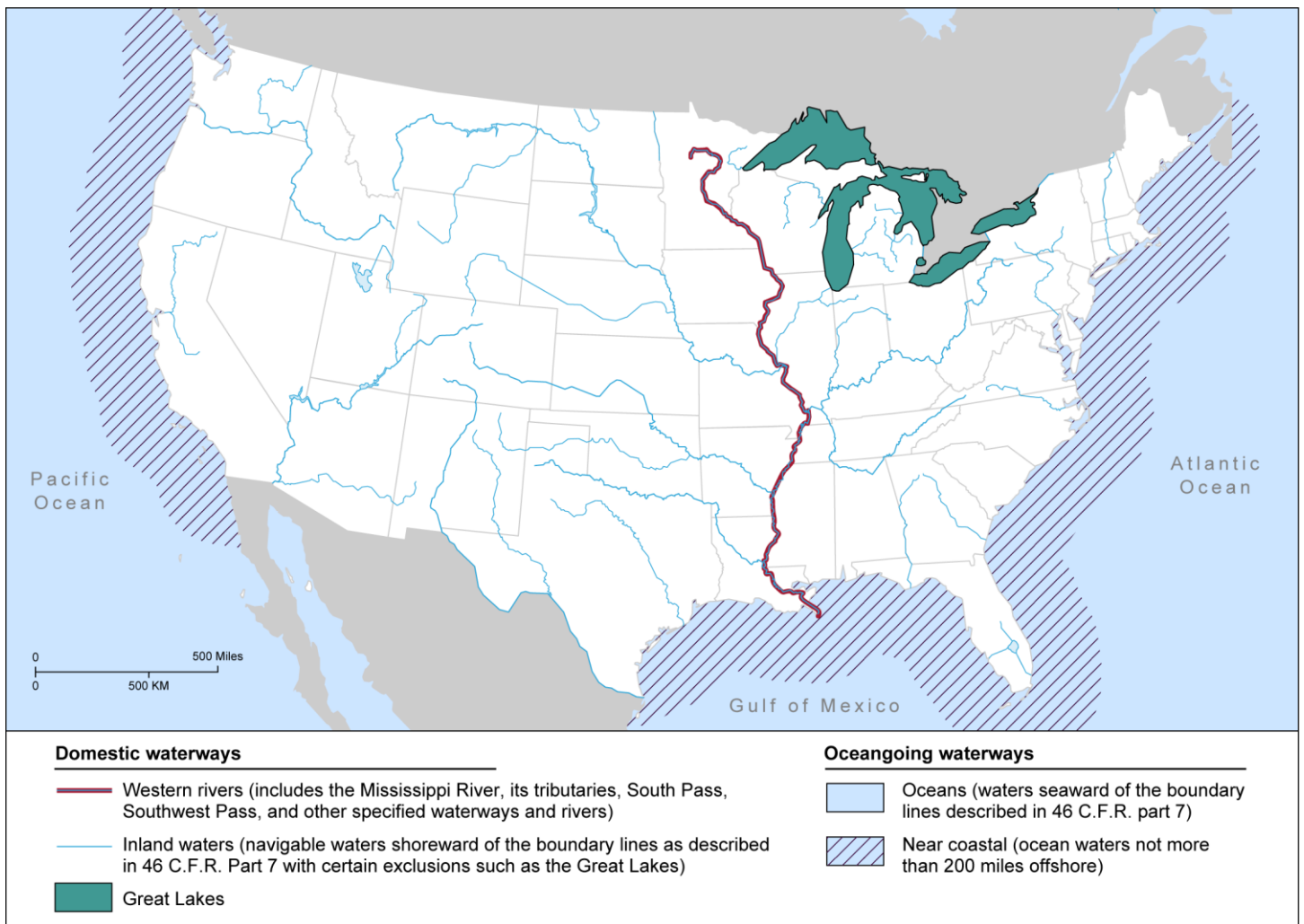
Training requirements vary based on the areas of operation indicated in figure 3 below. Under Coast Guard regulations, in general, oceangoing mariners must also hold an STCW endorsement certifying compliance with the international STCW requirements, which the Coast Guard has incorporated into federal maritime regulations.¹⁹ The STCW provides, among other things, an international training standard for mariners on vessels sailing on oceangoing waterways. Under Coast Guard regulations, mariners can meet such training requirements through a combination of experience or training with evaluation through professional examination and a practical demonstration of skills. According to the IMO, the 1978 STCW Convention was the first to establish basic minimum requirements on training, certification, and watchkeeping (a watchkeeper

¹⁸See 46 C.F.R. Parts 10-13. The Coast Guard also approves all training courses and programs intended to qualify U.S. mariners for Coast Guard endorsements and issues Coast Guard endorsements to Merchant Mariner Credentials.

¹⁹*Implementation of the Amendments to the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978, and Changes to National Endorsements*; Final rule; 78 Fed. Reg. 77796 (Dec. 24, 2013).

is someone who stands watch over the deck or engine) for seafarers on an international level. Previously, these requirements were established by individual governments, which resulted in wide variations in standards and procedures, according to IMO.

Figure 3: Areas of Operation for U.S. Mariners



Source: GAO, Coast Guard, and Map Resources.

Under Coast Guard regulations, before prospective mariners can become an oceangoing or domestic waterways qualified mariner, they first must apply for and receive a Merchant Mariner Credential (MMC).²⁰ To apply for an MMC, the prospective mariner must either hold or apply for a Transportation Worker Identification Card (TWIC), and pass a criminal record review, a drug test, and a physical examination.²¹ Coast Guard-training-related requirements for mariners vary according to their position and type of vessel on which they serve. Officers are in charge of the vessel and serve in management and leadership roles on the vessel; non-officer mariners serve under the command and supervision of the officers. Coast Guard-training-related requirements are divided based on whether mariners serve as officers or non-officers and whether they want to serve in the deck department (steering and guiding the vessel) or the engine department (watching over and maintaining the engines).²² Certain types of vessels such as passenger vessels, tankers, and towing vessels, require additional training.²³

Mariners sailing onboard Military Sealift Command (MSC) vessels and other vessels that may come under MSC operational control, such as the MARAD Ready Reserve Force vessels, are required to take specific DOD-approved training to match the types of vessels, cargo, mission requirements, and areas of operation according to MARAD. The specialized training includes such topics as physical security, antiterrorism, ship survivability, Navy communication systems, naval operations, engineering, and logistics. This training is typically provided

²⁰46 C.F.R. § 10.203(a).

²¹All prospective mariners who have never held an MMC are required to apply for a TWIC because the security threat assessment process is integrated with the TWIC application process. Some mariners, however, are not required to hold a valid TWIC and must only apply and pass the criminal record review to apply for an MMC. Section 809 of the Coast Guard Authorization Act of 2010 (Pub. L. No. 111-281, 124 Stat. 2095) permits the Secretary of the Department of Homeland Security to exempt mariners who do not require unescorted access to a secure areas of a vessel from the requirement to hold a TWIC as a precondition of receiving and holding a MMC.

²²Larger vessels also have a “stewards department,” which is the department onboard responsible for serving food. 46 C.F.R. § 10.109 lists endorsements including “steward’s department” and “stewards department (FH)” which are entry level ratings.

²³See, for example, United States Coast Guard, Navigation and Vessel Inspection Circular 4-01 (May 21, 2001) (towing vessels); 46 C.F.R. Part 13 (tankers); and STCW A-V/2 (passenger vessels).

by Navy trainers, as well as by union and private trainers. Some maritime companies might also require additional training for their mariner employees, including how to operate a specific type of engine.

Depending on where they decide to work and in what capacity, mariners then pursue the necessary Coast Guard endorsements. An endorsement is a statement of a mariner's qualifications, which may include the categories of officer, non-officer (referred to as a rating endorsement), and other special endorsements, such as those relating to the operation of specific types of vessels. Endorsements are affixed to an MMC much like a visa stamp on a passport. All endorsements for officer level mariners require varying amounts of training, sea time, examination, and demonstration of proficiency.²⁴ In general, both oceangoing and domestic endorsements allow the mariner to work on any vessel or engine equal in size or smaller than the endorsement they have.

To secure Coast Guard endorsements, mariners must take Coast Guard-approved training commensurate with their desired position on a vessel.²⁵ The Coast Guard's National Maritime Center (NMC) approves all training courses, programs of training, and training providers. These approvals also include the professional development program curriculum that leads to the issuance of a professional credential at the six state maritime academies and the United States Merchant Marine Academy (USMMA).

The expected compensation among mariners also varies widely. For example, according to BLS data, the median annual wage of mariners in 2010 was about \$46,600, with the lowest 10 percent earning less than \$24,890 and the top 10 percent earning over \$99,690. According to BLS, the median wages in 2010 for ship engineers and for captains, mates, and pilots were about \$66,000 and \$64,000, respectively. These median wages are estimated based on the wages for all mariners, including those working on oceangoing vessels as well as those working in domestic areas such as the Great Lakes and the inland waterways.

²⁴46 C.F.R. § 12.25-10. Entry level ratings do not require training, sea time, examination, or demonstration of proficiency to obtain their domestic rating.

²⁵Training is not required for domestic entry level rating endorsements.

Maritime Training Is Available through Many Public and Private Entities

MARAD's responsibilities include providing for the education and training of U.S. citizens for the safe and efficient operation of the U.S. merchant marine.²⁶ MARAD funds and operates the U.S. Merchant Marine Academy (USMMA), and it also provides direct support to the six state maritime academies to include training vessels. Community colleges and union-supported schools also provide training, as do private companies and non-profit organizations.

MARAD Funds and Operates the U.S. Merchant Marine Academy and Provides Partial Financial and Curriculum Support to the Six State Academies

MARAD oversees the USMMA, designs its training curriculum, and approves parts of the curriculum and courses at the six state maritime academies.²⁷ (Fig. 4 on p. 18 shows the locations of the seven academies.) For fiscal year 2013, Congress appropriated \$85.7 million to MARAD for the USMMA and \$17.2 million for the state academies, according to MARAD. The USMMA provides undergraduate education programs for students seeking to become officers in the U.S. merchant marine. The eligibility, scholastic, and physical requirements for prospective mariners are established in federal regulations.²⁸ Likewise, the six state academies operate as federally supported maritime academies and are subject to federal regulations.²⁹ These academies all offer a maritime-officer-training program similar to that offered at the USMMA. Aside from maritime-officer-training programs, some offer separate undergraduate and graduate degrees along with professional mariner training. According to USMMA officials, the USMMA's coursework mainly focuses on oceangoing training, although the academy has started to focus more on domestic waterways training. According to USMMA officials, the academy offers some courses as electives that focus on skills useful for operating vessels in domestic waterways, particularly for towing. Similarly, officials of four state academies also told us that required coursework is focused on oceangoing maritime training, but that each academy may also offer

²⁶46 U.S.C. § 51103(a). This is the Secretary of Transportation's general statutory authority, with respect to the merchant marine, which is delegated to MARAD.

²⁷The six state maritime academies are the California Maritime Academy, Maine Maritime Academy, Massachusetts Maritime Academy, State University of New York Maritime College, Texas Maritime College of the Texas A&M University at Galveston, and Great Lakes Maritime Academy.

²⁸46 C.F.R. §§ 310.54, 55, 56.

²⁹46 C.F.R. § 310.3.

elective training courses focused on domestic areas of operation including training specifically for tug and tow barges.

After successfully completing the 4-year course of study, USMMA graduates and state maritime academy graduates enrolled in the officer program receive a Bachelor's degree and a Coast Guard credential with a license³⁰ endorsement as an unlimited tonnage, oceans third mate (lowest level deck officer) or an unlimited horsepower, oceans third assistant engineer (lowest level engineering officer). According to MARAD data, graduation at the USMMA and the six state maritime academies has increased from 727 mariners graduating with oceangoing endorsements in 2007 to 854 mariners graduating in 2012 with oceangoing endorsements.

Fourteen Community Colleges Also Provide Maritime Training

According to NMC data, in 2012, 14 community colleges across the United States provided varying levels of Coast Guard-approved maritime training to both oceangoing and domestic mariners through either an individual course or entire programs of study. (Fig. 4 shows the 14 locations of the community colleges.) Mariners taking community college courses can earn credit toward a new endorsement or gain maritime-related skills. For example, according to NMC data, Carteret Community College in North Carolina offers individual courses and has trained approximately 40 students from 2010–2012. San Jacinto Community College Maritime in Texas, started in 2010, offers entire programs of study that can lead to associate degrees in maritime technology as well as individual Coast Guard-approved mariner courses. According to the director of the maritime college, since 2010, San Jacinto Maritime has issued approximately 1,800 to 1,900 maritime-training certificates and is creating a new maritime-training facility to enable it to offer better mariner training, including simulation.

³⁰Mariners who complete the requisite training and certification to become officers also receive a license.

Union-Affiliated Schools Primarily Provide Training to Oceangoing U.S. Mariners

Five major union-affiliated schools provide training to union members, as well as some non-members. (Fig. 4 on p.18 shows the locations of the union-affiliated schools.) The unions with which these schools are affiliated primarily represent oceangoing mariners.³¹ According to the unions, they have collective-bargaining agreements with companies that specify the terms and conditions for providing training to members, including entry-level training, endorsement maintenance training, and in some cases advancement training. An agreement may specify, for example, that for every day a union member is onboard a company vessel, the company contributes a certain amount to the union training fund.

Table 1: Maritime Union-Affiliated Training Schools

Maritime union	Training school	Location
Marine Engineers' Beneficial Association (MEBA)	Calhoon MEBA Engineering School	Easton, Maryland
Sailors' Union of the Pacific	Andrew Furuseth School of Seamanship	San Francisco, California
Seafarers International Union	Paul Hall Center for Maritime Training and Education	Piney Point, Maryland
American Maritime Officers	Raymond T. McKay Simulation, Training, Assessment & Research (STAR) Center	Dania Beach, Florida
International Organization of Masters, Mates and Pilots	Maritime Institute of Technology and Graduate Studies and the Pacific Maritime Institute	Linthicum Heights, Maryland, and Seattle, Washington

Source: GAO Analysis of MARAD Data.

Training at union-affiliated schools varies, but most have simulators and other specialized facilities in addition to classrooms, and offer Coast Guard and non-Coast Guard approved training. For example, the Calhoon School has engine simulators, a vessel bridge simulator, and machine shops for providing hands-on training to maritime engineers. The Paul Hall Center provides both career-entry basic maritime training to students with no maritime experience and professional advancement training for experienced mariners, and has engine and deck simulators, among other training aids. According to American Maritime Officers (AMO) officials, at the STAR Center (Simulation, Training, Assessment

³¹Out of the five major maritime unions that have their own schools, most represent oceangoing mariners, although some represent domestic mariners, primarily operating on the Great Lakes and inland waterways.

and Research), mariners have access to more than 400 maritime-training courses as well as customized courses as requested by companies.

According to union officials, aside from their training efforts for current members, two unions—AMO and International Organization of Masters, Mates and Pilots (IOMMP)—have entry-level mariner-training programs to produce officers. Officials told us that both programs are designed to offer high school graduates the opportunity to gain training and sea-service experience similar to that offered by the maritime academies but without a college degree. Both programs, according to union officials, are intended to produce oceangoing third mates (lowest level deck officers), will involve approximately 30 total mariners, and are expected to take approximately 2 to 2-1/2 years to complete.

Some maritime unions reported that they also provide training to non-union members on a case-by-case basis, particularly training that satisfies military requirements as mandated by the Military Sealift Command. For example, officials from the Seafarers International Union and AMO told us that they provide courses of study at their schools including helicopter firefighting, weapons training, and courses on chemical and biological hazards that meet military sealift requirements.

Oceangoing and Domestic Maritime Companies Offer Mariner Training

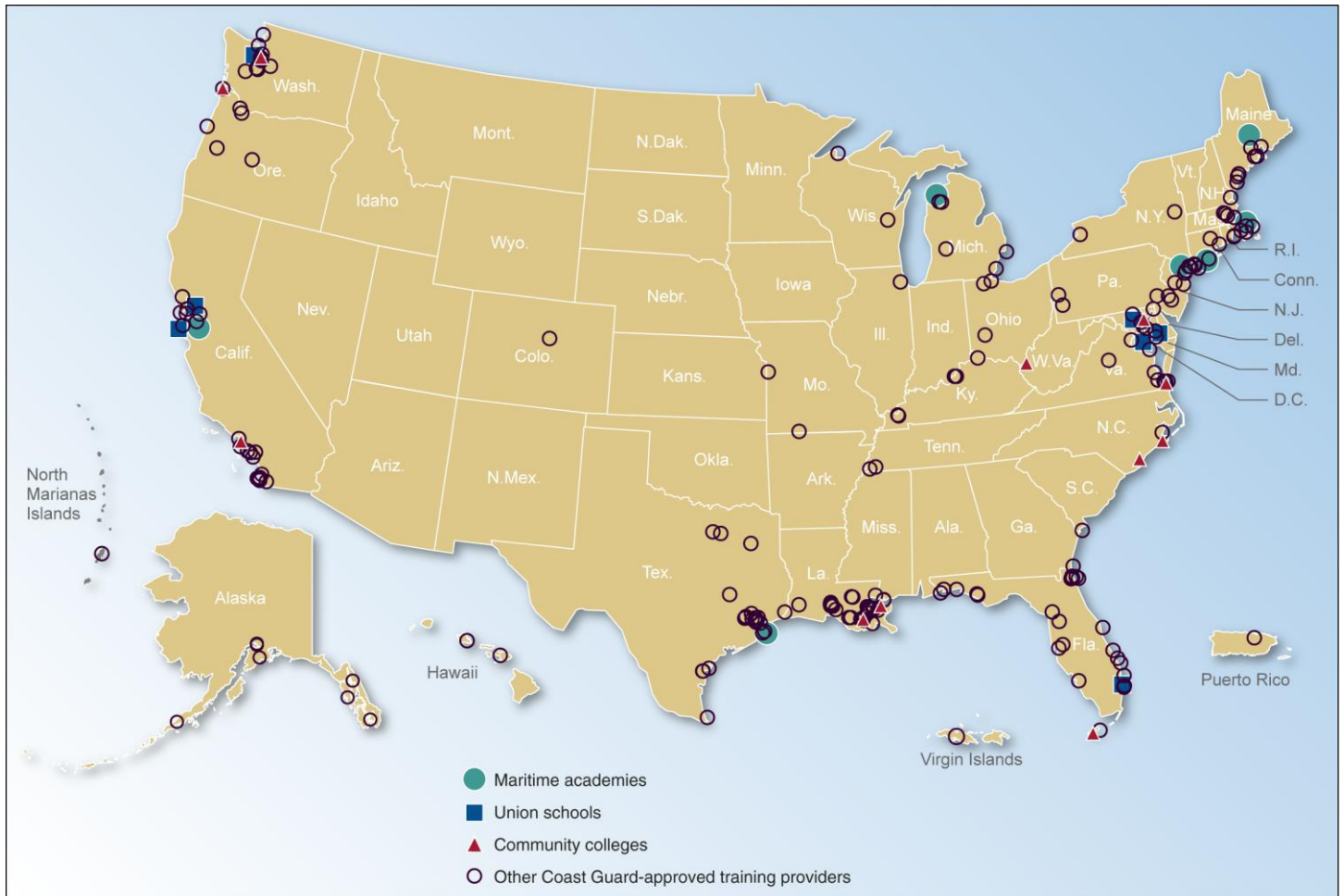
Companies across multiple sectors of the maritime industry, from an oceangoing carrier to an oilfield driller to a domestic waterways operator, offer and require specific training courses for their mariners. For example, representatives from an oceangoing-carrier company with vessels sailing under both U.S. and international flags told us that they require and provide training beyond that which a mariner brings to the job. The representatives further stated that the company might supplement union training with manufacturer-specific training that allows the mariners to get safety and quality certification for engines used on the company's vessels.

Likewise, representatives from a large operator of domestic waterways' inland and coastal tank barges that transport chemicals told us that their company has a training center in Texas, which is equipped with a training vessel and a full radar-equipped towboat wheelhouse simulator. According to a company representative, the company invested \$11 million in the training center in 2011.

**Private Maritime-Training
Providers Train
Oceangoing and Domestic
Mariners**

About 230 private maritime-training providers gave Coast Guard-approved training to varying numbers of mariners across the country in 2012, according to Coast Guard NMC data. (Fig. 4 on p.18 shows the locations of the private schools.) This training can range from safety training to management training to vessel operations. The schools range greatly in size. For example, one school we visited is a large non-academy training provider with two locations in Kentucky and Texas. According to school officials, this provider trains about 1,000 to 1,200 students per year. Moreover, according to officials, at both locations, the provider primarily trains domestic waterways mariners and offers simulator, hands-on, and classroom training. Courses range from 2 days to 2 weeks. Another school we visited offers 18 Coast Guard approved courses to about 50 to 60 mariners a year seeking to work on tugs and towboats.

Figure 4: Locations of Public and Private Maritime-Training Providers as of December 2012



Sources: DOT and Map Resources.

Federal and Private Financial Assistance Is Available for Maritime Training, but Some Mariners Could Lack Access to Assistance

Maritime-Training Costs Vary

The costs associated with required maritime training—whether borne by the mariners or by entities such as federal agencies—vary greatly depending on the type of training and the training provider. Training costs vary greatly both for the initial training that prospective mariners take before entering the workforce and for any ongoing training that current mariners take after entering the workforce. For example, several stakeholders estimated that Coast Guard-required entry-level mariner training—including basic safety training and other up-front costs for required physical exams and drug tests—range from about \$1,500 to \$3,000. In another example, a large private-training provider told us that one week of training—mostly designed for current mariners seeking to advance their careers or keep up with training requirements—costs about \$1,300 per mariner per week. According to GAO analysis, for prospective mariners enrolled in their first year at state maritime academies, tuition, fees, and room and board costs for an in-state mariner can be as high as \$29,000 or as low as \$19,000 per year, depending on the academy. Finally, one union stakeholder estimated that it would cost about \$30,000 for an entry-level mariner to get training through a private-training provider equivalent to that gained through one of the maritime academies.

Available Federal Assistance

MARAD provides each USMMA student with free tuition, room and board, uniforms, and books, in exchange for the student's obligation to serve for at least 5 years after graduation either in the maritime industry or on active duty in an armed or uniformed service of the United States. USMMA graduates must also meet other obligations, including (1) maintaining a U.S. Coast Guard officer license for at least 6 years after graduation; (2) accepting an appointment as a commissioned officer in any reserve unit of the U.S. armed forces and maintaining that commission for at least 6 years after graduation; and (3) submitting to

MARAD documentation verifying compliance with these obligations annually until service obligation requirements have been met. Students attending the six state maritime academies also have access to financial assistance through MARAD. State academy students can apply for MARAD's Student Incentive Payment (SIP) program, a competitive, voluntary program that provides up to \$8,000 per year to participating students that can be used to defray the costs of tuition, uniforms, books, and subsistence. In return, SIP recipients have the same obligations cited above for USMMA graduates with the exception of the obligation to serve in the maritime industry or on active duty within an armed or uniformed service of the United States. The service obligation for SIP students is 3 years instead of the 5 years of service required for USMMA graduates. MARAD estimates that the SIP program helps support the enrollment of about 75 new students each year at the six state academies collectively. Of the approximately 650 students that MARAD estimates will graduate from the state academies during the 2013 academic year, about 75 graduates, or 11 percent, received SIP funding.

In addition, both USMMA and state academy students may also be eligible for financial aid through Department of Education grants and loans. For example, according to USMMA, students may wish to obtain additional assistance to pay for educational supplies and fees not covered by MARAD.³² Similarly, officials from the Massachusetts Maritime Academy and from State University of New York Maritime Academy told us that about 80 percent of their students, respectively, use Department of Education loans to help pay for their schooling.

Prospective mariners pursuing oceangoing and domestic careers who are enrolled in maritime programs at other state and local colleges may be eligible for Department of Education grants and loans through their institutions. Generally, to qualify for Department of Education financial aid, students must have financial need and be enrolled at least part time

³²In addition, mariners in training programs—both at the maritime academies and in non-academy training programs—may be eligible for education tax credits that could help offset the costs of training. As we recently reported, tax credits such as the American opportunity credit and the lifetime-learning credit reduce tax filers' income tax liability on a dollar-for-dollar basis for qualified education expenses. The Business Deduction for Work-Related Education Tax may also benefit tax filers pursuing training. Deductible expenses include tuition, books, supplies, lab fees, certain transportation and travel costs and other education expenses. See GAO, *Higher Education: Improved Tax Information Could Help Families Pay for College*, [GAO-12-560](#) (Washington, D.C.: May 18, 2012).

in a college that has been certified by the Department of Education to participate in the federal student aid program. Thus, generally only those prospective mariners in an eligible training program at colleges eligible to participate in the federal student aid program would have access to Department of Education grants and loans.

Prospective mariners who are veterans may be eligible for financial assistance to fund maritime training through Department of Veterans Affairs (VA) education programs, but only if the training provider has been approved to accept VA education assistance funds. VA assistance is primarily provided through the Post-9/11 Veterans Educational Assistance Act of 2008 (Post-9/11 GI Bill), as amended.³³ That assistance can be used for programs of study at 4-year colleges and universities, as well as for non-college degree programs and trade schools, and for apprenticeships and on-the-job training.³⁴ However, all schools and training providers must be approved by VA to accept Post-9/11 GI Bill benefits. Several officials we spoke with at maritime-training facilities told us that their facilities did not use VA funds to pay for training. For example, the director of San Jacinto Maritime told us that mariners in training at his facility cannot use VA funds to pay for their training because the facility has not found it economically feasible to apply for GI-Bill status with the VA. In another example, an official at a large training facility in Kentucky told us that no mariners in training at his facility used VA programs to fund training.

Finally, several stakeholders told us that some states use training programs sponsored by the Department of Labor (Labor) to help fund

³³Pub. L. No. 110-252, 122 Stat. 2323, 2357. See also GAO, *VA Education Benefits: Student Characteristics and Outcomes Vary across Schools*, [GAO-13-567](#) (Washington, D.C.: July 25, 2013). The VA provided nearly \$11 billion in postsecondary education benefits through multiple programs to almost 1-million veterans and their beneficiaries in fiscal year 2012. The majority of such payments—over \$8 billion—was distributed through the Post-9/11 GI Bill.

³⁴All training providers accepting Post-9/11 GI Bill benefits must fulfill certain responsibilities, such as keeping the VA informed about the enrollment status of veterans; keeping the VA informed of new programs and changes in current programs; and keeping up to date on current VA rules and benefits.

maritime training.³⁵ The stakeholders indicated that these funds are usually allocated by state workforce agencies to maritime companies and local training providers, but some of these funds also could be directly accessible to eligible mariners seeking training.³⁶ For example, the Texas Workforce Commission has a Skills Development Fund grant program that funds training to meet specific training needs identified by Texas-based employers and trade unions. This grant program is a collaborative effort between Texas-based employers or trade unions and public community colleges or technical colleges. A grant through this program helped establish the local maritime-training program at the San Jacinto Community College in Texas. According to the program's website, since 2010, the program and 16 partnering maritime companies had received about \$1 million in funding for U.S. Coast Guard- and STCW-approved mariner training. According to the director of this program, the grant helps offset training costs for Texas-based maritime companies. Prospective mariners may also be eligible for direct access to Labor assistance funds for training, assuming that they meet any required financial need and any other requirements.

Assistance May Be Available for Union Members and Company Employees

Mariners who are members of a union may also have access to training that is paid through their unions.³⁷ For example, two union leaders told us that union members would receive assistance to attend training at a specific training provider and also would have other training-related costs paid by the union, such as room and board. However, most maritime

³⁵As we reported in 2011, Department of Labor programs are a major source of funding for federally funded employment and training programs. Based on the results of a survey, GAO found that about 77 percent of the total number of participants served across all federally funded employment and training programs received services through the Workforce Investment Act (WIA) Adult program and the Employment Service / Wagner-Peyser Fund program, both of which are administered by the Department of Labor. See GAO, *Multiple Employment and Training Programs: Providing Information and Colocating Services and Consolidating Administrative Structures Could Promote Efficiencies*, [GAO-11-92](#) (Washington, D.C.: Jan. 13, 2011).

³⁶A prospective or current mariner could be eligible to receive direct funds for training services through Department of Labor programs such as the WIA Adult program. The WIA Adult program and the Employment Service program are typically administered by the respective state workforce agency. The available training as well as the individual eligibility requirements would vary by state.

³⁷Although all the maritime unions we interviewed pay for mariner training, all union members are required to pay dues to maintain their membership.

unions represent primarily oceangoing mariners, who make up a small portion of the overall mariner workforce. Consequently, many current mariners working in the domestic waterways are not members of unions and therefore lack access to paid union training.

Some maritime companies in both domestic and oceangoing transportation provide employee training in-house or pay employees to attend off-site training courses. For example, representatives from a large offshore company told us that their company spends about \$100 million per year for in-house training for all of its mariners, including initial new-hire training and periodic subsequent training. Similarly, representatives from a large inland-towing company predominately operating in the rivers and coastal areas told us that the company pays for workers' initial training and all subsequent training, including any travel costs from the mariners' duty station to the training site. In addition, representatives of a large oceangoing company told us that their company pays for initial and subsequent training at a specific union school as well as training-related travel, lodging, and meal costs.

Selected Stakeholders Reported That Some Mariners Could Lack Access to Financial Assistance

Fourteen industry stakeholders we interviewed—including representatives from two maritime academies, six non-academy training providers, four unions and associations, and two other industry representatives—expressed concerns about the lack of financial assistance for some mariners. For example, a representative of a non-academy training facility and another stakeholder stated that only prospective mariners attending the USMMA and the state maritime academies have sufficient access to financial assistance. In another example, a representative of a non-academy training provider stated that most of the maritime schools that cater to unlicensed mariners are too small to be accredited by the Department of Education and that therefore, their students would not have access to federal student loan programs. Also, a private sector school stated that none of its students used federal programs and all paid out of pocket for the training costs. Some types of prospective and current mariners could lack access to the financial assistance listed in figure 5 because they do not meet the eligibility conditions for federal or private financial assistance. For example, a recent high school graduate seeking an entry-level maritime position would likely not have access to assistance to pay for any training required before applying for the specific position. In another example, a current non-union mariner working for a company that does not pay for training would likely not have access to financial assistance to pay for any continuing training courses needed to keep up with training requirements. Finally, a mariner who is a military

veteran and attending a non-college maritime program that has not been approved to accept VA funds or Department of Education financial aid funds would likely not have access to federal financial assistance. However, MARAD's responsibility towards paying for training mainly extends to students at the USMMA and the students at the state maritime academies who receive student incentive-payment program funds.

Figure 5: Examples of Financial Assistance Available to Mariners for Training

Mariners with access to source		Assistance source				
		Federal ^a		Veterans Affairs	Private	
		MARAD	Department of Education			Companies
Prospective mariners	USMMA students	✓	✓			
	State maritime academy students	✓ Limited access	✓			
	Students at other state and local colleges		✓ Must attend Education-approved program			
	Veterans		✓ Must attend Education-approved program	✓ Must attend VA-approved program		
Current mariners ^b					✓ Must work for company that pays for training	✓ Must be a member of a union that pays for training

Source: GAO.

^aProspective and current mariners may also have access to Department of Labor training programs. As we reported in [GAO-11-92](#), Department of Labor programs are a major source of funding for federally funded employment and training programs. Mariners seeking training could directly access such funds if they meet individual eligibility requirements.

^bCurrent mariners refers to mariners who have already entered the maritime workforce. This could include veterans and those in training at state and local colleges.

MARAD Primarily Supports the Needs of the Oceangoing Maritime Industry, Raising Concerns among Stakeholders about Training Implications for the Domestic Maritime Industry

Maritime Industry Has Shifted from Oceangoing to Domestic Sectors, but U.S. Policy Encompasses Support for Both

The oceangoing sector of the U.S. maritime industry has declined over the past decades while the overall domestic sector has been holding steady in recent years and some domestic sectors have grown. Although many factors influence the commercial oceangoing industry, we have previously reported that the costs of building vessels in the United States and operating vessels under the U.S. flag are significantly higher than in other countries.³⁸ In contrast, according to MARAD, the domestic sector has either held steady or seen growth in economic activity and investment over the past decade, especially in the offshore oil and drilling area and the inland and coastal transportation area.³⁹ MARAD officials stated that the recent growth in domestic commerce was a result of the increase in off-shore oil and gas support vessel activities.

³⁸For example, as we recently reported, foreign shipyards—such as those in China, Japan, and South Korea—can build vessels for less than U.S. shipyards. See GAO, *Puerto Rico: Characteristics of the Island's Maritime Trade and Potential Effects of Modifying the Jones Act*, [GAO-13-260](#) (Washington, D.C.: Mar 14, 2013).

³⁹See DOT, *U.S. Water Transportation Statistical Snapshot* (Washington, D.C.: November 2013).

MARAD Primarily Supports the Training Needs of the Oceangoing Maritime Industry

Although MARAD has been delegated DOT's statutory requirement to study all maritime problems arising in carrying out the merchant marine policies for commerce and national defense,⁴⁰ MARAD's programs and activities primarily focus on supporting the oceangoing sector of the maritime industry, which supports its national defense objectives. MARAD's support for the oceangoing sector includes providing mariner training and collecting and analyzing industry data to determine potential problems.⁴¹ MARAD's programs and activities, however, have not focused as much on collecting and analyzing industry data to determine potential problems in the domestic sector of the maritime industry. For example, MARAD assessed mariner training to meet sealift requirements in 2004⁴² and has recently completed a study with maritime unions to determine the availability of mariners to crew the sealift vessels if they are activated. Officials stated they intend to continue to track this number and have been collecting these data since 2007. Recent interest about this issue arose during a congressional hearing in May 2013⁴³ highlighting that DOD and a large maritime labor union representing mariners in all sectors of the industry disagreed on the number of mariners available for sealift. MARAD officials told us that MARAD has limited budget resources and has prioritized its efforts to oceangoing mariners and national defense objectives.⁴⁴

According to MARAD officials, while MARAD has not studied the domestic sector of the industry as it has the oceangoing sector, the

⁴⁰46 U.S.C. §§ 50101, 50104.

⁴¹MARAD is responsible for determining whether adequate manpower is available to support the operation of sealift ships during a crisis, as set forth in the National Security Sealift Policy, National Security Directive (NSD) No. 28, October 5, 1989.

⁴²DOT, *Merchant Mariner Training to Meet Sealift Requirements: A Report to Congress*. Maritime Administration (Washington, D.C.: August 2004).

⁴³Maritime Transportation: Hearings on the Role of U.S. Ships and Mariners Before the Subcommittee on Coast Guard and Maritime Transportation, House Committee on Transportation and Infrastructure, May 21, 2013.

⁴⁴MARAD's prioritization of resources for national defense is also reflected by its proposal for fiscal year 2014 to realign the Maritime Workforce Development office, which is responsible for the review and development of broad national policies and programs in the area of maritime labor and training, to be under the Strategic Sealift Associate Administrator. Maritime Workforce Development is the MARAD office that conducted the study to determine whether the current pool of oceangoing mariners is large enough to meet military sealift requirements.

academies directly support training for domestic and inland waterway commerce. The officials stated that while the maritime academies graduate mariners who are qualified to sail on oceangoing vessels, these qualifications also allow them to sail aboard vessels in other sectors of the industry, although additional endorsements may be necessary. The officials acknowledged that the increase in domestic requirements could, over time, lessen the applicability of oceangoing training that the academies provide to meet the training requirements of the domestic sector. However, they noted that there did not appear to be a lack of training providers for the domestic sector.

In addition, officials told us that they intend to collect data on the number of commercial mariners in different domestic maritime sectors, and their credentials and endorsements. The officials also told us that this effort could be similar to the study they conducted with the maritime unions on the oceangoing workforce and could compare the number of commercial vessels with the number of mariners who hold the appropriate credentials and endorsements to work on those vessels. However, the officials stated that MARAD has not yet developed a plan to conduct this study that includes both the necessary staff resources and an established time frame to complete the effort. Without a plan to conduct this study that includes both staff resources and time frames, it is unclear if MARAD will complete this effort.

Selected Stakeholders Raised Concerns about MARAD's Continued Focus on the Training Needs of the Oceangoing Maritime Industry

Some stakeholders expressed concerns about MARAD's continued focus on the training and other needs of the oceangoing sector and about the need for more information from MARAD on the maritime industry overall. Some stakeholders we interviewed—including representatives from three non-academy training providers and two companies—told us that MARAD seemed overly focused on supporting the needs of the oceangoing-maritime industry and had not acknowledged the current and future growth and needs of the domestic maritime industry. Some of these and other stakeholders stated they felt it was important for MARAD to collect data and conduct studies in order to help better understand, promote, and support the entire commercial industry, both the oceangoing and domestic sectors. These stakeholders included representatives of three academies, a non-academy provider, and a union. The union stakeholder stated that it was important to know about workforce trends, and that the industry could use more standardized sets of data. For example, one maritime academy stated that it could update training curriculums that will meet changing workforce needs if it had more industry survey data from MARAD.

Three of the maritime academies, whose funding from MARAD primarily focuses on producing oceangoing officers and on supporting national defense sealift, expressed the need for more information to better meet the requirements of the domestic industry, particularly in the offshore and near coastal areas, for example:

- One academy stakeholder stated that more information from MARAD and studies on qualified mariners would help the academy make planning and resource decisions. Without this information, the school sometimes makes decisions simply based upon what other schools are doing.
- Two academy stakeholders said that such studies could help focus and update their respective academies' curriculums.
- One academy started offering domestic waterways training as an elective and is planning to acquire a tug and barge simulator. According to this academy stakeholder, though, this academy makes these curriculum decisions based on anecdotal information from industry, other schools' practices, and some government data, and noted that more industry information from MARAD was important to the stakeholder to help make better planning and resource decisions.
- One academy stakeholder noted that this academy would like to increase its size, mostly in response to current growth in the offshore areas, but that more guidance would be helpful as the academy adapts to industry changes.

Several company stakeholders also expressed concerns about the academies' lack of sufficient curriculums specifically tailored for the domestic sector. For example, officials at one domestic maritime company that we spoke to noted that it required recent academy graduates to take 13 months of required training and on-the-job experience. In another example, officials from an offshore company told us that they did not think the academies have sufficient curriculums specifically focused on offshore operations.

According to MARAD officials, there has been an increase in specialized training necessary to work on specific types of vessels for both the domestic and oceangoing sectors of the industry. The officials stated that 20 years ago mariners could graduate from an academy with credentials that allowed them to work on any type of vessel. Since that time, specialization has led to more training requirements. According to

MARAD, tankers, passenger vessels, towing vessels, and dynamic-positioning vessels all require specialized training. The officials noted that it is increasingly difficult, if not impossible, for a 4-year maritime academy to provide all of the courses for an undergraduate degree and all of the necessary training and sea time for a mariner to have the qualifications to sail aboard all vessels.

As discussed earlier, MARAD has a broad mission to support both the domestic and oceangoing waterways, including providing overall direction for the training of U.S. mariners in both sectors. For MARAD to meet its statutory responsibilities, including those delegated by the Secretary of Transportation to MARAD, it is important that it study all problems arising in the merchant marine's ability to carry out specified national commerce and defense objectives to ensure both economic growth and sealift support in times of war. As industry stakeholders have noted, lack of sufficient information, including on mariner-training needs in the domestic sector, could have adverse effects for the domestic sector of the maritime industry.

MARAD Strategic Efforts Could Provide Opportunities to Identify and Study Training Issues

DOT has raised concerns about the number of U.S. oceangoing mariners. The primary source of mariners to crew government reserve sealift ships is the pool of U.S. mariners actively sailing in the U.S.-flag shipping industry. According to MARAD officials, the sufficiency (availability, commitment, and skills) of this mariner pool to support a large-scale activation of the government reserve sealift fleet (60 ships) depends upon the health and size of the commercial U.S.-flag merchant fleet. The DOT Deputy Secretary testified in May 2013 that while the pool of U.S. oceangoing mariners is adequate to meet current sealift needs, DOT was concerned that the costs of operating under the U.S.-flag registry may result in continued reductions in the oceangoing commercial fleet.⁴⁵ In addition, MARAD officials acknowledged that many mariners now prefer to work domestically, including on the outer continental shelf, which is a growing sector of the industry that is required to hire U.S. citizens. This shift in preference could lessen the number of qualified oceangoing mariners. The officials also acknowledged that the decline in the number

⁴⁵John D. Porcari, Deputy Secretary, U.S. Department of Transportation, *Maritime Transportation: Hearings on the Role of U.S. Ships and Mariners*, testimony before the House Committee on Transportation and Infrastructure, Subcommittee on Coast Guard and Maritime Transportation, 113th Cong., 1st sess., May 21, 2013.

of U.S.-flag ships has resulted in fewer qualified U.S. mariners for DOD sealift.

To help address these issues, MARAD announced in September 2013 that it is developing a national maritime strategy, to include ways to address the decline in U.S.-flag oceangoing vessels, shipbuilding, and other ways to support the maritime industry.⁴⁶ MARAD officials told us that they have set a preliminary 30-year goal to significantly increase the participation of U.S.-flag oceangoing vessels in international shipping. The share of imports and exports carried by the existing 89 U.S.-flag foreign-trading vessels is approximately 2 percent by weight of cargo; doubling the share of oceanborne exports and imports carried by U.S.-flag vessels to 4 percent could employ approximately double this number of vessels. Reaching a 10-percent share could employ 300 to 500 vessels, depending on future trade growth, vessel types, and vessel-size trends. As part of the process to develop this strategy, MARAD convened a series of roundtables in January 2014 with maritime stakeholders to generate ideas for improving, strengthening, and sustaining cargo opportunities and sealift capacity within the U.S. marine transportation system. Among the areas MARAD discussed with stakeholders was the number of qualified U.S.-citizen mariners and U.S.-flag ships, training and retention of the maritime workforce, and steps to revitalize the U.S. shipbuilding industry. The officials stated further that they will refine the 30-year target numbers for the U.S.-flag international oceangoing fleet after the roundtable discussions. Studying potential training-related problems affecting the merchant marine's ability to carry out specified national commerce and defense objectives to ensure economic growth and sealift support in times of war could provide information to maritime stakeholders and help MARAD meet its responsibilities.

Conclusions

It is important that MARAD ensure that the maritime workforce is trained to meet the needs of the domestic and oceangoing sectors of the maritime industry. The decline in the number of U.S. oceangoing vessels is adversely affecting the maritime industry's ability to meet sealift requirements. Considering that DOD relies on the merchant marine

⁴⁶Paul N. Jaenichen, Acting Maritime Administrator, *Maritime Transportation Regulations: Hearings on the Impacts on Safety, Security, Jobs and the Environment, Part I*, testimony before the House Committee on Transportation and Infrastructure, Subcommittee on Coast Guard and Maritime Transportation, 113th Cong. 1st sess., September 10, 2013.

during times of war, it is imperative that MARAD continue to study any potential problems that jeopardize fulfilling U.S. national defense objectives, in particular, whether there is a large enough pool of trained U.S. mariners. However, the Secretary's legislatively mandated role, delegated to MARAD, also includes ensuring that the entire merchant marine, both the oceangoing and domestic sectors, is sufficient to satisfy national commerce objectives. MARAD's resources and actions, however, are predominantly focused on the oceangoing industry's contribution to national defense. Many of the stakeholders we interviewed—including academy stakeholders responsible for training oceangoing mariners—have noticed this focus and are concerned about MARAD's lack of data and studies on the domestic maritime industry. For MARAD to meet its mission to foster, promote, and develop the entire U.S. merchant maritime industry, it is important that MARAD study any potential problems that could arise in fulfilling U.S. national commerce objectives for both the oceangoing and domestic waterways including whether there are sufficient numbers of trained mariners for all sectors of the maritime industry.

As MARAD develops a national maritime strategy and assists DOT in developing a national freight strategic plan, it has taken a step in the direction of studying problems facing the various sectors of the maritime industry with the January 2014 roundtable discussions with industry stakeholders. The development of the national maritime strategy can serve as an opportunity to determine whether there are any potential problems related to all sectors of the industry, including the training issues raised by the stakeholders we interviewed. MARAD would also have the opportunity to identify what analyses to conduct to understand how the U.S. maritime-training infrastructure can better meet the needs of the domestic waterways. Developing a national maritime strategy without the collection and analysis of fundamental industry information about the domestic maritime workforce could make it more difficult for MARAD to identify potential problems with ensuring sufficient numbers of trained mariners for all maritime industry sectors.

Recommendation for Executive Action

As part of the development of a national maritime strategy and a national freight strategic plan, we recommend that the Secretary of Transportation direct MARAD—in consultation with maritime industry stakeholders—to study and identify any potential problems in ensuring that U.S. mariners are adequately trained to meet the needs of the entire maritime industry, including the domestic waterways. Public forums, such as MARAD's

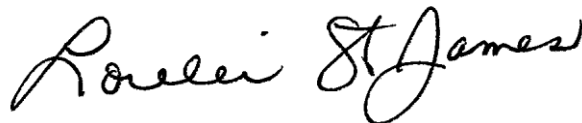
roundtable discussions, could serve as a means for gaining industry input on potential training issues.

Agency Comments

We provided a draft of this report to the Secretaries of Transportation, Homeland Security, and Department of Defense for review and comment. DOT did not agree or disagree with our recommendation but provided technical comments, which we incorporated as appropriate. The Department of Homeland Security also provided technical comments, which we incorporated as appropriate. DOD did not have any comments.

We are sending copies of this report to the appropriate congressional committees, the Secretary of Transportation, the Secretary of Homeland Security, and the Secretary of Defense. In addition, the report is available at no charge on the GAO website at <http://www.gao.gov>.

If you or your staff have any questions about this report, please contact me at (202) 512-2834 or StJamesL@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made major contributions to this report are listed in appendix II.



Lorelei St. James
Director, Physical Infrastructure

Appendix I: Scope and Methodology

The Coast Guard and Maritime Transportation Act of 2012 mandated us to review mariner training. Because of the large size and diversity of the U.S. maritime industry—such as the number of government agencies with maritime responsibilities, areas of operations, training requirements and regulations, training providers, and vessel-owning companies—we limited the scope of our review in the following ways. We focused on the three federal government agencies that have a broad and direct impact on training for the maritime industry: the Maritime Administration (MARAD), which has broad statutory responsibilities for overseeing the health of the maritime industry, including statutory responsibilities delegated by the Secretary of Transportation regarding the training of mariners and ensuring that the merchant marine meets U.S. waterborne commerce and national defense objectives; Coast Guard, which regulates the training infrastructure; develops training standards; approves maritime schools, courses and instructors; and issues credentials to mariners; and Military Sealift Command, which sets the training-related requirements for U.S. mariners to augment military sealift capabilities during times of war or national emergency. We selected for interview a non-probability sample of industry stakeholders based on such factors as area of operation, location, industry sector, and training provider type. We did not study the impact of training requirements on the maritime workforce primarily because the proposed Coast Guard regulations promulgating the most recent iteration of international training requirements had not been issued in a final form in time for our review. The Coast Guard issued the final regulation incorporating the IMO’s 2010 amendments to the STCW on December 24, 2013.

Our report examines the following questions: (1) What is the availability of government (federal, state, and local) and private sector entities that currently provide training to U.S. mariners? (2) What federal and non-federal financial assistance that available to mariners to help them meet training requirements? (3) What actions has MARAD taken to ensure there are trained mariners to meet commerce and national defense needs, and what are the views of merchant marine stakeholders on these actions and on current and potential training issues?

To describe what is known about government and private entities that provide mariner training, we obtained and reviewed documents from government and non-government stakeholders about training requirements and their training infrastructure. Specifically, we analyzed information about training requirements for U.S mariners, including current federal regulations governing training for mariners working on both oceangoing and domestic commercial waterways. Title 46 (Shipping)

of the Code of Federal Regulations (CFR) contain the Coast Guard's training-related requirements for both oceangoing and domestic waterways. Oceangoing regulations include the implementation of the International Maritime Organization's (IMO) International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978, as amended (STCW). Concerning how mariners receive training that satisfies commercial-oceangoing and domestic requirements and military requirements, we reviewed information and interviewed officials from MARAD; the Coast Guard and its National Maritime Center (NMC) in Martinsburg, West Virginia; and the Military Sealift Command. Specifically, the MARAD documents and data we analyzed included the number of federal and state maritime academy graduates in the past 5 years, budgetary resources for fiscal years 2009–2013, and industry studies and statistics. From the Coast Guard and NMC we obtained and analyzed documents and data on the numbers of mariner-training certificates issued by non-academy training providers in the last 5 years and the NMC's process for approving training providers and courses. Although our use of Coast Guard and MARAD data was limited in our report, we conducted interviews with knowledgeable agency officials in order to ensure the data were sufficiently reliable for our use. Regarding military sealift, we analyzed Military Sealift Command documents on its wartime requirements for the oceangoing vessels and the associated training requirements for merchant mariners.

The non-probability sample of maritime industry stakeholders that we selected for interviews included:

- 5 unions;
- 4 associations representing the maritime industry;
- 21 training providers, of which 6 were maritime academies, 4 were union-affiliated schools, 5 were maritime companies that offer training, 4 were for-profit training providers, and 2 were non-profit training providers; and
- 7 members of the Merchant Mariner Personnel Advisory Committee, which advises the Coast Guard on merchant marine personnel issues, such as training, qualifications, certification and other issues.

We selected these stakeholders because of their wide knowledge and roles in multiple aspects of the maritime industry. We also conducted site visits to maritime industry facilities and training providers in the New York

City and Houston, Texas, areas. We selected both areas based on the diversity of their maritime industry and their concentration of facilities and training providers. We also visited three of the four union-affiliated maritime-training schools we selected for interviews and toured their facilities, which were located in the Washington, D.C., area.

To describe what is known about federal and non-federal financial assistance that is available to mariners, we relied on the knowledge and experience of the industry stakeholders and government officials we selected for interview. We did not intend or attempt to provide a comprehensive overview of all possible federal, state, and local government and private sector financial assistance programs available for mariners, their employers, or their training providers. With the industry stakeholders we discussed the types of financial assistance, if any, that they provide—such as union and company provided training—and their knowledge and use of federal and other non-federal financial assistance. Also, we discussed with stakeholders how individual mariners pay for training and the types of mariners that do not have access to financial assistance. We compared the different sources of training as described by the stakeholders and, where necessary, we followed up with further research on financial assistance for training and education, including reviewing prior GAO work in this area.¹

To determine what actions MARAD has taken to ensure there are trained merchant mariners to meet commercial industry (both domestic and oceangoing) and national defense needs, we interviewed MARAD officials, including from the Office of Maritime Workforce Development, the unit responsible for conducting studies on the population of trained and qualified mariners; reviewed MARAD's publicly available studies, statistics, and surveys of the maritime industry; and included this topic in our interviews with industry stakeholders. With MARAD officials, we discussed the agency's current priorities and its ongoing and future efforts to study the U.S. mariner population. In particular, we discussed MARAD's current collaboration with maritime unions to determine

¹ See GAO, *Multiple Employment and Training Programs: Providing Information and Colocating Services and Consolidating Administrative Structures Could Promote Efficiencies*, [GAO-11-92](#) (Washington, D.C.: Jan. 13, 2011); *Higher Education: Improved Tax Information Could Help Families Pay for College*, [GAO-12-560](#) (Washington, D.C.: May 18, 2012); and *VA Education Benefits: Student Characteristics and Outcomes Vary across Schools*, [GAO-13-567](#) (Washington, D.C.: Jul 25, 2013).

whether the pool of mariners in the oceangoing industry is sufficient to meet military sealift requirements. We also analyzed MARAD's budget for the fiscal years 2009–2013 and its current strategic plan covering 2008–2013. In addition, we discussed MARAD's budgetary priorities and how the agency focuses its work and accomplishes its statutorily mandated objectives regarding the maritime industry as a whole.

To determine the views of merchant marine stakeholders on current and potential training issues, we developed semi-structured interview guides to elicit stakeholders' views on current training issues within the maritime industry, including federal regulations and oversight, as well as to collect basic information from the stakeholders, such as the demographics of the mariner population they represent and specific training-related information. We identified the following limitations that should be considered when using the results of our interviews with maritime industry stakeholders. First, the stakeholders we selected for interview were not a representative sample of the industry and, therefore, the views we received from them should not be interpreted as representing the industry as a whole. Second, information from our site visits and interviews is illustrative and cannot be generalized to the maritime industry and training providers.

We conducted this performance audit from March 2013 through January 2014 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Appendix II: GAO Contact and Staff Acknowledgments

GAO Contact

Lorelei St. James, (202) 512-2834 or StJamesL@gao.gov.

Staff Acknowledgments

In addition to the contact named above, Edward Laughlin (Assistant Director); Amy Abramowitz; Jessica Bryant-Bertail; Jose Cardenas; Colin Fallon; Geoffrey Hamilton; Sam Hinojosa; Josh Ormond; Emily Upstill; and Elizabeth Wood made key contributions to this report.

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