

# The COAST GUARD Journal of Safety & Security at Sea PROCEEDINGS

FALL 2018

of the MARINE SAFETY & SECURITY COUNCIL



**Captain of the  
Port Authorities**  
*Safeguarding  
America's waterways*



# PROCEEDINGS

Fall 2018

Vol. 75, Number 2

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**On the Cover:** The Brooklyn Bridge and East River comprise just a small part of the Port of New York and New Jersey, which is the third-largest U.S. port and the busiest on the East Coast. The port's cargo volume for 2017 was 6,710,817 TEUs (twenty-foot equivalent units). The captain of the port holds a position of great responsibility, especially when the port's already-heavy load of commercial traffic is combined with recreational use of the port waters during events such as Fleet Week or Fourth of July fireworks.

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## Assistant Commandant's Perspective

by REAR ADMIRAL JOHN P. NADEAU  
*Assistant Commandant for Prevention Policy  
U.S. Coast Guard*

**T**he Captain of the Port (COTP) is a critical role for the Coast Guard and the Nation as a unique, broad authority overseeing important aspects of safety and security in the Maritime Transportation System (MTS). The individuals in this role at different ports across the country are in a position of high visibility



## Champion's Point of View

by RAJIV KHANDPUR  
*Chief, Office of Waterways and Ocean Policy  
U.S. Coast Guard*

**I**am pleased to champion this edition of *Proceedings*, which highlights captain of the port (COTP) authorities and how vital the captain of the port role is to all Coast Guard missions.

Sector commanders have a wide range of authorities and responsibilities under federal law, wearing several hats as a captain of the port; federal on-scene

coordinator; federal maritime security coordinator; officer in charge, marine inspections (OCMI); and search and rescue mission coordinator. However, of all these authorities, many sector commanders agree with retired VADM Peter V. Neffenger that the COTP authority is the most important, far-reaching, and powerful authority held by a sector commander.

and must possess a wide array of qualities. Their actions have far-reaching effect not only for the local region but nationally. They must be leaders who can build coalitions and consensus; have robust knowledge of the governing laws and regulations; must be politically astute; and above all, have a clear understanding of their local port community and stakeholder interests. As might be expected, the Coast Guard sends some of its best and brightest to serve in these positions.

The MTS is a dynamic environment with thousands of major vessels transiting in and out of U.S. ports on a daily basis. America's waterways support a wide range of competing activities within the marine environment. From commercial fishing and recreational boating to mineral extraction, ocean tourism, and marine sanctuaries, the MTS is an open system that supports the interests of a broad community of stakeholders.

District commanders, sector commanders, and commanding officers of marine safety units designated as COTPs often issue captain of the port orders—a tool available to provide them with operational controls over an emergent situation posing safety, security, or environmental risks to the COTP's area of responsibility. A COTP may order a vessel to anchor to await repair of critical equipment, for example, or direct a shoreside facility to take certain actions regarding the handling of dangerous cargo. These orders are issued under one of two statutes: the Ports and Waterways Safety Act, or the Magnuson Act.

The Coast Guard's marine safety and prevention missions have undergone numerous and significant changes in the past several years. Prior to sectorization, the Coast Guard marine safety offices had a clear delineation between COTP and OCMI missions and authorities. The creation of sectors as well as new divisions for planning, waterways management, and incident management divided captain of the port authorities among multiple divisions and departments. This edition includes articles

However, as easy access promotes efficient use of the system, it also presents challenges. The sea, our ports, and all our waterways serve as vectors for multiple threats to our nation's safety and security, including terrorist threats; mass migration; and illegal smuggling of drugs, immigrants, and contraband.

As the Nation's premier multi-mission maritime agency, the Coast Guard offers enduring value. It is the only branch of the U.S. Armed Forces within the Department of Homeland Security and is uniquely positioned to secure our ports, protect the MTS, and safeguard America's national and economic security.

The following articles demonstrate the diversity of issues that our COTPs and service deal with on a daily basis and illustrate the tremendous work and dedication of the women and men of the U.S. Coast Guard. I hope you enjoy them!

from various Coast Guard headquarters program elements focusing on the excellent work done across disciplines to support the COTP mission, including various success stories, best practices, and case studies from the field.

While we are proud to share such COTP authority achievements, there is still work to be done to elevate the status of the waterways management program as it endeavors to better support the USCG prevention mission. We're working to make progress in filling waterways management billet gaps at sectors, right-sizing the billet grades, assigning the right people to the right jobs, and establishing a clear career path for ashore and afloat professionals.

I would like to take this opportunity to extend thanks to my staff for their help in coordinating this edition, and to all the authors who have taken the time to contribute articles. Your efforts were instrumental to highlighting captain of the port authority accomplishments while also conveying what's at stake as we progress forward.

# The Captain of the Port

A vital authority in service to our nation

by CAPT ANDREW E. TUCCI  
*Former Sector Commander  
Coast Guard Sector Long Island Sound*

A port today is a delightful and diverse—some would say “motley”—collection of agents, brokers, shippers, labor groups, contractors, government officials, seafarers, dockworkers, and businesses of every description ... not to mention the boats, barges, ships, military and emergency vessels, docks, piers, bridges, railroads, pipelines, and other infrastructure. Add to the mix some residences, non-maritime businesses, parks, and public access areas, and stir well.

Ports have interests as varied as their elements. They are vital links in global commerce and a driver of businesses. They serve strategic military and energy functions while providing services and dockage for fishing boats and recreational vessels. They are a place of recreation for coastal residents and transportation for local commuters, while boasting fragile marine habitats and environmental resources.

What person or organization could possibly monitor, manage, and control all of these elements? While Coast Guard captains of the port are not responsible for overall port governance, they do, however, have a vital role in how ports operate in both steady-state and crisis situations.

The title “captain of the port” commands great respect within the Coast Guard and across the maritime industry. The responsibilities of a captain of the port (COTP) literally “cover the waterfront” and include extraordinary authority over vessels, facilities, cargo operations, and the people working on vessels and the waterfront. Wise use of these authorities can have a strong impact on ports as well as regional and even national challenges.

Captain of the port regulations and responsibilities are found in a number of locations, including 33 Code of Federal Regulations (CFR) Part 6 and 33 CFR Part 160.



The busiest container port in the United States, the Port of Los Angeles, adjoins the separate Port of Long Beach. Together, these two port complexes cover nearly 4,300 acres of land and water along 43 miles of waterfront. [Trekandshoot/Shutterstock.com](#)



The Coast Guard and local law enforcement sign an agreement to improve safety and security in and around Oak Bluffs Harbor, Massachusetts. The agreement, signed by Oak Bluffs Chief of Police Erik G. Blake, left, and CAPT Raymond J. Perry, the captain of the port for southeastern New England, provides the Oak Bluffs Police Department federal authority to enforce Coast Guard safety and security zones. Coast Guard photo

While a full examination of all of these regulations is beyond the scope of this article, allow me to point out the nature of this authority.

To take just one example, 33 CFR 160.111 states that a COTP may “order a vessel to operate or anchor in the manner directed when: (a) ... the COTP has reasonable cause to believe that the vessel is not in compliance with any regulation, law, or treaty.” Other regulations allow the captain of the port to direct cargo operations, prohibit vessels from operating, and inspect waterfront facilities.

The simplicity of these regulations reveals their power. While my legal colleagues will properly point to various implicit and explicit limitations, the fact remains that the American people have granted captains of the port an almost astonishing degree of authority over maritime operations.

That being the case, how has the Coast Guard managed to retain and exercise COTP authority over time? The short answer is that we have exercised that authority with considerable restraint, and with due regard to all stakeholders, while never hesitating to employ it when warranted and needed to achieve clear objectives.

### A Historic Perspective

A little historical context can help us understand this unique authority.

Captain of the port authority can be traced to the Espionage Act, passed by Congress on June 15, 1917, shortly after our entry into World War I. Less than a year earlier, a fire followed by a series of devastating explosions had destroyed the munitions facility on Black Tom’s Island in New Jersey. Authorities correctly suspected German

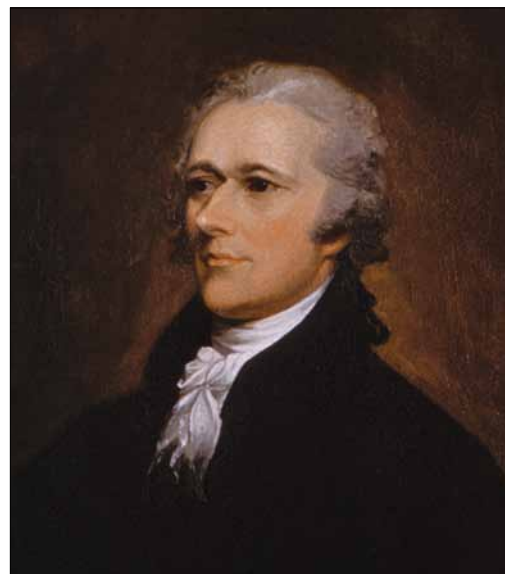
saboteurs. The act granted the president—delegated to the Coast Guard—the authority to control ports, control the movements of vessels, establish anchorages and restricted areas, and supervise the handling and storage of explosive cargos.

Commodore Ellsworth P. Bertholf appointed Captain Godfrey L. Carden in New York the first Coast Guard captain of the port, with other Coast Guard personnel assuming that same title in nine other major port areas. Captain Carden’s command became the single-largest Coast Guard command in the war, including over 1,400 personnel, four U.S. Army Corps of Engineers tugs, and five cutters. He was therefore able to establish a unity of effort with the objective of maintaining safety and security in the port.

Some COTP-related authorities and activities ended with the armistice, but others continued, and in the lead-up to World

War II, the Coast Guard resumed many of its previous port security functions. Once again, the scope of authority granted to COTPs was impressive. “The captain of the port ... shall have the right of entry to waterfront facilities at all times. The captain of the port may cause to be inspected and searched at any time, any waterfront facility or any person or package thereon ...”<sup>1</sup>

With the Cold War concerns of the 1950s came the Magnuson Act and an executive order by President Harry S. Truman. Later the Port and Waterways Safety Act, the Port and Tanker Safety Act, and the Oil Pollution Act of 1990 expanded upon or leveraged COTP authorities. After the 9/11 attacks, Congress passed the Maritime



Alexander Hamilton  
Coast Guard  
Historian’s Office

<b>Clear Objective</b>	COTPs exercise their authority to address situations that might threaten people, the environment, and port infrastructure, as well as to promote safe, secure, and environmentally sound port operations.
<b>On-Scene Initiative</b>	Captains of the port do not need to seek permission from higher authority to issue orders, and Coast Guard administrative procedures are streamlined to avoid delays. Equally important, captains of the port can lift restrictions with equal speed as soon as conditions allow.
<b>Effective Presence</b>	Our operational presence in port areas means that we are aware of baseline maritime activity and risks before an event, and therefore are able to make informed decisions when incidents occur. Specific COTP actions, like safety zones, are generally enforced via on-scene Coast Guard personnel. This means COTP orders are effective and meaningful.
<b>Managed Risk</b>	A captain of the port's job is not to eliminate risk, but to manage it to an acceptable level. Accepting a certain degree of risk in consultation with stakeholders allows commerce to proceed while taking prudent measures to limit the overall potential consequences of a situation.
<b>Unity of Effort</b>	COTP actions such as safety and security zones or vessel traffic systems help coordinate actions by various private and public sector organizations into a unity of effort that serves the port community as a whole. COTP involvement in forums such as harbor safety committees and area maritime security committees promotes a unity of effort in steady-state situations and lays the groundwork for collective action in contingencies.
<b>Flexibility</b>	The broad nature of COTP authority allows great flexibility in addressing risk. Captains of the port have flexibility in the geographic scope of an order (e.g., the size of a safety zone), the timing (e.g., "daylight transit only"), and the specific measures they may take or require of a vessel or facility operator. Another example of this flexibility is COTP approval of facility security plans, which are performance-based plans customized for individual port facilities.
<b>Restraint</b>	The Coast Guard recognizes that most vessel and facility operators are responsible, professional, and share the Coast Guard's interest in a safe and timely resolution to an incident. Highly prescriptive measures are rarely needed. Cooperation with operators helps ensure that the COTP takes only those measures necessary to achieve the desired objective. Consultation with stakeholders promotes transparency and reminds us that we serve the public as a whole. Captain of the port actions are not punitive in nature, but intended only to address specific safety, security, and environmental hazards.

Transportation Security Act, which built upon long-standing captain of the port authorities.

### Principles of Coast Guard Operations

Coast Guard captains of the port have been exercising their authority since 1917. The principles that guide all Coast Guard operations go back even further, to the very first days of our service.

The principles of Coast Guard operations, as described in Coast Guard Publication 1, are instructive as to *how* we have exercised this authority over time as well as how we should continue to do so. These principles apply to all Coast Guard operations, not just those associated with captains of the port. They are derived from Alexander Hamilton's "Letter of Instruction to the Commanding Officers of Revenue Cutters," dated June 4, 1791:

- Clear Objective
- On-Scene Initiative
- Effective Presence
- Managed Risk
- Unity of Effort
- Flexibility
- Restraint

The principle of clear objective is particularly important and speaks to the purpose of COTP authorities. Going back to 1917, the objective was to keep ports functioning by enabling the Coast Guard to keep them safe from accident and secure from sabotage. One way to look at this is that captains of the port should exercise their authority to the benefit of the port as a whole, rather than they would to benefit any individual vessel or facility operator.

Our regulations make this clear in several locations. For example, 33 CFR 160.109 states that captains of the port may take certain actions "To prevent damage to, or the destruction of, any bridge or other structure in the United States ..." Other regulations cite conditions that are unsafe, those posing a threat to the marine environment, or specific safety risks such as vessels that don't comply with traffic service requirements or don't have an English-speaking deck officer on the bridge.

While in some cases captains of the port achieve these objectives by issuing direction to specific vessel or facility operators, in other cases they serve as honest brokers to resolve





The Captain of the Port is responsible for establishing and enforcing safety zones when necessary, as with the Kilauea volcano eruption that began May 3, 2018. The eruption was such a prolonged event the Coast Guard released public service announcements, one of which showed an image similar to the one here, and read “Please Kokua Respect the Safety Zone. If you take a lava boat tour ensure your operator has a Coast Guard-issued mariner credential and a permit from Hawaii DLNR [Department of Land and Natural Resources]! These operators are licensed. Their vessels are inspected and meet federal safety guidelines.” USGS Hawaiian Volcano Observatory photo

operational conflicts or to establish mutually agreed upon procedures. This is especially true in contingency preparedness and in addressing risks associated with new or novel operations in the port. While individual vessel or facility operators may understandably grumble a bit about any specific COTP requirement, most understand that a hazard to one is a hazard to all, and that everyone benefits by working toward the objective of a safe, secure port.


As explained on page 8, the principle of clear objective demonstrates the purpose and driver behind COTP actions. Other principles help inform how the Coast Guard uses its authority. The table provides some examples. These principles help explain how the Coast Guard has served our nation so well for so many years.

### The Future of Captain of the Port Authority

Coast Guard captains of the port have served our nation for over a century, and the need for this authority—and the Coast Guard crews who put it into action—will continue, as well. As our economy and coastal population grow, more commerce must pass through a limited number of ports in any given time. Just-in-time manufacturing and rising public expectations demand flawless performance and high safety, security, and environmental

standards as well as rapid, organized recovery from any incident. These are all areas where prudent use of COTP authorities will play a role.

One new challenge is the increased use of cyber technology in ports and the maritime industry. Some U.S. ports have already seen cyber incidents impact port operations. More will come, and captains of the port will use their authorities and work with stakeholders and experts to address these threats.

Whether risks come in the form of accidents, natural disasters, old-school threats, or cutting-edge technology, the ever-present need to quickly and decisively resolve safety, security, and environmental threats to port communities tells us that COTP authorities will continue to serve the nation. 

#### About the author:

*CAPT Tucci is the past sector commander and captain of the port for Coast Guard Sector Long Island Sound.*

#### References:

U.S. Coast Guard historian’s website at <http://www.history.uscg.mil>  
 This Is the Coast Guard, Kaplan & Hunt, 1972, Cornell Maritime Press Inc., Cambridge, MD.

#### Endnote:

<sup>1</sup> Federal Register, Friday, March 31, 1944. Currently reflected in 33 CFR Part 6.

# Taking Charge!

## Critical success factors for a captain of the port

by CDR KIRSTEN TREGO  
*Senior Reserve Officer*  
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CDR JUSTIN JACOBS  
*Prevention Department Head*  
*Sector Anchorage*  
*U.S. Coast Guard*

The position of the captain of the port (COTP) empowers designated senior Coast Guard officers with far-reaching federal authorities—the power to control vessels, facilities, activities, and people on America’s navigable waterways in order to safeguard the marine transportation system. Given the complex nature of this role, and the significant consequences of any actions the captain of the port may take, it is imperative they possess certain leadership, knowledge, and decision-making skills to be effective. This article explores some critical factors that can foster their success.

Due to Coast Guard organizational structure changes in the mid-2000s, the Coast Guard officer designated as the captain of the port is typically the sector commander. This COTP/sector commander also fulfills other roles, serving as the officer in charge, marine inspection; federal on-scene coordinator; federal maritime security coordinator; and search and rescue mission coordinator.

Given the diverse nature of the duties, the officers designated as a captain of the port come from a variety of professional backgrounds, yet all show a commonality of factors that make them successful. The success factors discussed in this article stem from a study the authors conducted that included interviewing numerous current and retired captains of the port from a geographically diverse cross-section of sectors.<sup>1</sup>

### **Success Factor 1: Relationship Building**

It is vital that captains of the port build strong relationships with port partners early in their tours. These relationships will be extremely helpful when emergent situations require teamwork, communication, and flexibility. COTPs must also understand that the motivations and goals of their port partners will be as varied as the interests that they represent. Businesses want their operations to continue at all costs, certain stakeholders believe that environmental concerns trump all others, and still others will promote their niche interests and concerns. The COTP must de-conflict the shared use of the waterways and



Coast Guard Captain of the Port Tony Hahn (center) updates port conditions during a press briefing at the Robstown Incident Command Post outside Corpus Christi, Texas, in August 2017. Other participants are (from left) Texas General Land Office Area Manager Jay Veselka, Corpus Christi Port Commission Chief Operations Officer Sean Strawbridge, and U.S. Army Corps of Engineers Resident Engineer Andrew Smith. Coast Guard photo by Petty Officer 2nd Class Cory J. Mendenhall



Coast Guard crewmembers enforce a safety zone as the CMA CGM *Theodore Roosevelt*, a 1,200-foot container ship on its maiden voyage to the United States, passes under the recently elevated Bayonne Bridge in September 2017. The bridge connects Bayonne, New Jersey to Staten Island, New York. Captain of the port duties include ensuring the safety of the marine transportation system. Coast Guard photo by Petty Officer 1st Class Sabrina Clarke

strike a balance between safety, security, environmental protection, and the promotion of commerce.

Open and frequent communications with port stakeholders and waterway users is vital to success. This interaction can occur in traditional settings such as harbor safety committees, area maritime security committees, and incident command system port-wide exercises. Communications can also be forged through involvement in less formal venues like rotary clubs, propeller clubs, other private organizations, Chambers of Commerce, industry events, and social events.

Exercising captain of the port authority is all about managing risk. Equally critical is how that risk mitigation is communicated to partners so they understand the why, what, and how of any action being taken. Port partners are more willing to accept bad news when a COTP is communicating with them, especially when that COTP demonstrates they are listening to their concerns and ensuring they are heard. If a captain of the port is not willing to listen to their stakeholders, then trust and communication breaks down and the captain of the port may lose credibility.

## Success Factor 2: Political Acumen and Awareness

Captains of the port must be aware of several important points:

- ▶ The COTP position holds a great deal of federal authority.
- ▶ Their position grants them substantial power and influence.
- ▶ Their actions will have very real consequences that are far-reaching and could potentially affect the region, state, or nation.
- ▶ They are always in the public eye.

These points are important to keep in mind when issuing a captain of the port order or closing a waterway, either of which may have direct, unforeseen economic and environmental impacts on waterway users. On the other hand, a failure to take timely action on an emergent situation could result in a safety, security, or environmental incident. Either scenario *will* affect the public. This is important to consider in a hyper-connected society, where individuals can post actions by the captain of the port, as well as their opinions of those actions, to social media and news websites within minutes.



During the response to a collision of two vessels in the Houston Ship Channel in March 2015, CAPT Brian Penoyer, Sector Houston/Galveston captain of the port, briefs Congressman Gene Greene (far left corner) on port restrictions. Coast Guard photo by Petty Officer 3rd Class Dustin R. Williams

Another important consideration is the connection of the private sector and the public to political powers in the region. Disgruntled port partners and stakeholders may quickly call politicians and congressional representatives to vent their frustration with the local COTP. Decisions made with the informed consent of the port partners and stakeholders can diminish the potential for bad press and negative political involvement.

### Success Factor 3: Knowing the Consequences of Actions

Captains of the port have many tools at their disposal to exercise risk management within their respective ports. Past experience will help a COTP decide how to manage risk within a port, but the COTP must understand the unique nature of each port and determine what risk management looks like in that area of responsibility for that particular situation. A successful COTP must develop a process that mitigates risk and simultaneously ensures the safety, security, environmental protection, and efficiency of the port.

Economic impacts and potential ripple effects resulting from a captain of the port order must also be considered. A captain of the port can direct the movement of any vessel, order a vessel or facility to cease cargo operations, bar a vessel from entering or departing port, terminate operations at regulated facilities, close a waterway, or close

the entire port for any number of reasons. These actions have the potential to disrupt the normal operations of the port and create unforeseen ripple effects. Many of the nation's ports generate millions—or even billions—of dollars in economic activity every day. Closing a port for even a single day can have far-reaching economic impacts that can affect businesses and the national economy. A COTP's actions must take into account all of the possible impacts.

Captain of the port authorities should be exercised sparingly and judiciously. Rather than using the full weight of the authority from the outset, it is recommended that they start

with the lowest possible authority/enforcement action to gain compliance where lesser measures are appropriate. Additionally, the public assumes the Coast Guard has the authority to take action on a variety of issues when, in fact, it does not. Captains of the port are cautioned against taking action when they may not have jurisdiction or authority to do so.

### Success Factor 4: Delegation of Authority

The complexity of leading a Coast Guard sector, including exercising COTP authority, requires a strong, trusting



Seaman Kevin King keeps an eye on the electronic chart system as his 45-foot response boat-medium passes a buoy in the Tampa Bay area in September 2017. The Coast Guard in St. Petersburg spent the day evaluating the condition of the ports in the Tampa area in order to reopen the port to traffic after Hurricane Irma. Coast Guard photo by Petty Officer 3rd Class Steve Strohmaier




Ships and barges resume transit along a previously closed section of the Houston Ship Channel after responders moved a damaged chemical tanker out of the channel. In 2015, a collision between the *Carla Maersk* and *Conti Peridot* led the captain of the port to close the ship channel for three days. Coast Guard photo by Chief Warrant Officer Matthew Tilimon

relationship with the deputy sector commander and the delegation of those responsibilities that improve efficiency within the command cadre. The sector commander/COTP must also rely on department heads to cover multiple meetings within the port.

However, port stakeholders could perceive a decision to send an officer of a lower rank as a signal that the particular group or stakeholder is unimportant. A successful captain of the port will navigate port politics by creating strong relationships with port partners and trusting department heads and division officers to cover meetings when necessary. A sector commander/COTP can become a choke point if they choose not to delegate responsibilities and authorities, which becomes very important to the effective execution of daily Coast Guard missions. That said, knowing when *not* to delegate is even more important. For example, a COTP must not delegate authority for the issuance of captain of the port orders.

In conclusion, to be successful, COTPs must understand their authorities and their proper applications. They must understand the various missions within their respective areas of responsibility and routinely check up on identified hot spots. A successful COTP strives to build strong relationships with port partners, waterway users, the public, and their representatives in local government. Communication is paramount, allowing a COTP to assess situations from multiple perspectives before making a

decision. Captains of the port must learn how to listen to all sides of an issue, then move forward boldly with their authorities. A successful captain of the port leads Coast Guard members *and* industry partners to ensure the safety and security of the port. 

**About the authors:**

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*CDR Caroline Beckmann currently serves as Senior Reserve Officer at Marine Safety Unit Port Arthur, Texas, overseeing Reserve forces in the southeastern part of the state. Prior to that, she was the emergency preparedness liaison to FEMA Region 1 and spent five years on active duty. In her civilian capacity, she works in the fitness industry.*

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**Endnote:**

<sup>1</sup> Sponsored by the Coast Guard Office of Waterways Management and the Office of Port and Facility Compliance, a captain of the port study was conducted in 2014–2015 and included present and former captains of the port from 2006 through 2014.

# Coast Guard Captain of the Port

## A brief history

by LARRY BROOKS  
*Training Specialist*  
*Marine Safety Branch, Training Center Yorktown*  
*U.S. Coast Guard*

In 1916, the Black Tom Island, New Jersey, munitions terminal was the primary staging area for munitions bound for the war in Europe. On July 30 of that year, German saboteurs attacked the terminal, causing it to explode with a force 30 times more powerful than the 2001 World Trade Center collapse. Situated across the Hudson River from Manhattan, the Black Tom Island explosion shattered windows as far away as New York City and caused more than \$500 million in damage, if calculated today. Until the 9/11 terrorist attacks, it was ranked as the worst foreign terrorist attack on U.S. soil.

It also prompted the Espionage Act of 1917, which shifted responsibility for the safe transit of vessels in the United States from the U.S. Army Corps of Engineers to the Department of the Treasury, the Coast Guard's parent agency at the time. It also created the Coast Guard's captain of the port (COTP) role and the service's authority over the anchorage and navigation of ships in U.S. waters. At the conclusion of World War I, those authorities were rescinded, as the Espionage Act only applied during times

of war. The authorities were reinstated at the beginning of World War II.

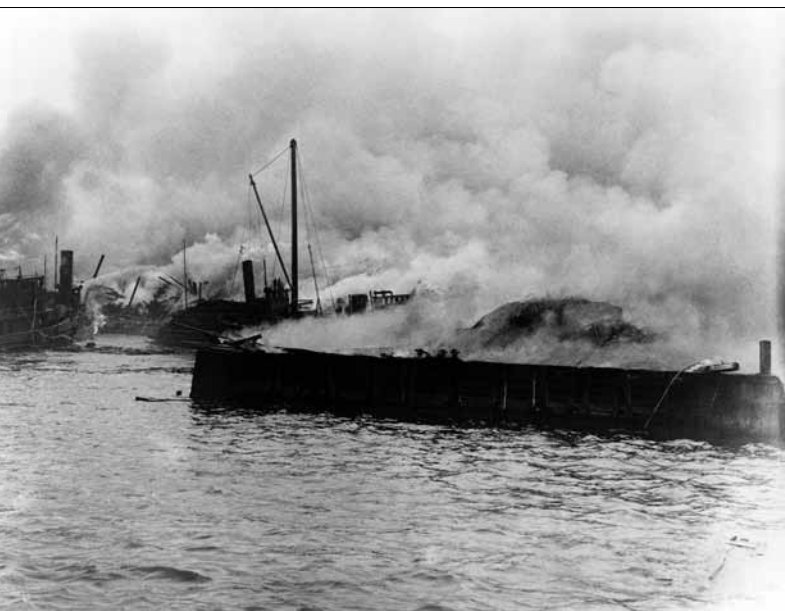
It wasn't until 1950, and the passage of the Magnuson Act, that the captain of the port role was made a somewhat permanent fixture at U.S. ports. Again, Coast Guard authorities grew from safeguarding ships to the protection of harbors, ports, and waterfront facilities. Our service's port security activities for the next two decades were not well documented, but the Coast Guard's role in



Above: Captain of the port for the Coast Guard's New York Division, CAPT Godfrey L. Carden, became the best-known Coast Guard captain of WWI. In fact, the term "captain of the port" was invented to describe his role as overseer of New York's port security. Coast Guard Collection photo



Left: Department of the Treasury Secretary William G. McAdoo served at the time of the 1917 Espionage Act. Library of Congress photo



Black Tom Island port facilities in Jersey City were destroyed in a massive explosion on July 30, 1916. Everett Historical | Shutterstock.com



Tugboats Z-Four and Valor assist CMA CGM Libra as it maneuvers into the Port of Oakland, California, in September 2015. Sheila Fitzgerald | Shutterstock.com

ports would eventually expand to include port safety and environmental protection responsibilities.

Most current sector commanders are assigned regulatory titles as part of their duties. These include COTP (see example below); officer in charge, marine inspection (OCMI); federal on-scene coordinator (FOOSC); and federal maritime security coordinator (FMSC). The search and rescue mission coordinator is not a regulatory title, though it is a responsibility defined by law for the district commander and is delegated through USCG policy to the sector level.

### **Growing Responsibilities**

In 1950, as the nation entered the Cold War, the COTP, through 33 CFR part 6, was delegated authority to address

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### **33 CFR 1.01-30 Captains of the Port**

Captains of the Port and their representatives enforce within their respective areas port safety and security and marine environmental protection regulations, including, without limitation, regulations for the protection and security of vessels, harbors, and waterfront facilities; anchorages; security zones; safety zones; regulated navigation areas; deepwater ports; water pollution; and ports and waterways safety.

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port security concerns, but not safety concerns. The statutory authority for these regulations (50 USC 191) covers the subject of “war and national defense,” so the regulations were strictly for addressing national security concerns in the ports. The regulations in 33 CFR 126 for waterfront facility inspections were not as expansive as the current version, and were limited to facilities of particular hazard, handling designated dangerous cargo, and a few controlling permits.

From 1950 until 1971, there was no COTP program manager at Coast Guard headquarters, so little guidance was provided for standardization. Originally written to ensure secure naval anchorages and management of complex port needs, the anchorage regulations in 33 CFR 110 were managed using the district commander’s authority. Ports with significant naval presence or military operations—like explosive load-outs—developed an active COTP program. In other ports, it appears there was a lot of local interpretation of the regulations and program emphasis depending upon command priorities.

In January 1970, a Navy cargo ship anchored in the Chesapeake Bay dragged anchor during a 50-knot gale and damaged a 350-foot section of the Chesapeake Bay Bridge Tunnel. It took almost two months to repair the damage. The following year, the tankships SS *Arizona Standard* and SS *Oregon Standard* collided with each other in heavy fog at the entrance of the San Francisco Bay. Since both vessels were operated by the same company, and the incident caused a major oil spill, this incident got

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Robert Price, a captain in 1971 when he was assigned as commanding officer of Base Gloucester, New Jersey, said that COTP was considered a collateral duty at the time, and port oversight was shared with the U.S. Army Corps of Engineers.

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nationwide attention. In both cases, Congress expressed concern that no agency had oversight or control of the prevention aspects of these incidents. This changed in 1972 with the enactment of the Ports and Waterways Safety Act (PWSA), which empowered the Coast Guard to control waterways when needed for safety purposes.

### Safety Authority Granted

The Ports and Waterways Safety Act authorized the Coast Guard to establish vessel traffic separation schemes for port approaches and vessel traffic services (33 CFR part 161) for ports with a high risk of casualties. Today, the Coast Guard has regulations for vessel traffic services in 10 ports and cooperative services in another three ports.

The PWSA authorized the COTPs and district commanders to establish safety zones and close or control waterways for safety purposes. These safety zones can be established on a permanent basis around vessels or facilities to mitigate risk, or they can be created specifically for planned events like powerboat races or air shows to ensure public safety. They can also be established during

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Upon signing the Ports and Waterways Safety Act on July 10, 1972, President Richard Nixon made the following statement:

*“Under this act, the Coast Guard gains much-needed new authority to protect against oil spills by controlling vessel traffic in our inland waters and territorial seas, by regulating the handling and storage of dangerous cargoes on the waterfront, by establishing safety requirements for waterfront equipment and facilities, and by setting standards for design, construction, maintenance, and operation of tank vessels. The legislation provides a firm basis for the safeguards we will need to handle increased tanker traffic with minimum environmental risk.”*

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port emergencies like oil spills or storms to manage waterways traffic. The law also provided the Coast Guard with the authority to mitigate risk by issuing orders to vessels or facilities to take action as directed. The regulations for COTP orders are in 33 CFR 160.

The Coast Guard has been involved in enforcing regulations for handling dangerous cargo for the protection of vessels, ports, and the marine transportation system since 1871. This responsibility has grown over the years to include stowage, as well as segregation and documentation of bulk, containerized, or packaged dangerous cargoes. This includes enforcement of safety, security, and marine environmental protection regulations for waterfront facilities. The facility inspection and container inspection programs are a major part of COTP duties and require specialized training and qualifications. These regulations are in 33 CFR parts 105, 126, 127, 128, 154, and 156. As the risk associated with handling a cargo increases, the COTP’s oversight will also increase.

### Expanding Duties

There have been a number of individual laws that refined or expanded Coast Guard and COTP authorities and duties. The grounding of the tankship *Argo Merchant* in 1976 off the coast of Nantucket, Massachusetts, resulted in Congress passing the Port and Tanker Safety Act of 1978. This law expanded Coast Guard authority over tank vessel cargo transfers. It also provided authority for 33 CFR part 164, which requires



Petty Officer 1st Class Ramona Mason, an operations specialist and vessel traffic service (VTS) watchstander, monitors vessel traffic in the Strait of Juan de Fuca while on watch at VTS Puget Sound, Seattle, on September 11, 2012. VTS Puget Sound watchstanders monitor maritime traffic in the Puget Sound, Admiralty Inlet, Rosario Strait, and the Strait of Juan de Fuca. Coast Guard photo by Petty Officer 3rd Class Nathan Bradshaw





Coast Guard aircrews conduct flyovers to assess the ports of Houston, Texas City, Freeport, and Galveston, Texas in August 2017. These port assessments are conducted in order to identify any damaged Coast Guard-regulated port facility, potential oil spills, or chemical release as well as any navigational obstructions along the ports. Coast Guard photo by Petty Officer 1st Class Patrick Kelley

specific navigation equipment on all vessels over 1,600 gross tons, and responsibility for the vessel master to report non-operating equipment prior to entering port. These regulations also require dual radar systems on tankships over 10,000 gross tons.

As interest in port safety was growing, so was the nation's concern for the environment. The tankship *Torrey Canyon* grounded off the coast of England in 1967, spilling over 25 million gallons of crude oil. The cleanup operations were grossly inadequate, showing a lack of planning for, or knowledge of, oil cleanup techniques. In one of many cleanup efforts, the British tried to bomb the tankship to ignite the oil. Besides being unsuccessful, it opened the tanks and helped the oil to spread. In addition, the vessel's liability for the oil spill was based on 1800s law, limiting the vessel's liability to the value of the vessel and cargo following the casualty. The value of the *Torrey Canyon* following the grounding and bombing consisted of a single lifeboat valued at \$50. The U.S. Congress took note and pushed the Coast Guard to address pollution response contingencies. In late 1967, the Coast Guard established a task force in Elizabeth City, North Carolina, to start preparing for a tank vessel pollution casualty.

Polluted waterways like Ohio's Cuyahoga River, which self-ignited on several occasions, highlighted environmental problems within the United States. In an effort to be proactive, the nation's Council on Environmental Quality recommended the Coast Guard be given a lead role in pollution response. Congress' subsequent passage of the Federal Water Pollution Control Act created the regulatory title of federal on-scene coordinator (FOSC) for the Environmental Protection Agency and the Coast Guard to share.

At the same time, it expanded COTP responsibilities by adding pollution prevention regulations for vessels and facilities. This linked the regulatory titles of COTP and FOSC. The pollution prevention regulations added the third component of COTP responsibilities for marine environmental protection, as outlined in 33 CFR 1.01-30.

The Coast Guard realized these combined responsibilities for safety, security, and marine environmental protection needed structure and policy support, so in 1971 the Coast Guard established the Office of Marine Environmental Systems ("W"). RADM Michael Benkert was the initial office chief, with oversight of operations and policy for maritime law enforcement, port safety, port security, maritime pollution, and aids to navigation.

He had a strong marine inspection background, and the new W staff soon realized many of their primary stakeholders were the same as those of the headquarters Office of Marine Inspection and Investigations (“M”). These stakeholders were the owners/operators of commercial vessels, port authorities, and waterfront facility operators.

It didn’t take long to decide that the COTP and FOSC should be combined with the OCMI at marine safety offices to provide these stakeholders with a single point of contact. By the mid-1970s, many COTP positions that had been located at groups, bases, or port safety and security stations were relocated to these new marine safety offices.

The merger created a unit with five departments:

- inspections
- investigations
- licensing
- vessel documentation
- port operations

The marine inspection offices had been staffed with mostly officers, many of whom were prior merchant mariners. These marine inspectors typically worked remotely out of the commercial shipyards and rarely returned to the main office. The port operations staff consisted mostly of petty officers who conducted the bulk of the field work for the COTP and FOSC functions. These new commands had to adjust to the difference in operational tempo between the scheduled workload with shipyard inspections and crisis management incidents surrounding pollution response.

Within a few years, cross-training programs were established for the officers that included marine inspections, investigations, pollution response, and port safety. For the most part, petty officers qualified as pollution

responders and facility inspectors. Eventually they were also instrumental in conducting freight and tank vessel compliance examinations. The marine science technician rate grew into the marine safety program’s preferred rate, yet the marine science technician “A” school curriculum did not have any marine safety-related information until the early 1990s. Other enlisted rates, particularly boatswains mate and machinery technician, staffed the marine safety offices in the early days and added great value because knowledge of their individual rate could be applied to vessel compliance or pollution response incidents.

The Vessel Documentation Office was centralized at the National Vessel Documentation Center in the early 1990s because it was a very exacting process to register a vessel under the U.S. flag. Merchant mariner licensing and documentation was also centralized in the late ‘90s and is now managed by the National Maritime Center. Several sectors have co-located regional exam centers.

As programs matured, the maritime law enforcement and aids to navigation functions found new program offices at Coast Guard headquarters. The Office of Marine Environmental Systems was merged with the marine inspection and investigations offices in 1988. With the merger, the headquarters program manager for the COTP title disappeared. Staff components for individual parts of the regulation existed at headquarters for the next 20 years, but there was no overall COTP program manager to provide guidance or policy on the use of safety zones, security zones, regulated navigation areas, anchorage grounds, marine event permits, or COTP orders again until 2010, when the CG-5512 office was created at headquarters. Eventually this office was renamed CG-WWM-1, the Waterways Policies & Activities Division, and is committed to the establishment of policies for the proper management of the nation’s maritime transportation system. //

**Acknowledgements:**

The author would like to acknowledge USCG Historian William Thiesen, Ph.D.; retired USCG Vice Admiral Robert Price; retired USCG Captain Wayne Six; and retired USCG Captain Don Taub for their contributions to this article.

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Coast Guard crewmembers from Maritime Safety and Security Team New York aboard a 25-foot response boat—small enforce a waterway security zone surrounding Washington, D.C., leading up to the 2017 presidential inauguration. State, federal, and local agencies worked together to restrict unauthorized vessel traffic navigating through the area. Coast Guard photo by Petty Officer 2nd Class Matthew S. Masaschi

# The U.S. Coast Guard Auxiliary and the COTP

## Integration and support of Coast Guard marine safety operations

by BARRY BERG  
Division Chief, Ports & Safety Division  
National Prevention Directorate  
USCG Auxiliary

Created by Congress in 1790, the United States Coast Guard fills many unique roles in that it serves as a uniformed military service, federal law enforcement agency, and federal regulatory agency. Consisting of four branches—active duty, Reserve, civilian employees, and Auxiliary—it is unlike any other agency in the federal government.

The Coast Guard's past has uniquely shaped the organization. It originated in the Treasury Department, shifted to the Department of Transportation, and finally became a part of the Department of Homeland Security (DHS). With roots in the Revenue Cutter Service, the Life Boat Service, and Steam Boat Inspection Service, it came to be

known as its modern form, for the most part, in January 1915. In January and June 1939, respectively, the United States Lighthouse Service—aids to navigation—and the Coast Guard Civilian Reserve were added.

On February 19, 1941, Congress passed the Coast Guard Auxiliary and Reserve Act, Title II, Section 201. This divided the Coast Guard Civilian Reserve in two—the United States Coast Guard Reserve, and the Coast Guard's civilian arm, the Coast Guard Auxiliary, which currently numbers 26,000 volunteers.<sup>1</sup>

Evolving with the storms of change, the Coast Guard adapts to meet its mission goals with originality and flexibility. Its Auxiliary is also unlike any other organ of the federal government. As such, the Coast Guard is relying more on integration of its Auxiliary year after year to meet those mission requirements, especially those in marine safety.

### What is the U.S. Coast Guard Auxiliary?

"Auxiliary" implies an ancillary, ex officio, or benevolent organization, which in this case couldn't be more wrong. Many liken it to its cousin, the Civil Air Patrol, or more properly the U.S. Air Force Auxiliary. The Civil Air Patrol is a patriotic civilian organization like the American Red Cross.<sup>2</sup> Thus, it is a non-governmental organization with a defined mission of providing emergency services, education, and a cadet corps focusing on aerospace.

The Auxiliary is a uniformed volunteer branch of the Coast Guard.<sup>3</sup> In contrast to the branches that are paid, auxiliaries are enrollees,<sup>4</sup> and as such are strictly prohibited by law from military action or direct



A Coast Guard auxiliariist observes the partially submerged fishing vessel *Perseverance*. The crew abandoned the vessel after it struck a rock and began taking on water in Icy Strait near Spasski Island, Alaska. They were rescued by the crew of the vessel *Whittle Wall* and taken to Hoonah, Alaska. Coast Guard Auxiliary photo courtesy of Mike and Noreen Folkerts



Coast Guard Auxiliarist Cheryl Little, flotilla staff officer-marine safety, right, assists Petty Officer 3rd Class Danny Bast in collecting soil samples from a mock oil spill on the shore of Tampa Bay, Florida. The field training exercises were hosted by the Sector St. Petersburg Response Department as part of federal on-scene coordinator representative training. Coast Guard Auxiliary photo by Patti Kuhn

law enforcement. During his 2010 State of the Coast Guard address, ADM Thad Allen, 23rd Commandant of the Coast Guard, was asked his opinion of the Coast Guard Auxiliary. To paraphrase his response, they are the best-kept secret in all Washington. They are dedicated, enthusiastic, and work for free.

### **A Bit of History: The Auxiliary's Evolution into Coast Guard Integration**

Congress created the Coast Guard Auxiliary as the Coast Guard Reserve in 1939. They were trained as volunteer forces to augment active duty Coast Guard forces, working primarily with recreational boating. By assigning this mission to its Reserve, it was free to apply more resources to its other defined missions.

As early as May 1940, well in advance of the Japanese attack on Pearl Harbor, President Roosevelt and key members of government realized, "...that it was probably a question of when, not if, the United States would be drawn into war."<sup>5</sup> Forward-thinking members of government saw a need for a rapid expansion of all U.S. military branches, including the Coast Guard, which needed personnel to engage in both military and law enforcement. In February 1941, Congress changed the Civilian Reserve to the United States Coast Guard Auxiliary, making room to create a military reserve similar to the other

military services.<sup>6</sup> Those not able to engage in combat support or not eligible for military service for age or health reasons were transferred to the Auxiliary, thus using civilians to augment and support the home front.

There were times auxiliarists and reservists were "performing jobs that were indistinguishable from each other, and no one seemed to mind."<sup>7</sup> This included dangerous jobs like attacking German submarines in U.S. coastal waters. By 1943, as production of coastal destroyers began to catch up, this mission was abandoned and the Auxiliary took up more civilian duties, such as recruiting, blood drives, coastal patrol, and Coastwatchers.<sup>8</sup> By 1944, civilian aircraft and marine radios were allowed to aid in search and rescue missions, freeing up military resources.

After the war, the emphasis of the Auxiliary returned to its roots of recreational boating safety and boater education, yet part of the initial mandate remained unfulfilled—"to facilitate the operations of the Coast Guard."<sup>9</sup>

Recreational boating safety remained the Auxiliary's focus from the 1950s until the early 1990s.<sup>10</sup> During the same period, Congress expanded the Coast Guard's missions. In 1976, the Coast Guard commissioned a study by a private research firm that concluded, "In summary, we consider the Auxiliary the greatest economical resource readily available to the COGARD (*sic*). It performs in an outstanding manner and its personnel are among the most professional group of volunteers in the nation..."<sup>11</sup> Another study done at about the same time similarly complimented the work done by the Auxiliary, but urged the regular Coast Guard to do a better job of using Auxiliary resources and play a bigger role in its administration. One sentence in the report echoed many auxiliarists' sentiments then and now: "Many Coast Guard personnel are not familiar with the Auxiliary, nor aware of its capabilities."<sup>12</sup>

Around 1990–1991 the Coast Guard Active Duty began to integrate the Auxiliary into day-to-day operations augmenting Coast Guard offices, flying as observers in C-130s, inspecting commercial fishing vessels, and qualifying as Coast Guard boat crew.<sup>13</sup> This culminated with the Coast

Guard Appropriations Act of 1996,<sup>14</sup> in which Congress specified under Section 822:

*The purpose of the Auxiliary is to assist the Coast Guard as authorized by the Commandant, in performing any Coast Guard function, power, duty, role, mission, or operation authorized by law.*

This change in law allowed the Auxiliary to integrate into Coast Guard operations as long as auxiliarists served in non-military roles and avoided the direct law enforcement terms of U.S. Code, Title 14.

The beginning of the 21st century opened two major portals to integration of the Auxiliary:

- In 2000, the commandant authorized the Marine Safety Qualification Insignia to recognize professional accomplishment by qualifying active duty, Reserve, civilian, and Auxiliary personnel serving the marine safety mission.<sup>15</sup>
- In response to the 9/11 terror attacks, the Coast Guard Auxiliary was called upon to integrate with Coast Guard surge operations. This marked the beginning of Coast Guard reliance on Auxiliary participation during events of national significance.

The use of qualified auxiliarists allows the COTP to make more effective use of his or her staff. For example, a marine safety team consisting exclusively of active duty personnel can only perform one inspection at a time. By adding two trained, qualified auxiliarists, this allows doubling capacity without changing the budget or billets.

What does that mean to the Coast Guard? In 2007, the Coast Guard concluded that the worth of each auxiliarist was between \$2,850 and \$2,927 annually, reporting, “The CG receives close to \$70 million worth of work from the Auxiliary organization each year, following the subtraction of \$14M in expenses.”<sup>16</sup>

### How Does the Auxiliary Integrate?

14 USC §821 (a) specifies that the Coast Guard Commandant is responsible for management of the Auxiliary. The headquarters unit delegated by the commandant for this task is the Office of the Chief Director of the Auxiliary. The website of the chief director’s office states, “The United States Coast Guard Auxiliary is the uniformed volunteer component of Team Coast Guard.”<sup>17</sup>

Let’s focus on what this author believes is the most important word in that sentence—*volunteer*. In any organization, especially in those dedicated to public service, what’s the difference between a person who volunteers and paid staff? Except for remuneration, nothing! They work alongside each other, often doing the same

job. The same level of professionalism and dedication is expected from both.

What, then, is the value of a volunteer? In the Fall 2010 issue of *Proceedings*, CDR David Chareonsuphiphat said that Auxiliary personnel’s 2009 contributions were equivalent to that of 2,186 full-time Coast Guard employees. Allowing a value of \$20.25 per volunteer hour, that translates to an estimated savings of \$91 million for the year.<sup>18</sup> Add in the costs of current and future personnel benefits that were saved, and the value is even greater.



Auxiliarist Don Garvey and marine science technician Gregory Steiger, MSD-St. Paul, Sector Upper Mississippi River, ready the boom for deployment during a 2015 joint boom exercise on the Mississippi River. In the background, Auxiliarist Matthew Stokes unloads a trailer. Coast Guard photo by MSTC Mary K. Strauss

The Coast Guard requires force readiness and work-force training for all of its branches, including the Auxiliary. Beyond this, it encourages interested auxiliaries to meet the same rigorous competencies it expects from its paid staff to enable them to assist in day-to-day operations. When a Coast Guardsman has achieved at least four qualifications and spent a minimum of 5 years in the marine safety field, they are eligible to be awarded the Marine Safety Professional Device. While the Auxiliary version of the device is slightly different, the determination and dedication required to earn it is the same.

Only minor differences exist between an auxiliary and an active duty Coast Guardsman's personal qualification standards. Those differences involve tasks the law prohibits auxiliaries from engaging in, or directives from the commandant.

While the qualification standards are nearly identical, active duty personnel are expected to complete them in about 240 hours, or a minimum of 10 hours per week for about six months. As volunteers, auxiliaries generally take between one and two years to complete the same qualification.

Sometimes a qualification can be obtained through an intensive 15- to 20-day course of study at a Coast Guard training center, or "C-School." Based on the value auxiliaries provide the Coast Guard, additional value might be had by allocating more C-School slots for these dedicated volunteers, as most auxiliaries almost never attend these courses. Regardless, both groups are held to the same standards. When they have completed this process, the captain of the port designates in writing that this person is awarded the qualification. To harken back to my previous comments about volunteers, you can see there is no difference, except remuneration.

### **Integration—Regular Day-to-Day Operations**

Defined by Congress, day-to-day Coast Guard operations include 11 statutory missions.<sup>19</sup> Auxiliaries can be found working in all but four missions—drug interdiction, migrant interdiction, defense readiness, and law enforcement. Even in those excepted missions, auxiliaries play a supporting role, whether administratively or in a minor adjunct role.

While all volunteer contributions are regarded as valuable and cost effective, the importance of auxiliaries who have achieved the marine safety professional designation should be noted. Because their tasking is the same as their active duty counterparts, their hours spent on those activities should not be counted as adjunct hours, but rather as full-time equivalent (FTE) hours. The business world uses FTEs as a means to reference the costs and productivity of any project, task, or job.

Certain mission areas can benefit from an influx of additional qualified auxiliaries. For example, while Coast Guard policy does not allow for auxiliaries to work near HAZMAT areas in pollution operations, these volunteers can supervise oil spill removal organization (OSRO) boom deployment at environmentally sensitive areas safely downstream from the actual pollution site. This enables either a significant reduction in active duty call-out or an increase in the operational productivity and tempo.

The Coast Guard, being a small force, does not densely populate its geographic areas of responsibility. Currently, if a spill is reported outside of the unit's physical office location, two unit members are dispatched to observe and report. This can disrupt normal operations from four hours up to two days. As an alternative, auxiliaries from the local area of the spill can be dispatched to view and photograph the spill, sending observations back to the unit. This can result in the command staff receiving vital information in minutes and with limited disruption of normal operations. If the incident warrants it, trained auxiliaries can supervise OSRO operations until active duty personnel arrive to assume responsibility.

This is just one of many situations where commanders can enhance staff and capabilities without additional impact to staff task load or billet count. The Coast Guard Auxiliary provides a pool of personnel almost as large as that of active duty Coast Guard, and with some investment in training, commanders can potentially augment



Auxiliary Rusty Pumfrey, one of about 60 Coast Guard Auxiliaries activated for service during Hurricane Harvey and its aftermath, works in the Houston incident command post September 17, 2017. Pumfrey was a deputy liaison officer for the post-Harvey oil and hazardous material recovery effort led by the Environmental Protection Agency. Coast Guard photo by Chief Petty Officer John Masson



Crewmembers aboard the Coast Guard Cutter *Vice* escort the *Jose Gaspar* pirate ship during the 2017 Jose Gasparilla Pirate Invasion in the Port of Tampa, Florida. Photo by Coast Guard Auxiliarist George Papabeis

understaffed missions. This is an important tool in any commander's quiver.

Independent Sector,<sup>20</sup> a leadership forum of charities, foundations, and corporate giving programs, valued volunteer labor in 2016 at \$24.14 per hour. For the calendar year 2017, auxiliarists directly contributed just over 60,000 hours to marine safety missions, not counting administrative time.<sup>21</sup> This is worth nearly \$1.5 million in direct attributable labor, and this value does not include the cost of employee benefits saved.

Allowing for more auxiliarists to receive on-the-job training or attend C-School would create more marine safety-qualified auxiliarists and a larger pool of qualified individuals available for a commander's discretionary use. The caveat is that these qualified people must be regularly used to keep their skills current—not just trained and then forgotten.

Since the Coast Guard Appropriations Act of 1996, there has been an increasing trend for integration of the Auxiliary into day-to-day operations, most especially in marine safety. As the relationship between the Coast Guard and its Auxiliary has evolved, so has the history of policy changes encouraging commanders to integrate

auxiliarists into unit operations,<sup>22</sup> including the commander's auxiliary policy statement to unit commanders.<sup>23</sup> However, while the vector of Coast Guard policy points to integrating auxiliarists into sector operations, a lack of understanding regarding auxiliarist capabilities and skill levels often prevents the use of potentially qualified individuals.

### **Integration—Incident Management**

By their very nature, surge operations are difficult for any organization. When Coast Guard personnel are deployed for emergencies, individual units, as well as the commercial entities they serve, are affected.

While only a few members of a unit may be deployed, it can be a large percentage of the unit's prevention staff. Long-running incidents, like Deepwater Horizon, can require individuals to make multiple deployments, affecting unit efficiency and retention.

A force of trained Auxiliary personnel with the same day-to-day experience as active duty personnel can backfill the unit with sufficient qualifications to function at normal staffing levels. Trained auxiliarists also provide a pool of deployable personnel available for the affected

## Current Marine Safety Qualifications Available to Auxiliarists

- Auxiliary Assistant Container Inspector (AUX-EC)
- Auxiliary Assistant Barge Inspector (AUX-BI)
- Auxiliary Assistant Contingency Planner (AUX-ACP)
- Auxiliary Assistant Facility Inspector (AUX-EU)
- Auxiliary Assistant Foreign Freight Vessel Examiner (AUX-FFVE)
- Auxiliary Assistant Foreign Passenger Vessel Examiner (AUX-FPVE)
- Auxiliary Assistant Hull Inspector (AUX-HI)
- Auxiliary Assistant K-Boat Inspector (AUX-KI)
- Auxiliary Assistant Life Raft Inspector (AUX-LR)
- Auxiliary Assistant Machinery Inspector (AUX-MI)
- Auxiliary Assistant Machinery Inspector—Steam (AUX-MS)
- Auxiliary Assistant Marine Casualty Investigator (AUX-FO)
- Auxiliary Assistant Maritime Enforcement Investigator (AUX-EO)
- Auxiliary Assistant Pollution Responder (AUX-ED)
- Auxiliary Assistant Port State Control Examiner (AUX-PSCE)
- Auxiliary Port State Control Dispatcher (AUX-PSC)
- Auxiliary Assistant Suspension and Revocation Investigator (AUX-FN)
- Auxiliary Assistant T-Boat Inspector (AUX-TI)
- Auxiliary Uninspected Passenger Vessel Examiner (AUX-UPV)
- Auxiliary Assistant Waterways Management Representative (AUX-WM)

Find more information on these qualifications at [www.uscgaux.info/content.php?unit=P-DEPT&category=ms-pqs](http://www.uscgaux.info/content.php?unit=P-DEPT&category=ms-pqs)

area, allowing commanders an effective tool during surge operations and improving continuity of forces. In this author's opinion, unit commanders need to look outside of their office cubicles and creatively apply the virtual pool of talent before them. To capitalize on this option, needs must be anticipated and integration must begin with training and then merging this workforce into regular operations before the surge demands it.

### In Conclusion

As a volunteer force, the Auxiliary is mostly comprised of older individuals who wish to dedicate their retirement

to public service. They bring to the Coast Guard their time and their passion for public service. Many have led successful careers in civilian and military occupations. This provides the Coast Guard with new and sometimes unique solutions to problems.

At present, less than 0.5 percent of Auxiliary members are actively involved in the professionally demanding area of marine safety. There is a reservoir of talent out there that has demonstrated its perseverance, dedication, and enthusiasm. When added to their active duty shipmates, this resource pool could infuse the Coast Guard with cost-effective solutions, helping to enhance the very DNA of the service to which they have pledged themselves. //

### About the author:

*Barry Berg has served in the USCG Auxiliary for 11 years. He has held many staff officer positions, principally in communications and marine safety, at the flotilla, division, district, and national levels. He has earned the Auxiliary Marine Safety Professional Device and is a three-time recipient of the Auxiliary Achievement Award. He currently volunteers part-time as the designated Auxiliary unit coordinator at Marine Safety Detachment St. Paul, Sector Upper Mississippi River, Eighth Coast Guard District. A former IT professional, he created the first America's Waterway Watch website for Coast Guard headquarters. While active in many marine safety roles, his passion lies in environmental outreach education, serving as a guest lecturer to undergraduate elementary education teachers on science methods techniques for environmental awareness.*

### Endnotes:

- <sup>1</sup> <https://cgaux.org>, referenced June 2018
- <sup>2</sup> Both named in federal statutes 36 USC Subtitle II (b) §403 (§§40302 to 30307)
- <sup>3</sup> 14 USC §821—832
- <sup>4</sup> The preceding 3 segments under the terms set forth in 14 USC are employees. The role of Auxiliarists changes when on assignment to duty, when they assume the same status as employees, per 14 USC §832. When they join, Auxiliarists are enrolled rather than hired.
- <sup>5</sup> Susan Dunn, "The Debate Behind U.S. Intervention in World War II." *The Atlantic*, July 8, 2013.
- <sup>6</sup> <http://www.uscgaux.info/content.php?unit=081&category=auxiliary-history>
- <sup>7</sup> <http://www.uscgaux.info/content.php?unit=130-05-03&category=uscg-aux-history>
- <sup>8</sup> Ibid.
- <sup>9</sup> <http://www.uscgaux.info/content.php?unit=081&category=auxiliary-history>
- <sup>10</sup> <http://www.uscgaux.info/content.php?unit=130-05-03&category=uscg-aux-history>
- <sup>11</sup> Ibid.
- <sup>12</sup> Ibid.
- <sup>13</sup> Ibid.
- <sup>14</sup> [www.gpo.gov/fdsys/pkg/PLAW-104publ324/pdf/PLAW-104publ324.pdf](http://www.gpo.gov/fdsys/pkg/PLAW-104publ324/pdf/PLAW-104publ324.pdf)
- <sup>15</sup> ALCOAST 183/01
- <sup>16</sup> <http://www.uscgaux.info/content.php?unit=081&category=auxiliary-history>
- <sup>17</sup> [www.uscg.mil/Our-Organization/Auxiliary/](http://www.uscg.mil/Our-Organization/Auxiliary/)
- <sup>18</sup> CDR David Chareonsuphithat, "Return on Investment: The value of the U.S. Coast Guard Auxiliary," Proceedings of the Marine Safety & Security Council, Fall 2010, pp. 73–75.
- <sup>19</sup> [www.gocoastguard.com/about-the-coast-guard/discover-our-roles-missions](http://www.gocoastguard.com/about-the-coast-guard/discover-our-roles-missions)
- <sup>20</sup> [www.independentsector.org/resource/the-value-of-volunteer-time/](http://www.independentsector.org/resource/the-value-of-volunteer-time/)
- <sup>21</sup> Data source: AUXDATA, the Coast Guard official record-keeping database for the USCG Auxiliary
- <sup>22</sup> <http://www.uscgaux.info/content.php?unit=P-DEPT&category=alcoast-archive>
- <sup>23</sup> [www.uscg.mil/Portals/0/OurOrganization/auxiliary/CGA\\_Policy.pdf](http://www.uscg.mil/Portals/0/OurOrganization/auxiliary/CGA_Policy.pdf)



# The Coast Guard's Waterways Management Program

Past progress, future direction

by LCDR WILLIAM ALBRIGHT  
*Waterways Program Manager  
Office of Waterways & Ocean Policy  
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LCDR ERIC STAHL  
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Coast Guard management of waterways is a complex endeavor essential to the nation's marine transportation system (MTS). The purpose of waterways management is to provide mariners access to navigable waterways; facilitate effective, efficient movement of commerce to and from intermodal connections; and promote a safe, secure, and environmentally sound marine transportation system as a component of the national transportation system. It requires an understanding and balancing of competing priorities—safety, security, facilitation of commerce, stakeholder perspectives, and even political acumen and the ability to articulate clear, well-thought-out positions.

One of the more powerful tools used to manage waterways is the captain of the port authority, which is vested in the sector commander. This authority ties together the agency's 11 Homeland Security and non-Homeland Security missions (see sidebar this page) within America's navigable waters.

For many years, waterways management (WWM) has served a crucial role within the Coast Guard sectors' command cadres. It often serves as a bridge between the Coast Guard and the public, as well as between the service's prevention and response missions. Other articles in this edition explain in more detail the variety of ways WWM provides a vital service to the nation's ports and waterways.

Within the Coast Guard's Office of Waterways and Ocean Policy (CG-WWM) under the Marine Transportation Systems Directorate (CG-5PW), the Waterways Policies and Activities Division (CG-WWM-1) is responsible for the identification of policy and planning needs associated with WWM and marine transportation system issues. This small division puts out policies delineating and supporting Coast Guard field activities in WWM and devising strategies that anticipate and set the service's responses to emerging practices among ports and waterways stakeholders. Thus, while the Coast Guard's

day-to-day WWM activities occur at districts and field units throughout the nation, CG-WWM-1 provides the overarching guidance, policy, and training to make it happen.

In the wake of the September 11 terror attacks, and during the years of the global war on terrorism, WWM in general experienced significant organizational churn and wildly diverse sets of public and government demands. Over the last several years, the division of CG-WWM-1 has made significant progress in calming this churn and prioritizing those demands. Despite this progress, much work remains to improve program functionality, develop emerging policy and work processes, enhance public-private partnerships, and offer opportunities for junior service members to chart their careers in the program. What follows is a discussion of recent history, accomplishments, goals, and the program's direction for the next five years.

## Section 888 of the Homeland Security Act of 2002 defines Coast Guard missions as:

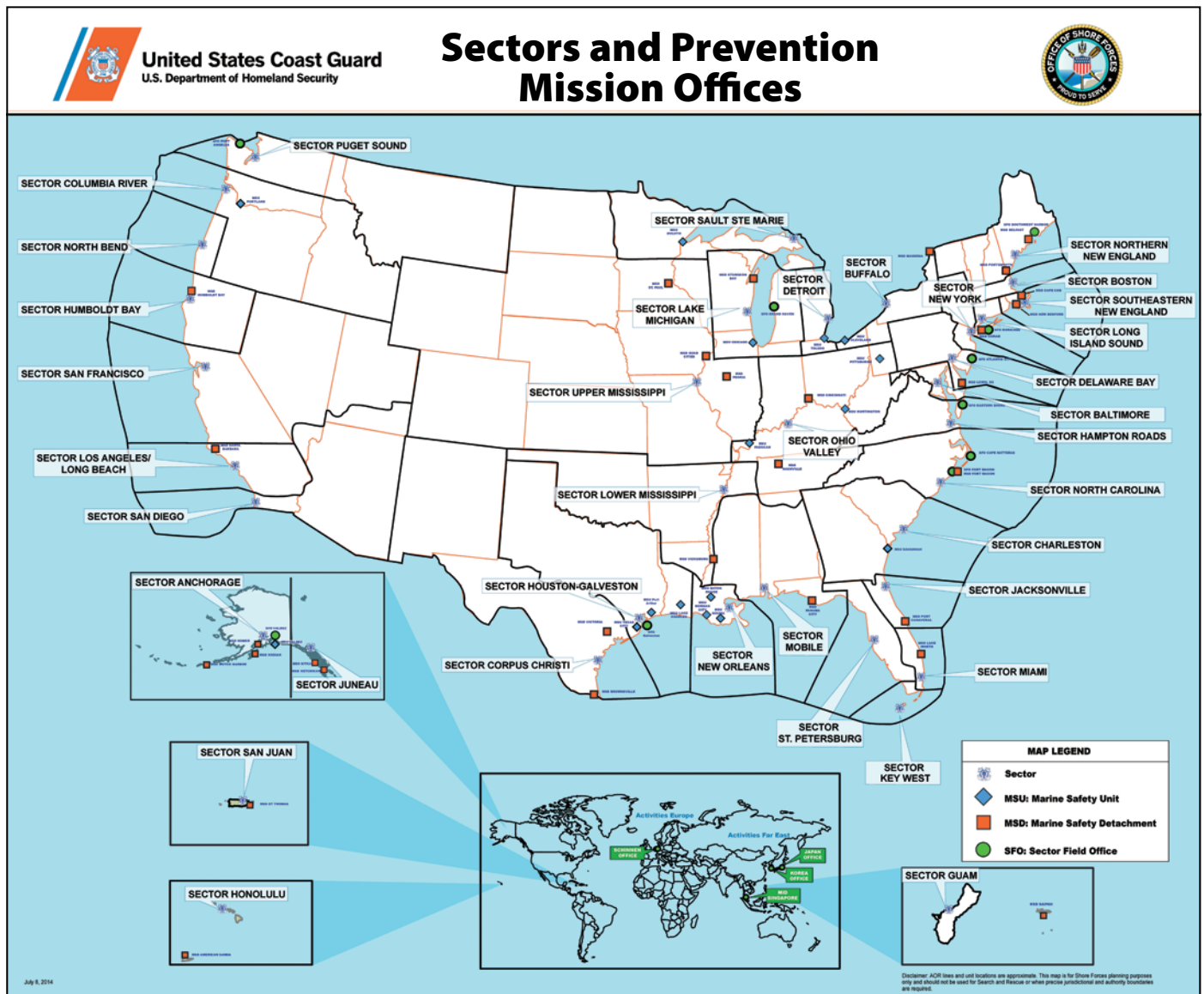
<b>Non-Homeland Security Missions</b>	<ul style="list-style-type: none"><li>• Marine safety</li><li>• Search and rescue</li><li>• Aids to navigation</li><li>• Living marine resources (fisheries law enforcement)</li><li>• Marine environmental protection</li><li>• ICE operations</li></ul>
<b>Homeland Security Missions</b>	<ul style="list-style-type: none"><li>• Ports, waterways, and coastal security</li><li>• Drug interdiction</li><li>• Migrant interdiction</li><li>• Defense readiness</li><li>• Other law enforcement</li></ul>

## Past History and Recent Successes

The past 12 years have significantly altered the Coast Guard's marine safety and prevention missions. Prior to the creation of sectors in the early 2000s, the Coast Guard's organization at marine safety offices clearly delineated the captain of the port (COTP) and the officer in charge, marine inspection (OCMI) authorities and roles. However, the creation of sectors relocated traditional marine safety office functions that used COTP authority to various divisions within the new prevention-response organization. Pollution incident response and contingency planning merged with other incident response and management functions. The consolidation of vessel and waterfront facility compliance activities with WWM and the aids to navigation mission under the new prevention department further blurred the formerly bright line between COTP and OCMI authorities and roles. As service members

adapted to the new architecture, subject matter expertise specific to COTP authorities became diluted across the entire shoreside service.

By 2010, the reorganization into sectors and the Coast Guard's emphasis on vessel compliance activities meant that the WWM program had fewer than 100 dedicated billets. By that time, both the standard guide for personnel qualification (PQS) in WWM and the *Marine Safety Manual* (Volume VI), WWM's foundational doctrine, last updated in 1986, were significantly outdated. There was no formal "C" school at Coast Guard training centers to set baseline understanding among service members for COTP authorities and WWM responsibilities. Qualification in other prevention specialties commonly thought to sufficiently explain COTP authorities did not serve to explain many of the more nuanced aspects of WWM. Among these were harbor safety committee engagement,





USCG Sector Puget Sound, co-located with USCG Base Seattle, pictured here, is one of many Coast Guard port locations providing waterways management services. Coast Guard photo

anchorage management, and field unit responsibilities within highly specialized programs like marine planning and the permitting of bridges and marine events. These facts were not lost on Coast Guard leadership or ports and waterways stakeholders.

From 2010 on, serious work began to resurrect the Coast Guard's WWM program. In April 2011, ALCOAST 197/11 announced *Project Trackline*, designed to focus this resurrection, alongside other programs, in three major areas: program structure, people, and leadership. By 2013, these areas had become distilled to three parallel lines of effort:

- review and validation of the program's strategic missions, ultimate ends, concepts of organization and operation, and performance results
- comprehensive workforce analysis to ensure proper training, assignment, and career development for personnel
- comprehensive analysis of the program's doctrine and policies, including interagency agreements and joint work processes, to result in enhancement of its information and decision support systems

The Waterways Policies and Activities Division, bolstered by headquarters offices and field unit commanders, completed some very noteworthy tasks and accomplished significant milestones as follows:

- defined the core elements of WWM

- published nine tactical procedures related to COTP authorities, limited access areas, marine event permitting, and other WWM issues
- created the first professional "C" school and industry internship programs for WWM
- redesigned the WWM workforce structure, including the redesign of billet paygrades to more closely match job responsibilities
- completely revamped the standard guide for PQS
- defined the requirements for Coast Guard officers to earn recognition as a waterways management career specialist—the Operations Ashore Prevention (OAP13) code within the Officer Specialty Management System

By 2015, *Project Trackline* was complete and the program was well on its way to recovery and being recognized as not only a critical element of the prevention mission, but also as essential to all Coast Guard missions.

### Future Direction

Unquestionably, the Coast Guard's role in the management of the nation's waterways and marine transportation system will remain one of the cornerstones of the service's marine safety mission. Ports and waterways operators continually adopt new systems and services such as commercial space vehicle recovery, autonomous

vessels and port equipment, and expanded public-private partnerships for infrastructure development. In order to maintain consistent regulatory oversight of ports and waterways operations, the WWM program must likewise continue to monitor such advancements and adopt new technologies and procedures when the service's existing methods are no longer relevant. This requires a constant eye on the balance between oversight and the impact of such oversight on the Coast Guard's government partners, ports and waterways stakeholders, and U.S. taxpayers.

To achieve this balance, over the next five years, the Waterways Policy and Activities Division will continue to focus on four areas of effort, building on our past successes:

- *Program Structure*: optimize the structure of the program at all levels of the organization
- *People*: enhance the professionalism and competencies of the program's active duty, reserve, and civilian workforce
- *Leadership*: provide programmatic leadership by refining the program's suite of policy, doctrine, and guidance

- *Partnerships*: foster partnerships with other government agencies, members of the public, and the maritime industry

Key lines of effort within these four areas include:

- Identify and address policy gaps and legislation changes relevant to emerging practices among national ports and waterways operators and their international counterparts
- Redefine long-held measures of activity to more appropriately capture district and field unit performance within the WWM program, including identification of metrics suitable for use as key performance indicators
- Refine workflow processes and technologies to reduce workloads on waterways managers and to simplify public and private stakeholders' interactions with districts and field units
- Assist Coast Guard leadership in determining optimal workforce structures throughout the program using performance indicators
- Refine the WWM "C" school curriculum to address subjects emerging at districts and



Coast Guard Cutter *Webber*, the service's first fast response cutter, arrives at Coast Guard Sector Miami. The Coast Guard's maritime transportation system management program ensures safe, efficient, secure, and environmentally sound waterways essential to the flow of goods and commerce. Coast Guard photo by Petty Officer 2nd Class Kelley Parker



At Sector Houston-Galveston, Texas, Petty Officer 2nd Class Adrian Ortegon moves cards along the vessel traffic service's manual board used to track vessels while the automatic identification system is down for maintenance in 2016. The Coast Guard provides these services in major ports throughout the United States as a way of communicating to various mariners about port conditions that would affect safe transit in and out of ports and waterways. Coast Guard photo by Petty Officer 3rd Class Jennifer Nease

field units that require baseline, common understanding among all waterways managers

- Refine and expand the performance standards and training aids for the qualification of district and field unit waterways managers—active duty, reserve, and civilian
- Develop programs to provide incentives for existing and future officer and enlisted workforce specializations in WWM
- Leverage authorities and interagency relationships at all levels of government to holistically manage the marine transportation system
- Foster new and improve existing lines of communication among waterways stakeholders, chiefly by enhancing the Coast Guard's commitment to harbor safety and other public-private committees

These lines of effort recognize that progress still needs to be made to fill WWM billet gaps at sectors, right-size the billet pay grades, assign properly qualified people, and establish a clear career path for WWM professionals into senior leadership positions. While the division has defined numerous strategic objectives within these lines of effort, attributing specific performance indicators to these objectives will require ongoing collaboration with the program's partners to ensure that the program's activities remain relevant and targeted. As noted above, the diverse nature of activities among field unit waterways managers will require the Waterways Policy and Activities Division to leverage all of its working relationships. Among these are Coast Guard districts, field units, and training center personnel, as well as partner government agencies and ports and waterways operators.

As with any program or mission, the future successes of waterways managers and the program will stem from the policies and strategic objectives of today, based on the progress achieved in the past. Because WWM activities deal directly with industry partners and local governments, and clearly affect the successes of local economies and public perception, the service must continue to support the development of WWM training regimens, career specialization, and workforce management.

In summary, WWM is a critical element of the health of the nation's MTS, which supports millions of American jobs, creating significant local, regional, and national economic benefits. It facilitates trade, moves passengers and goods, and allows America's economy to remain globally competitive. Additionally, effectively managed waterways are essential to all 11 Coast Guard missions. It is therefore important to have a well-trained and competent workforce of Coast Guard personnel along with a comprehensive set of regulations, procedures, and practices to vigilantly carry out WWM duties. ■

**About the authors:**

*LCDR William Albright has served in many capacities during his nearly 14 years in the U.S. Coast Guard. Most recently, this included serving as the inaugural waterways management industry trainee in 2016, the supervisor of MSD Homer, and a waterways management program manager at Coast Guard headquarters. He has received three Coast Guard Commendation Medals, a U.S. Army Achievement Medal, and a Letter of Commendation.*

*LCDR Eric Stahl joined the U.S. Coast Guard in 1997. His assignments have included two cutters, marine inspections and investigations tours, and as an international port security liaison officer to Southeast Asia. He has received two Meritorious Service Medals, the Coast Guard Commendation Medal, and two Coast Guard Achievement Medals.*

# Dynamic Under Keel Clearance Project

by LCDR ISAAC D. MAHAR

*Division Chief*

*Waterways Management*

*U.S. Coast Guard Sector Los Angeles-Long Beach*

The Ports of Los Angeles and Long Beach are critical to the economic vitality of California and the rest of the country. The port complex is 4,300 acres, including 43 miles of waterfront, 270 berths, and 86 gantry cranes. It also produces \$235 billion in trade annually as of 2016. Combined, these ports have the largest container complex in the U.S., representing 40 percent of the nation's containerized cargo. More than 50 percent of California's oil comes through the port complex. Also of note, the Port of Long Beach's Pier 121 has the deepest supertanker berth on the West Coast.

Oil imports are an important part of the overall economic picture, and they are increasing. There were 4,405 total transits in 2015 and 4,601 in 2016. Oil tanker transits accounted for 632 transits in 2015 and 637 in 2016, and the trend is up. This means that an increasing number of ships—and ships of greater and greater size—are transiting in and out of this port complex with limited capacity.

A typical supertanker is around 1,100 feet long, 200 feet wide, and weighs over 300,000 metric tons. These vessels also have extremely deep drafts, often 65 feet or more. The channel into the Port of Long Beach is dredged to a depth of 76 feet. The U.S. Coast Guard captain of the port, in accordance with the harbor safety plan, requires a 10 percent safety margin, which allows tankers with a draft of 69 feet or less to enter Long Beach. For many years, as an additional safety precaution, it was agreed that maximum drafts would be limited to 65 feet, however. This presents a challenge: How do you increase the flow of product into the port while also reducing risk? More specifically—without additional dredging, how do you safely get vessels with drafts deeper than 65 feet into the port?

## **The Solution: Dynamic Under Keel Clearance Project**

If there was a better way to measure the sea conditions and other factors impacting a vessel, especially a ship's

pitch and roll—put simply, if we could *know* instead of guess—a more precise prediction could be made for the under keel clearance needed. As the word “dynamic” implies, each transit should be measurable and specific, rather than a one-size-fits-all approach. The process should be scientific, nuanced, and repeatable. Why not use advanced technology to better predict the safety margin actually required?

**In 2016, the ports of Los Angeles and Long Beach produced \$235 billion in trade.**

The good news is that tools to improve the process already exist. A software group out of the Netherlands, Charta Software, has been using a system they developed which measures tides; currents; wave conditions; channel depth; ships' course, speed, pitch, and roll; and numerous other factors to predict the required under keel clearance with adequate safety factors

specific to each vessel. This system has been used successfully in the Netherlands by the Ports of Rotterdam, Amsterdam, and Eamshaven. Captain John Strong, vice president of the Jacobsen Pilot Service—Long Beach Pilots made a transit with Dutch Pilots and brought the idea of using the system back to Long Beach.

In 2014, a partnership was formed between the Jacobsen Pilots, the Port of Long Beach, the California Office of Spill Prevention and Response, and Tesoro (now Andeavor), which owns and operates Pier 121. Also involved was the Marine Exchange of Southern California as well as numerous partners cooperating through the vital harbor safety committee, including U.S. Coast Guard captain of the port Charlene Downey. In addition, the tools and expertise of the Coastal Data Information Program (CDIP), National Oceanic and Atmospheric Administration (NOAA), Southern California Coastal Ocean Observation System, and U.S. Integrated Ocean Observing System were used. Technical and subject matter experts using weather measuring systems in Europe were consulted.

In the same year, a memorandum of understanding was signed laying out the goals and phases of the project.



The *Eagle Varna*, with a 67-foot draft, transits to a Long Beach berth. Andeavor Marine Operations Manager photo by Captain Rob McCaughey

The agreed-upon goal was simple: to have an accurate and reliable prediction model that could be applied to Long Beach. The first phase was a feasibility study, then validation through operational tests, and finally, an implementation or refinement phase.

The goals of the interagency mission agreement were to increase safety, improve effectiveness, and reduce emissions. Safety would be improved through the transits themselves by having a scientific method for predicting under keel clearance requirements, thus reducing the chance of groundings. Overall efficiency benefits would be seen by having a better means to calculate arrival times to the port, thus decreasing time at anchorage. Lastly, emissions would be reduced by simply having larger but fewer vessels with an overall decrease in stack emissions per cargo ton, as well as by cutting down on the number of required lightering operations.

### **Progress So Far**

The feasibility study was successfully completed in 2015. First, the advanced measurement system used updated

NOAA weather as well as CDIP buoy inputs for the local area. In the summer and fall of 2015, additional analysis and validation was realized through observing 20 supertanker transits. Predictions were then compared with real-time “Octopus” measurements. The Octopus is a monitoring device that connects directly to the ship’s bridge to record vessel movement information that is displayed on a laptop using proprietary software.

In 2016, an additional 10 transits were completed, further improving and validating the model. In December 2016, when the project findings were presented to the harbor safety committee and the Coast Guard captain of the port, it was agreed that the maximum draft could be increased from 65 to 69 feet, increasing gradually by one-foot increments. In 2017, the project took a dramatic leap forward with the implementation phase of the project. On April 8, 2017, the first 66-foot-draft supertanker, the *Gem No. 2*, successfully completed a transit, followed one month later by the 67-foot-draft *Eagle Varna*’s transit.

Then, on November 9, 2017, the next milestone occurred: the transit of the first 68-foot-draft vessel, the



Coast Guard observers LCDR John Suckow and LCDR Isaac Mahar stand on the deck of the *Bunga Kasturi Empat* on November 9, 2017. Coast Guard photo

*Bunga Kasturi Empat*. It takes highly skilled professionals and tremendous coordination to safely navigate a vessel of this size. In accordance with past transits, a detailed safety brief took place with the Long Beach Pilots and other critical operators. A “go/no-go” decision was made based on sea state as well as an exhaustive list of safety parameters. Three Long Beach pilots, an Andeavor representative, a towing vessel representative, and two Coast Guard Sector LA-LB personnel met the vessel at the outer anchorage. The Octopus, with its advanced sensors, was brought on board to measure vessel motion, which was recorded on a laptop.

A typical transit has two assist tugs; in this case, four were employed—two on the bow, and two on the stern—as the vessel made its way through Queens Gate, the entrance through the Long Beach Harbor breakwall. The transit continued with no issues, safely mooring at Long Beach Pier 121. The total transit took less than two hours and provided positive proof of the effectiveness of the model.

At the time this article was written, there had been 21 successful transits of vessels with a draft greater than 65 feet. The final goal is a transit for vessels with a 69-foot draft, which is expected in 2018 if model data continues

#### For more information

For inquiries regarding the project in Long Beach, California, please contact:

- Project manager Captain Kip Louttit, Marine Exchange of Southern California, [klouttit@mxsocal.org](mailto:klouttit@mxsocal.org)
- Captain John Strong, Jacobsen Pilot Services, [JZS@jacobsenpilot.com](mailto:JZS@jacobsenpilot.com)
- Captain Rob McCaughey, Andeavor, [Robert.B.McCaughey@andeavor.com](mailto:Robert.B.McCaughey@andeavor.com)
- LCDR Isaac Mahar, USCG Sector LA-LB Waterways Management Division, [Isaac.D.Mahar@uscg.mil](mailto:Isaac.D.Mahar@uscg.mil)

to be validated. The project partners hope to continue outreach, helping other ports and interested maritime operators to learn from what is being done in Long Beach.

#### Conclusion

This project has been an outstanding success so far, meeting the goals of increasing safety, efficiency, and emissions reduction. While the primary focus has been the Port of Long Beach and deep-draft tanker ships, other ports and types of vessels may be able to duplicate this process. From very large container vessels to cruise ships—or even bulk carriers—the under keel process used here could be an excellent way to overcome deep draft clearance challenges.

The most important take-away is the success of the partnerships in this project. The tremendous cooperation between private industry, the port, research and technical experts, and government agencies—local, state, and federal—have enabled a smooth implementation of cutting-edge technology for the port. Clearly agreed-upon goals, understanding of roles and responsibilities, and effective information sharing has enabled this project to progress on schedule while exceeding expectations. //

#### Acknowledgements

Captains Kip Louttit, John Strong, and Rob McCaughey contributed to this article.

#### About the author:

*LCDR Isaac D. Mahar is a 2003 graduate of New St. Andrews College and a 2016 graduate of the Naval War College, where he earned his master's degree. He recently transferred from Coast Guard headquarters to his current role as the chief of Coast Guard Sector Los Angeles-Long Beach's waterways management division. He has more than 12 years of Coast Guard experience, including tours conducting marine inspections and overseeing waterways management operations in the Gulf of Mexico as well as the Ports of Houston and Mobile, Alabama.*



# Ports and Waterways Safety Assessment

by MICHAEL EMERSON  
*Director of Marine Transportation Systems*  
*U.S. Coast Guard*

**T**he Ports and Waterways Safety Assessment (PAWSA) has unbounded utility for our captains of the port. It is a structured discussion among waterway stakeholders that focuses on hazards, risks, and mitigation strategies. In developing shared priorities, participants help identify management solutions that reflect community interests.

## Purpose

Captains of the port are responsible for enforcing port and waterway safety and security as well as marine environmental protection regulations. They use PAWSA workshops to inform and implement safety zones, security zones, regulated navigation areas, anchorage grounds, marine event permits, and port orders that facilitate commerce and improve efficiency. PAWSAs are also effective

for planning navigation projects, furthering cooperation among government agencies and the private sector, strengthening the role of harbor safety committees, and reinforcing the role of sector commanders in promoting waterway management activities. The Coast Guard has completed 58 PAWSA studies nationwide since the program's inception in 1999.

PAWSAs are disciplined, results-oriented, intensive workshops designed to identify major waterway safety hazards, estimate risk levels, evaluate potential mitigation measures, and set the stage for the implementation of selected risk intervention strategies. These two-day quantitative assessments rely on expert opinions to evaluate the relative risk of several variables influencing both the causes and consequences of marine accidents. Process experts from Coast Guard headquarters frequently host



CGC *Sturgeon Bay* breaks ice on New York's Hudson River in January 2014. Navigable waterways must be kept open for ships delivering petroleum products such as home heating oil and other goods. Coast Guard photo

Waterway Risk Model					
Vessel Conditions	Traffic Conditions	Navigational Conditions	Waterway Conditions	Immediate Consequences	Subsequent Consequences
Deep Draft Vessel Quality	Volume of Commercial Traffic	Winds	Visibility Impediments	Personnel Injuries	Health and Safety
Shallow Draft Vessel Quality	Volume of Small Craft Traffic	Water Movement	Dimensions	Petroleum Discharge	Environmental
Commercial Fishing Vessel Quality	Traffic Mix	Visibility Restrictions	Bottom Type	Hazardous Materials Release	Aquatic Resources
Small Craft Quality	Congestion	Obstructions	Configuration	Mobility	Economic

Chart courtesy of author

being assessed—vessel masters, pilots, officers of operating companies, and the like. Stakeholders represent all others whose livelihood or lifestyles are affected by waterway activities. Absent a proper blend of participants, the same people will be talking about the same issues they have been discussing for years. Instead, the goal is to build a team that reflects the full spectrum of community interests and can provide a comprehensive evaluation for each of the 24 risk factors that make up the PAWSA Waterways Risk Model (see graph).

informational webinars in advance of significant PAWSAs for all participants and interested community members.

### Key Elements

A successful PAWSA requires the participation of professional waterway users with local expertise in navigation, waterway conditions, and port safety. Additionally, stakeholders are included in the process to ensure important environmental, public safety, and economic consequences are given appropriate attention as risk intervention strategies are identified and evaluated. Assembling vessel operators—from large cargo ships to paddleboards—harbor pilots, waterfront facility managers, local government and law enforcement officials, emergency responders, and other public stakeholders in the same room for two days is essential to establishing consensus on risks and the policies to address them. It also supports transparency that builds trust among stakeholders and prompts buy-in to the group's recommendations.

Selection of PAWSA participants is based on their waterway expertise and done in a way that maintains equities to create a balanced cross-section of users and stakeholders. The process balances a need to draw in navigation and traffic management experts and representatives of all significant stakeholder groups within the affected waterway community. These objectives must be accomplished without exceeding a manageable number of participants involved in the deliberations and judgments.

There must also be a balanced mix of waterway users and stakeholders. Waterway users are those who are actually involved in the movement of vessels in the waterway

### Recent Success

In two recent Hudson River PAWSA workshops in Poughkeepsie and Albany, New York, participants from across the state gathered to address anchorages and other measures to improve safety. During each session, about 40 users and stakeholders engaged in facilitated discussions of waterway commerce, vessel traffic, mishaps, weather, fatigue, and proposed projects. These variables as well as the associated mitigation options were often contentious, but focusing on specific risks was the key to success. Both groups ultimately achieved consensus on a way forward, including the establishment of a Hudson River Harbor Safety Committee as a forum for continuing dialogue.

The Hudson River PAWSAs provided a valuable foundation for addressing safety measures along the entire waterway. The captain of the port may still have hard work ahead and face opposition to anchorages, but specific concerns have been identified and structured discussions can be continued. These PAWSAs were especially complex, and equally instructive. The users and stakeholders in New York revealed unique waterway concerns that hadn't previously been considered, and which may inform PAWSA participants in other regions. A subsequent PAWSA was recently completed in Buzzards Bay, Massachusetts. //

#### About the author:

*Michael Emerson is the Director of Marine Transportation Systems at Coast Guard headquarters. He manages a broad portfolio of marine navigation, waterway, and bridge programs, and is also responsible for a wide variety of polar and Arctic safety and security initiatives. Mr. Emerson retired from the Coast Guard in 2014 with 30 years of service.*

# The Coast Guard's Marine Transportation System Recovery Program

More than a decade of increasing effectiveness

by JOSEPH COUCH  
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LANT-55  
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Formed in response to Hurricane Katrina, the Coast Guard Maritime Recovery and Restoration Task Force (MR2TF) delivered its final report to the Coast Guard Atlantic Area and Eighth District commanders in April 2006. The report included 17 key recommendations to enhance the Coast Guard's process for recovery and restoration of the marine transportation system (MTS). This article will explore the Coast Guard's response to the challenges issued by the MR2TF and how the program managers and field units applied MTS recovery strategies and priorities as they responded to events from 2010 through the 2017 hurricane season.

## The MR2TF and Key Recommendations

Hurricane Katrina made landfall in August 2005, resulting in a substantial disruption of the nation's marine transportation system. In an effort to understand how the Coast Guard addressed MTS disruption at all levels of the organization, commanders of the Atlantic Area and Eighth District chartered the MR2TF with four objectives in mind:

1. Identify the short- and long-term issues affecting the MTS.
2. Recommend recovery actions to operational commanders.
3. Identify long-term needs for full restoration.
4. Recommend improvements to national plans and organization for future recovery efforts.<sup>1</sup>

After an extensive review of current Coast Guard policy and procedures for MTS recovery, then conducting interviews with an exhaustive list of port stakeholders and operators throughout the Eighth District, the MR2TF delivered their final report, which included:

- five Coast Guard policy and procedure changes
- six recommendations for future incidents of national significance

- six recommendations to immediately bridge the gaps noted in the study and start implementing MTS recovery procedures in a systematic way across all Coast Guard sectors

The Winter 2006–2007 issue of *Proceedings*<sup>2</sup> included an article authored by a member of the MR2TF on this final report and how the Coast Guard leveraged a unique opportunity to enact several of the concepts envisioned by the task force. The author detailed the response of a specialized unit within the planning section of the Incident Management Team (IMT) and how they worked closely with port partners when 45,000 barrels of waste oil were discharged into the Calcasieu River and adjacent waterways. These coordinated efforts identified recovery priorities, managed and prioritized vessel movements, and kept congressional and cabinet-level officials informed of the progress toward economic recovery.

## MTS Recovery Plans and Policy

The Coast Guard has primary responsibility for coordinating and expediting the recovery of the MTS.<sup>3</sup> When an MTS disruption occurs, the captain of the port (COTP) will implement activities outlined in the MTS recovery plan designed to facilitate recovery of an impacted port using a coordinated and collaborative effort. The MTS recovery plan is currently an annex within the Area Maritime Security Plan (AMSP) based on a federal regulatory requirement—33 Code of Federal Regulations Part 103.505, which specifically states that the AMSP should address the procedures to facilitate recovery of the MTS after a transportation security incident.

The Coast Guard began expanding its approach to address all possible categories that could disrupt the MTS—an “all hazards” approach—in 2008. This led to a more holistic planning method for responding to man-made and natural disasters. This methodology now

includes an all-hazard MTS recovery plan in each COTP zone nationwide.

Consequently, substantial MTS recovery implementation occurred in 2008, and then again in 2014, which included key lessons learned from Deepwater Horizon and Superstorm Sandy. Coast Guard guidance, as outlined in the Navigation and Vessel Inspection Circular (NVIC) 9-02 series, included detailed MTS recovery procedures, a standardized MTS recovery plan format, and guidance indicating where to include the recovery plan within the AMSP. Since then, captains of the port have revised the MTS recovery plan they use and implemented it in response to real-world incidents.

In the near future, the Coast Guard anticipates an expansion of this planning effort. An MTS recovery plan NVIC, currently being promulgated at Coast Guard headquarters, will provide needed guidance on:

- the development and maintenance of a new “stand-alone” MTS recovery plan
- a common MTS recovery plan template
- all-hazard MTS recovery processes and procedures
- guidance on unity of effort among MTS recovery stakeholders within each COTP zone

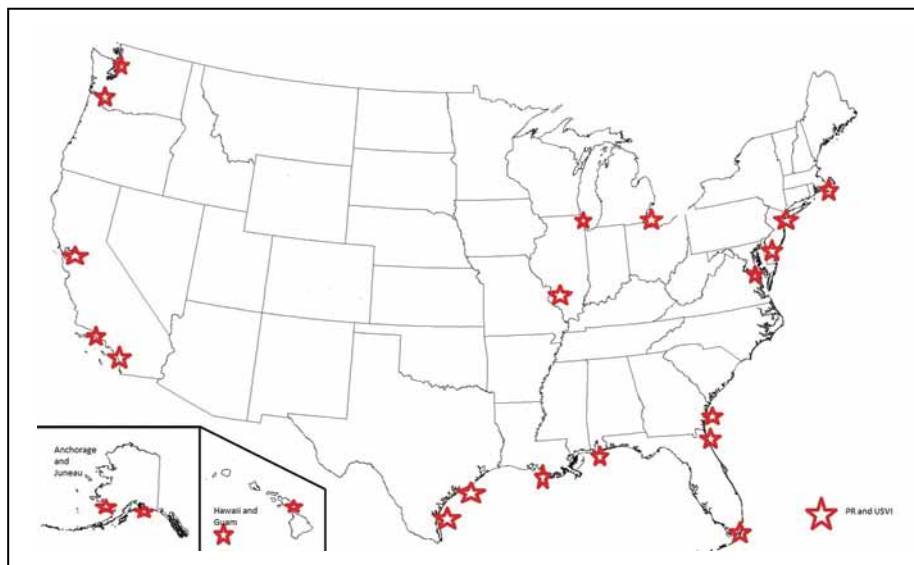
Most importantly, the MTS recovery plan is activated by the COTP when one of the following categories of MTS disruption occurs:

- Infrastructure impact—hurricane, flood, earthquake, major infrastructure casualty (e.g., bridges, roads, public infrastructure)
- Constrained operational capacity—maritime security level increase, cyberattack, labor shortage, movement of cargo to non-impacted area
- Constrained response operations—oil discharge, mass rescue operations, mass casualty

The new plan format is process-focused, meaning the plan elements directly relate to preparedness and response.

### Security Specialist (Port/Recovery) Position and Training and Qualification Initiative

Following the devastation of hurricanes Katrina and Rita, Coast Guard leadership began outlining many initiatives to better prepare and respond to MTS disruptions. One of the initiatives involved future planning for organizational improvements and resulted in the hiring of 29 security specialist (port/recovery) civilian positions in 2008. These



This map shows the locations of security specialist (port/recovery) assignments, a position created in 2008 to improve preparation for and response to MTS disruptions. Coast Guard graphic

positions were assigned at various levels within the Coast Guard, including:

- 22 assigned to Coast Guard sectors nationwide
- one to each of five district offices within Atlantic Area
- one assigned to cover the Atlantic Area and Pacific Area
- one assigned to Coast Guard headquarters

Over the past 10 years, COTPs have counted on this talented workforce to champion important tasks dedicated to advancing preparedness for and response to MTS disruptions. Those tasks have direct links to many related Coast Guard missions or programs, including but not limited to waterways management, contingency planning and force readiness, and incident management.

In preparation for an incident, a typical security specialist (port/recovery) will lead the development of MTS recovery and salvage response plans. This includes providing training for unit personnel, coordinating with other government agencies and key stakeholders within the ports, and exercising MTS recovery strategies and priorities as part of a normal exercise schedule. These specialists are trained to assist with post-incident recovery activities involving activation of the MTS recovery unit. As a subject matter expert, this person could fulfill a leading role in the recovery unit or act in a supporting role to help a MTS recovery unit leader:

- track and report on the status of the MTS
- understand critical recovery pathways
- recommend courses of action
- provide an avenue for stakeholder input
- provide Incident Command/Unified Command with recommended priorities

By 2009, it became clear across all levels of the organization that the Coast Guard would directly benefit from a structured qualification effort to ensure that a consistent approach to MTS recovery would be applied in all coastal and river COTP zones. In 2010–11 the Coast Guard Seventh District initiated the development of the first MTS recovery workshop to familiarize personnel assigned to the various Seventh District MTS recovery units with the Coast Guard’s new policy, MTS recovery plans, and the tools available in the field to help manage recovery planning and reporting.

Though the grassroots effort in the Seventh District was promising, there was a clear need for a master lesson plan (MLP) to align and standardize training materials and meet minimum requirements for MTS recovery unit leader qualification. The Coast Guard headquarters Domestic Ports Division (CG-FAC-1) and both Coast Guard area commands supported additional workshops in New Orleans and Orlando, Florida, to refine the training materials developed for the workshops and design a MLP to meet the overall objectives.

In 2012, the master lesson plan for MTS recovery workshops was completed and approved by PACAREA,

LANTAREA, and headquarters program managers, becoming the foundation for all future Type 3 MTS Recovery Unit Leader (MTSL3) workshops.

When the MTS recovery unit (MTSRU) leader position was formalized within the planning section of an incident management organization in 2008–2009, there was only one documented and qualified Type 3 MTS recovery unit leader in the Coast Guard. The success of the collaborative effort between COTPs with dedicated support of area and headquarter champions can be effectively measured by the current number of qualified Type 3 MTS recovery unit leaders—160.<sup>4</sup> Atlantic and Pacific Area commands have continued to champion the effort to develop a training program for Coast Guard Training Center Yorktown, fully supported by the Coast Guard Force Readiness Command.

### Congressional Review of Coast Guard Efforts

In 2011, the House of Representative’s Committee on Commerce, Science, and Transportation and the House Committee on Transportation and Infrastructure requested that the Government Accountability Office (GAO) determine how extensively the Coast Guard had revised the

## Excerpt from the Government Accountability Office Audit

Elements of Recovery	Present in all AMS Plans?	Additional/Notable Information Provided
<b>Marine Transportation System Recovery Unit (MTSRU) Information:</b> <ul style="list-style-type: none"> <li>Procedures for establishing unit</li> <li>Roles in information gathering and providing guidance to the Incident Command</li> <li>Communication with stakeholders</li> </ul>	✓	<ul style="list-style-type: none"> <li>Two plans provide particularly robust details regarding topics such as conducting post-incident assessments, identifying port area needs, and checklists for key items needed to support MTSRU functions</li> <li>Two port areas leverage existing collaborative bodies to support MTSRU information-sharing functions during a transportation security incident (TSI)</li> </ul>
<b>Procedures for Gathering Essential Elements of Information (EEI):</b> <ul style="list-style-type: none"> <li>Discussing importance of developing pre-incident baseline data</li> <li>Obtaining and updating data during a TSI</li> <li>Providing guidance for EEI development and/or references to other guidance</li> </ul>	✓	<ul style="list-style-type: none"> <li>Five plans provide a template or instructions for determining applicable EEIs to gather, in some cases providing details on specific EEIs within the port area<sup>1</sup></li> <li>All plans provided guidance or references to external guidance to be used in EEI development</li> </ul>
<b>Recovery Priorities:</b> <ul style="list-style-type: none"> <li>General priorities for port area recovery</li> </ul>	✓	<ul style="list-style-type: none"> <li>Five plans include slight modifications to Coast Guard HQ-defined priorities to reflect unique conditions in their port areas</li> </ul>
<b>Salvage Response Plans:</b> <ul style="list-style-type: none"> <li>Defining the roles and responsibilities of federal, state, and local partners</li> <li>Defining recovery-specific tasks to identify salvage response needs</li> <li>Identifying local marine salvage providers for use when needed</li> </ul>	✓	<ul style="list-style-type: none"> <li>Details were generally very consistent between individual plans</li> <li>One plan outlines specific tasks for the senior salvage officer following a TSI</li> </ul>

<sup>1</sup> Of the other two plans, one provides guidance on the roles and responsibilities of an EEI work group for developing and cataloging EEIs in their data system. The other plan states that EEIs are kept and maintained separately within the Coast Guard and made available when needed following an incident.

area maritime security plans to address the key recovery elements. Overall, the GAO's response was positive. The Coast Guard had worked to incorporate key recovery processes and procedures into 43 AMSPs nationwide, and the COTPs had made efforts to incorporate industry partners in the marine transportation system recovery mission.<sup>5</sup>

The GAO final report did not include any recommendations for change to the Coast Guard's approach to the recovery of the marine transportation system. It was one of the few GAO audits of Coast Guard programs that highlighted the success of the agency's efforts rather than provided recommendations to address program gaps or identify areas for improvement.

### MTS Recovery During Responses to Major Events

By 2009, all COTPs had completed the development of MTS recovery plans, either as stand-alone plans or as an annex to area maritime security plans. In January 2010, a series of natural and man-made disasters—including the Haiti earthquake—once again tested the foundations of the MTS recovery program and the Coast Guard's readiness to implement the MTS recovery strategies envisioned by the MR2TF.

**Hurricane Sandy:** In 2012, this "superstorm" presented another significant challenge for the Coast Guard. The ports of New York and New Jersey suffered extensive infrastructure and system damage from the storm surge that exceeded 14 feet in some port areas. Lost and submerged containers in navigable channels impacted waterway systems. Fixed and floating critical aids to navigation were severely damaged or destroyed, and widespread damage to key energy and cargo transfer terminals in New Jersey threatened the delivery of fuels and commodities to the northeastern United States as winter approached.

Sector New York quickly established an MTS recovery unit comprised of key port stakeholders and USCG representatives. This team quickly developed port assessment priorities, identified critical cargo streams necessary for the region, and coordinated with national leadership to rapidly stabilize the marine transportation system.

Sector New York set a new standard for the training, preparation, and use of a multiagency MTS recovery unit. The success of the effort can be directly related to the strong relationships built between the COTP and industry partners, training and exercises focused on recovery

## Haiti and Deepwater MTS Response Unit Actions

Implementation of initial MR2TF recommendations during the first two major responses—the Haiti Earthquake and Deepwater Horizon events—after Marine Transportation System recovery plans were developed in 2009

Response	2006 MR2TF Recommendation	2010 Response Implementation
Haiti Earthquake Response	Insert MTSRU in Planning Section	IMTs for HAITI at all levels included MTS recovery units or support cells
	Develop cadre similar to IMAT to assist with MTS Recovery	MTS Recovery Assist Teams created and deployed to Haiti to assess and prioritize MTS recovery mission and coordinate with USN
	Refine the set of measures for Essential Elements of Information	The MTS recovery assist team and TMS support cell at the area command used the new EEI concept to develop EEIs for Haiti, using the data to monitor recovery efforts and determine priorities

Response	2006 MR2TF Recommendation	2010 Response Implementation
Deepwater Horizon Response	Insert MTSRU in Planning Section	IMTs for DWH at all levels included MTS recovery units or support cells
	Develop cadre similar to incident management assist team to help with MTS Recovery	MTS Recovery SMEs from sectors deployed to D8 to support area command and field units
	Refine the set of measures for Essential Elements of Information	MTSRUs used the Common Assessment and Reporting Tool (CART) to report the status of the MTS and recovery efforts. Area command used CART data to make resource and response decisions and develop an incident-wide COP for MTS status
	Engage major maritime trade organizations via MTSRU participation	Port coordination teams across D8 supported and participated in MTS recovery planning and helped develop priorities and alternative pathways for recovery

Coast Guard graphics

prior to the storm,<sup>6</sup> and the development of a communication process based on common measurements and terminology. The Coast Guard incorporated these key lessons into the 2014 Coast Guard-wide MTS recovery plan update effort.

The 2016–2017 hurricane season again presented significant MTS recovery challenges for the entire Coast Guard. From Hurricane Matthew through Hurricane Maria, an increasingly effective line of communication was created between field units and national leadership. This helped to prioritize the allocation of limited and exhausted assessment and recovery assets, accurately identify critical needs, and led to the rapid resumption of port activities—often within days of impact.

**Hurricane Matthew:** This October 2016, category 5 storm damaged more than 700 aids to navigation in multiple southeastern and mid-Atlantic ports. This damage resulted in the closure of 13 commercial ports, affecting national defense capabilities and increasing the potential loss of fuel inventories throughout the southeastern United States. The area command established for the event coordinated closely with the MTS recovery units within each COTP to prioritize the deployment of these assets. They also coordinated with the U.S. Army Corps of Engineers (USACE) and National Oceanic and Atmospheric Administration (NOAA) channel assessment teams.

**Hurricane Harvey:** This storm system impacted the southeastern Texas coast, stalling over the Houston-Galveston area, where more than 50 inches of rain caused massive, widespread flooding. Severe infrastructure damage and a stalled oil refining capability resulted in nearly immediate national impacts. The Coast Guard MTS recovery units and the stakeholder port coordination teams activated as envisioned by the MR2TF and enacted their predetermined plans for assessment, prioritization, and recovery.

This coordinated effort streamlined the assessment and repair of damaged aids to navigation and channels, allowing for rapid resumption of operations in these nationally vital ports. These successful efforts instilled a sense of confidence in the process and raised the awareness of how pre-planning and coordination strengthens resiliency and the ability to rapidly recover from a disruption event.<sup>7</sup>

**Hurricane Irma:** The enormous size and power of this storm system resulted in nearly every critical Seventh District port being impacted within a 12-hour period. The statewide evacuation initiated prior to the storm exhausted a significant percentage of the state's



The Sector New York Marine Transportation System Recovery Unit participates in a workshop. Coast Guard photo

fuel inventories and required a coordinated approach between the Seventh District and the states of Florida, Georgia, and South Carolina to gain a full awareness of the critical fuel inventory levels and identify port status and support needs. The coordination was also crucial to developing a prioritized distribution of limited assets to correct damaged aids to navigation and conduct channel assessments.

The MTS recovery units in the field were able to provide real-time updates on the status of all key systems in their ports using the Common Assessment and Reporting Tool (CART). Within 24 hours of the storm's impact, they were able to start the port opening process, with priorities established to include relief cargoes for the Caribbean, fuels, and passenger vessels.

**Hurricane Maria:** This Category 4 storm carved a path through Puerto Rico and the U.S. Virgin Islands, resulting in the closure of 22 commercial ports. In addition to the remote location and widespread damage to the transportation infrastructure, the complete and total loss of all utility services in the islands complicated the MTS recovery effort, further constraining all MTS assessment and recovery efforts. MTS recovery support cells formed at the area and headquarter levels, linking with an embedded MTS recovery presence in Emergency Support Function 1 led by the Department of Transportation at the National Command Center. This direct link between all levels of the response organization helped maintain a balanced, sustained MTS recovery effort, providing the ability to address critical COTP priorities, including:

- using multiagency efforts to transport and replenish critically needed cryogenic oxygen for hospitals
- prioritizing the efforts of NOAA and USACE to conduct channel surveys



Coast Guard LCDR Eric Carrero, international port security liaison officer for Haiti, and LTJG Mike Clausen from the Coast Guard District Seven Marine Transport System Recovery Assist Team (MTSRAT), inspect a section of the pier that collapsed in November 2010 during Hurricane Tomas. The MTSRAT deployed to Haiti to conduct an assessment of the marine transportation system and the condition of the piers for vessels to dock and offload supplies. Coast Guard photo by Petty Officer 3rd Class Sabrina Elgammal

- developing inspection standards for foreign cruise vessels acting as berthing for emergency responders
- developing inspection and compliance policy to address U.S. vessels arriving to support relief and infrastructure repair

The story is still being written on the 2017 hurricane season and how MTS recovery initiatives recommended in 2006 assisted the national recovery effort. The emphasis on recovering the marine transportation system after each storm, however, could not be more evident. Headlines across the nation carried the same message after the storms passed. From USA Today to CNBC, the message was clear: The recovery of the marine transportation system is vital to the overall local and regional recovery effort.

It is through the marine transportation recovery program, and after 12 years of effort after the MR2TF, that we find a diverse group of maritime stakeholders working together to plan, prepare for, and quickly and efficiently recover the MTS after a major disruption. //

#### **About the authors:**

*Joseph Couch retired from the Coast Guard in 1997, returning in 2003, as the environmental specialist for the Fifth Coast Guard District. In 2003, he obtained a port security specialist position within the Coast Guard Atlantic Area Command. He currently serves as a port/recovery security specialist in their preparedness division. Prior to civil service, Mr. Couch worked as the training division manager for IMS*

*Environmental Services in Chesapeake, Virginia, and served as the project manager for development of more than 200 federal and state-required oil and hazardous substances contingency plans. During his 20 years with the Coast Guard, he served at the Coast Guard Training Center in Yorktown, Virginia; the Marine Safety Offices of New Orleans and Baltimore; and aboard the Coast Guard cutters Westwind and Storis.*

*Douglas Campbell retired from the Coast Guard in 2004 as a lieutenant commander. During his 25-year Coast Guard career, he served aboard the Coast Guard Cutter White Sumac; with additional assignments to the National Strike Force Pacific Strike Team; Marine Safety Office San Juan; Marine Safety Office Jacksonville, Florida, for two separate tours; and as the supervisor of Marine Safety Detachment Marathon in the Florida Keys. In November 2008, he obtained a port security specialist (recovery/salvage) position with Sector Jacksonville. He is responsible for the development, implementation, and coordination of marine transportation system recovery plans and salvage response plans for Northeast and East Central Florida. He is qualified as a Type I MTS Recovery Unit Leader and has provided MTS recovery support to the Incident Management Teams for the Haiti Earthquake, Deepwater Horizon, and hurricanes Sandy, Matthew, Irma, and Maria.*

#### **Endnotes:**

- <sup>1</sup> Maritime Recovery and Restoration Task Force, Final Report, 27APR06
- <sup>2</sup> LCDR Brian Falk, "Planning the Recovery of the Marine Transportation System: Establishing the marine transportation system linkage within the Incident Command System," *Proceedings of the Marine Safety & Security Council*, Winter 2006–2007, pp. 38–40.
- <sup>3</sup> DHS\_DOT Transportation Systems Sector-Specific Plan
- <sup>4</sup> Coast Guard Business Intelligence Cube on MTS Recovery Unit Leader Qualifications 2008–2017
- <sup>5</sup> GAO-12-494R-Coast Guard Recovery Planning, April 6, 2012
- <sup>6</sup> USCG Super Storm Sandy After Action Report (FOUO)
- <sup>7</sup> E-mail between authors and LCDR Russell Pickering, MTSRU Leader, Sector Corpus Christi



# Marine Planning

## Analyzing requirements before making changes that affect the marine transportation system

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**M**arine planning resembles the more commonly recognized discipline of urban planning. A well-established technical and political process, urban planning negotiates the development and use of land, planning permission, protection and use of the environment, public welfare, and the design of the urban environment, including air, water, and infrastructure. Similarly, marine planners use a scientific approach to address ocean management challenges through strategic policy and sustainable goals. Both planning processes identify and integrate competing and complementary interests into design and functionality, taking a holistic approach to development.

When done correctly, marine planning is completed before changes are implemented and is part of a review, validation, and approval process that includes participation by all stakeholders.

Marine planning is increasingly critical as our marine population density and competing interests swell. According to the final recommendations of a 2010 White House council task force:<sup>1</sup>

*“Demands on the ocean, our coasts, and the Great Lakes are intensifying, spurred by population growth, migration to coastal areas, and economic activities. Human uses of the ocean, coasts, and the Great Lakes are expanding at a rate that challenges our ability to plan and manage them under the current sector-by-sector approach. New and expanding uses—including energy development, shipping, aquaculture, and emerging security requirements—are expected to place increasing demands on our ocean, coastal,*

*and Great Lakes ecosystems. There is also increasing demand for access to these places for recreational, cultural, and other societal pursuits. As these demands increase, overlapping uses and differing views about which activities should occur where can generate conflicts and misunderstandings. At the same time, there is an overarching need to sustain and preserve abundant marine resources and healthy ecosystems that are critical to the well-being and continued prosperity of our Nation.”*

The Coast Guard Strategy for Maritime Safety, Security, and Stewardship identifies five challenges that closely align with the task force’s final recommendations:

- the increasing complexity and use of the U.S. exclusive economic zone (EEZ)
- the growth of the global maritime supply system
- the emergence of transnational threats
- the increasing scale of, and potential for, catastrophic incidents
- the vastness, anonymity, and limited governance of the global maritime domain<sup>2</sup>

Although several stakeholders have equities in specific areas, the Coast Guard’s broad mandate of maritime safety, security, and stewardship directly or indirectly links it to every interest.

The Coast Guard protects U.S. national interests from all threats—internal and external, natural and man-made—along America’s coasts, in international waters, and in any other maritime region where they may be at risk.<sup>3</sup> But new challenges continue to arise, including increased congestion, larger vessels, greater complexity of port operations, increased exploration



Giant trevally along a shallow reef in Hawaii’s Papahānaumokuākea Marine National Monument. NOAA photo



The Port of Oakland, California, loads and discharges more than 99 percent of containerized goods moving through Northern California. Multiple cargo ships are shown docked in inner harbor. Sheila Fitzgerald | Shutterstock.com

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*“Globalization has led to an interconnected world, where the security and prosperity of any one nation relies on productive international relationships. Today’s economy is critically dependent on global trade, which in turn relies on safe, resilient, and efficient transportation systems. Over 90 percent of global trade travels through maritime conveyance, making the safety, security, and environmental stewardship of the U.S. Maritime Transportation System (MTS) a national security and economic imperative. Technological advancements have led to greater efficiencies in maritime trade, and have allowed for greater exploitation of critical maritime natural resources. Efficiencies in extracting critical—yet finite—resources have increasingly challenged our collective ability to govern and manage competing needs of growing populations. The impacts of climate change in the maritime environment—already evident in the Arctic—may also exacerbate many of these competing demands.”*

—USCG Commandant’s Strategic Intent 2015–2019

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and resource extraction on the Outer Continental Shelf, advanced marine technologies, transport of energy resources and hazardous materials, and expansion of the Panama Canal that may alter maritime shipping routes.<sup>4</sup>

The captain of the port (COTP) relies on marine planning to validate or refine the existing system to accommodate evolving changes in the marine transportation system (MTS). Additionally, USCG headquarters, areas, and districts are coordinating studies that cross traditional boundaries to better serve the interconnected needs of the broader system. Marine planning is the fundamental planning activity that enables the Coast Guard to operate effectively and efficiently to meet its statutory requirements in Title 14 U.S. Code, Section 2—activities for which the Coast Guard is organized, trained, and equipped to carry out.

### **A Regional Issue**

Each Coast Guard district has unique characteristics, resources, capabilities, requirements, and constituencies that must be considered to effectively address local maritime needs. Improved technologies, new opportunities, and active, vocal constituencies have created an environment where competing interests vie to secure maritime

resources that up until now have been either ignored or controlled by the first party to occupy the space.

For example, in the Gulf of Mexico, the placement of hundreds of oil rigs caused an atypical ship routing system that wasn't carved out until after many of the rigs were already in place. Shipping may have been more efficiently and safely routed, and living marine resources may have been better protected, had effective marine planning processes been in place beforehand to analyze the impact these structures would have on myriad interests in the region. Now countless considerations affecting maritime regions are part of the analysis of maritime usage plans to ensure they're consistent with Coast Guard maritime safety, security, and stewardship objectives. It isn't unreasonable to assume that additions to the list of new and expanding ocean, coastal, and Great Lakes uses will increase in years to come.

Regional planning bodies are coalitions of stakeholders that strengthen coordination, planning, and policy implementation, and enhance public participation.<sup>5</sup> They provide an opportunity for stakeholders to inform others of their plans and objectives, to better understand other stakeholders' equities, and to coordinate activities. Eleven regions have been identified in the United States. The Coast Guard is the advocate for the MTS, safe navigation, and the mariner while remaining mindful of how various initiatives could affect Coast Guard operations. The portfolio represented by the district commander is increasingly complex due to technological advances and many other changes—larger number of transits, an expanded cruise industry, neo-Panamax shipping, and greater intermodal connectivity—which affect existing routes, routing measures, and safety margins.

The other stakeholders include a diverse group of international, federal, state, tribal, and local governments as well as advocacy groups representing their constituents' interests and objectives. For example, National Oceanic and Atmospheric Administration Fisheries is responsible for the stewardship of the nation's ocean resources and their habitat. The organization is increasingly focused on aquaculture—the breeding, rearing, and harvesting of plants and animals in all types of water environments—as population growth increases pressure on our ability to provide adequate food. Similarly, the Bureau of Ocean Energy Management oversees offshore renewable energy development as we deplete non-renewable resources and renewable resources become more competitive. These are two of myriad organizations and coalitions representing their communities of interest and lobbying to ensure their concerns are addressed.

Regional plans for the Northeast and Mid-Atlantic have been developed and validated by the National Ocean Council (NOC). These plans are based on a premise that they summarize the ocean planning process as guides,

## Traditional, New, and Expanding Ocean, Coastal, and Great Lakes Uses

The ocean, our coasts, and the Great Lakes are home to and support myriad important human uses. Marine planning provides an effective process to better manage a range of social, economic, and cultural uses, including:

- Aquaculture (fish, shellfish, and seaweed farming)
- Commerce and Transportation (e.g., cargo and cruise ships, tankers, and ferries)
- Commercial Fishing
- Environmental/Conservation (e.g., marine sanctuaries, reserves, national parks, and wildlife refuges)
- Maritime Heritage and Archeology
- Mining (e.g., sand and gravel)
- Oil and Gas Exploration and Development
- Ports and Harbors
- Recreational Fishing
- Renewable Energy (e.g., wind, wave, tidal, current, and thermal)
- Other Recreation (e.g., boating, beach access, swimming, surfing, nature and whale watching, and diving)
- Scientific Research and Exploration
- Security, Emergency Response, and Military Readiness Activities
- Subsistence Uses
- Tourism
- Traditional Hunting, Fishing, and Gathering
- Working Waterfronts

Source: *Final Recommendations of the Interagency Ocean Policy Task Force*

informing agency decisions and practices rather than specifically outlining actions. Appropriately, they are the beginning of the process and the frame for continued work.

### A National Priority

On a very broad scale, the significance of marine planning is demonstrated by the establishment of the NOC, a cabinet-level organization. Reliable sea lines of communication, which describe the primary maritime routes between ports and are used for trade, logistics, and naval forces, are absolutely critical to U.S. national security. They are also among the most important of marine planning concerns, especially for the Coast Guard in its role of supporting the MTS. The NOC reviews and certifies each regional marine plan to ensure it is consistent with other regions, national security objectives, and the National Ocean Policy.<sup>6</sup>

The United States has the largest system of ports, waterways, and coastal seas in the world, including some 95,000 miles of coastline. The MTS contains 26,000 miles of commercial waterways that serve 361 ports; 3,700 marine terminals—from marinas to mega-ports; 200 locks; and



Located about 4 miles from Block Island, Rhode Island, the Block Island wind farm is the first offshore wind farm in the United States. NOAA photo

1,000 harbor channels. The system also includes 1,500 miles of international maritime border with Canada, connecting population centers to the Atlantic Ocean through the Great Lakes and the St. Lawrence Seaway System.<sup>7</sup> These individual components are essential to the smooth function of the entire system.

### The Coast Guard Approach

As the world's premier multi-mission maritime service, the Coast Guard offers unique, enduring value to the Department of Homeland Security and the American public. At all times a military service, a federal law enforcement agency, a regulatory body, a first responder, and an intelligence community member, the Coast Guard serves a nation whose economic prosperity and national security are inextricably linked to vast maritime interests. To preserve these interests at home and abroad, the Coast Guard employs its broad authorities; an expansive network of interagency, military, and industry relationships; and unique operational capabilities and international partnerships that enable it to execute daily, steady-state operations and respond to major incidents. This requires prioritization and uniformity throughout the service as well as coordination of ongoing and projected activities with other stakeholders. The end result is a coherent national approach that still allows operational commanders the necessary flexibility to accommodate unique regional factors.<sup>8</sup>

The Coast Guard has long used marine planning as the basis to meet its statutory responsibilities. The Coast Guard provides a safe, efficient, and navigable waterway system to support domestic commerce, international trade, and military sealift requirements for national defense.<sup>9</sup> To accomplish this, several programs work together to address the same issue from different, but related, perspectives. The director of marine transportation systems management oversees marine planning efforts and facilitates coordination with, and outreach to, other affected programs and MTS stakeholders, including other federal, state, tribal, and local agencies. This directorate supports short-range aids to navigation, navigation systems and standards, and vessel traffic services. It also offers support for mapping and charting tide, current, and pilotage information, as well as domestic icebreaking and technical assistance and advice.

The director of commercial regulations and standards develops national regulations, standards, and policies to enhance maritime safety, security, and stewardship; develops and executes an engagement plan for international standards; and administers a technical compliance program to ensure uniform application of design and operating standards on commercial vessels.

The director of inspections and compliance develops and maintains policy, standards, and prevention activities associated with MTS recovery planning and operations. Complementary response programs such as search and rescue, maritime environmental protection, law enforcement, and defense operations are key elements of the comprehensive marine planning process.<sup>10</sup>

The ultimate purpose of marine planning is to reduce risk. "Marine Planning to Operate and Maintain the Marine Transportation System (MTS) and Implement National Policy," COMDTINST 16003.2A, emphasizes the multi-mission character of the Coast Guard by expanding marine planning activities within several operating programs. Prevention includes such measures as placing aids to navigation (ATON), ensuring that commercial vessels are properly designed, built, and maintained, and recreational boater safety education. A heightened prevention posture may mean deploying automatic identification systems (AIS) and aids to navigation before a dangerous weather event to make waterways more resilient, should physical aids be damaged or lost. Response efforts by

district commanders and COTPs are the Coast Guard’s reaction to adverse events, and are often precipitated by pre-positioning forces from across the nation, using them to support post-incident operations.<sup>11</sup> These related and complementary aspects of marine planning help enable the COTP to maintain the MTS.

Coast Guard marine planning activities are mostly carried out at the district or sector level. Coast Guard headquarters and areas provide guidance and assistance, but the Deputy Commandant for Operations has the overall responsibility for marine planning. Several headquarters directorates and programs provide policy guidance related to specific perspectives of the marine planning process. Area commanders are mostly concerned when regional planning overlaps district boundaries.

### Studying the Atlantic and Gulf Coast Seacoast Systems

Coast Guard headquarters and Atlantic Area chartered the Atlantic Coast Port Access Route Study (ACPARS) in May 2011 to address the potential navigational safety risks associated with the development of offshore renewable energy installations and to support future marine planning efforts. Subsequently, headquarters

also chartered the waterways analysis and management system (WAMS) study for the Atlantic and Gulf Coast Seacoast System in June 2015 to deal with increasingly congested and complex waterways, as well as to help district commanders adjust their aids to navigation to better match capabilities with emerging requirements. The ACPARS and the WAMS study for the AGSS followed the basic models for port access route studies and waterways analysis and management system studies, but went well beyond the scope of previous studies. These studies provide valuable insight into future MTS requirements.

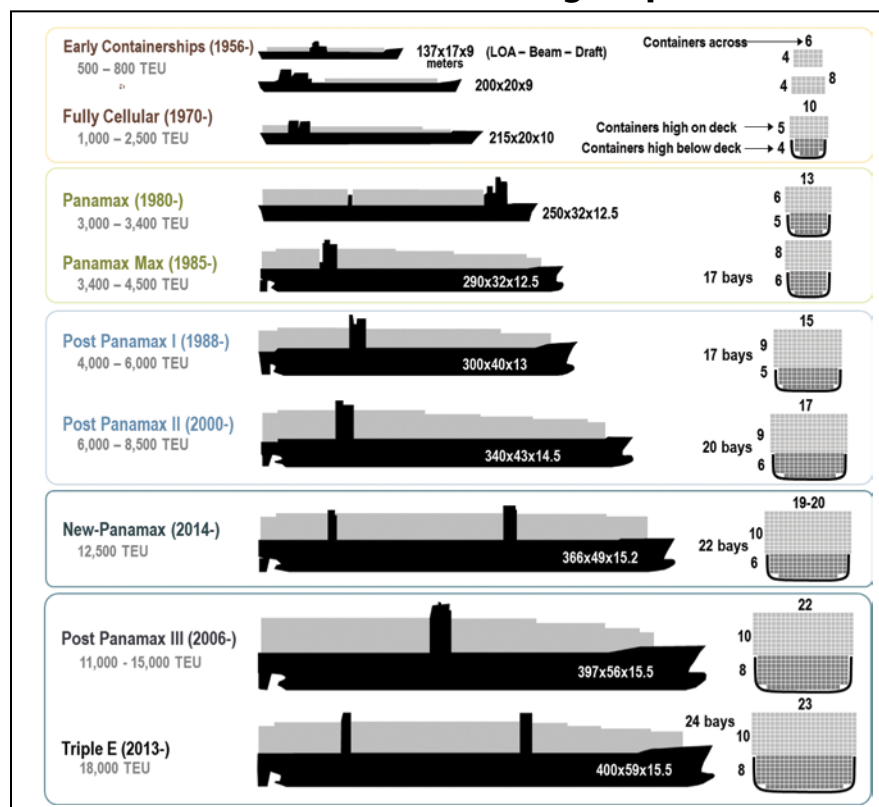
The ACPARS was initiated to study shipping traffic routes and density off the Atlantic Coast in support of the Department of Interior’s “Smart from the Start” initiative, as well as provide data to support future marine planning efforts. The study area included the entire Atlantic Coast—from Maine to Florida—and was focused on waters seaward of the existing port approach systems within the exclusive economic zone. Its intent was to identify all current and anticipated new users and determine what impact the siting, construction, and operation of proposed alternative energy facilities may have on near coastal users. Additionally, it looked at whether routing

measures should be modified or created to ensure the safety of navigation.<sup>12</sup> Though the ACPARS focus was intended for offshore wind energy, other activities like hydrokinetics, aquaculture, or traditional oil, gas, and mineral extraction are served equally well.

ACPARS used AIS data to identify the primary routes taken by shipping along the Atlantic Coast. It also identified additional data requirements to evaluate changes in navigational safety risk resulting from different siting and routing scenarios. The study provided invaluable information to myriad Coast Guard programs regarding the effects that changes in the offshore areas could have on existing resources and capabilities. The precedence of activities varies, depending on many factors, to help determine an optimal balance.

The ACPARS also led to development of marine planning guidelines to assist offshore developers and marine planners with their evaluation of the navigational impacts of projects with multiple permanent fixed structures. The guidelines consider sea space necessary for ships to maneuver safely and discuss other factors to be considered

## Evolving Ship Designs Affect MTS Marine Planning to Accommodate Maneuvering Requirements



Graphic courtesy of Dr. Jean-Paul Rodrigue, Department of Global Studies and Geography, Hofstra University, New York, USA

when determining appropriate separation distances for the siting of offshore structures near shipping routes and other multi-use areas. These guidelines consider port approaches and traffic separation schemes; coastwise or coastal shipping routes; offshore deep draft routes; navigation safety corridors; and potential contributions and mitigations to risk, as well as unique circumstances.<sup>13</sup> There is a tremendous benefit to potential developers and other users in understanding the constraints that mariners operate under and how these constraints could affect their initiatives. It is also an important basis upon which to refine the guidelines, given the standard approach and guidance.

The AGSS WAMS was conducted to determine the short-range aids to navigation requirements for the United States Eastern Seaboard from the border with Canada to the Mexican border. Its recommendations and conclusions were focused on providing consistent, program-wide policy to support district commanders' ATON services within the AGSS. It did not determine individual aids to add, keep, or remove, but rather analyzed the capabilities of various user types to shape policy for the next-generation waterway system management and design. Similar WAMS will be conducted in the Pacific Area and Western Rivers.

## The Way Ahead for Marine Planning

Captains of the port enforce port safety, security, and marine environmental protection regulations, including, without limitation, regulations for the protection and security of vessels, harbors, and waterfront facilities; anchorages; security zones; safety zones; regulated navigation areas; deepwater ports; water pollution; and ports and waterways.<sup>14</sup> Their authorities enable the Coast Guard to coordinate incident and disaster preparedness and response, singularly and in coordination with other government entities.<sup>15</sup> The COTP is the Coast Guard's primary operational component responsible for maintaining a reliable, safe, secure, and resilient MTS.

Marine planning has been, and will continue to be, an important tool to define and analyze requirements that shape decision making as the Coast Guard endeavors to ensure maritime safety, security, and stewardship in ocean areas, along U.S. coasts, and in the Great Lakes. Consistent with the concept of marine planning, the Coast Guard must unify efforts and foster invaluable relationships with a full range of stakeholders who depend upon, or operate in or near, the MTS. The Coast Guard must capitalize on the unique nature of its broad authorities and capabilities to help improve performance and efficiency. Acknowledging the growing complexity and vitality of commercial activities in the maritime region, the

Coast Guard will continue to build upon robust interagency relationships with federal, state, and local governments, and engage maritime industry stakeholders in forging an optimal solution.<sup>16</sup>

Risk management and hazard prevention across the MTS will remain the essential approach to accomplishing safety and security objectives. In an increasingly complex maritime environment, the Coast Guard will continue to emphasize the role of effective incident management in response and recovery operations for events and activities that pose major threats to commercial activity, the environment, or human life.

The Coast Guard must endeavor to meet the emerging demands of all commercial maritime activities. This will include active engagement in ship design and construction, offshore infrastructure, transportation of energy products via the MTS, and the construction and operation of new terminals. The service must also enhance its technical competency and workforce capacity while expanding contingency plans and preparedness activities, ensuring vigilance in waterways management, and exploring improvements to national response policy.<sup>17</sup>

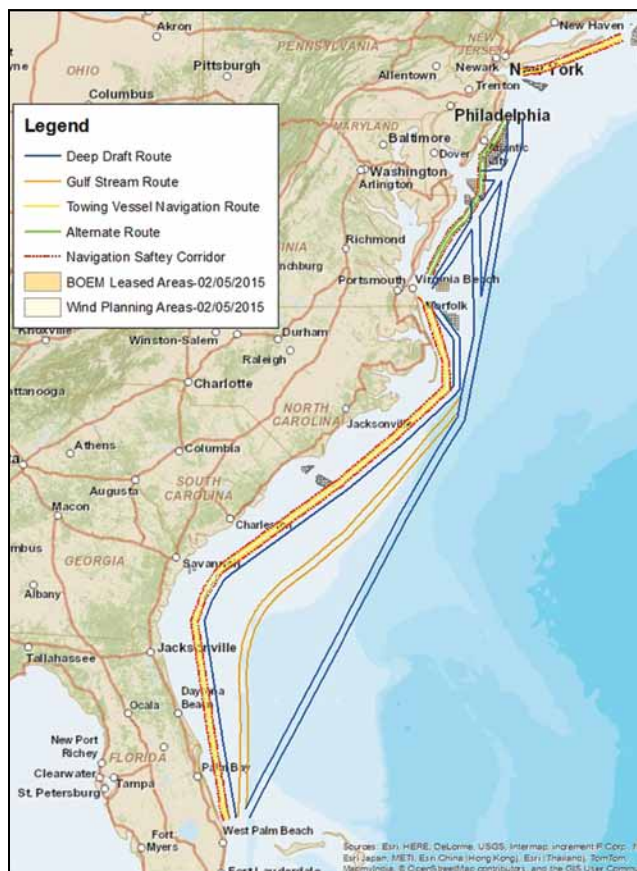
### Coast Guard Mechanisms to Develop and Maintain the MTS

- Waterways Analysis and Management System study—validates the adequacy of the existing aids to navigation system
- Navigation Safety Risk Assessment—evaluates the impact of a structure on or near the navigable waters of the United States
- Waterway Suitability Assessment—used by the COTP to assist in making a determination on the suitability of the waterway for liquefied natural gas marine traffic and liquefied hazardous gas facilities
- Port Access Route Study—used by program managers to assist in making a determination of the need to establish traffic routing measures, fairways, traffic separation schemes, limited access areas, recommended routes, and regulated navigation areas in order to ensure navigational safety in the United States' off-shore approaches and coastal waters
- Ports and Waterways Safety Assessment—identifies major waterway safety hazards, estimates subsequent risk levels, evaluates potential mitigation measures, and sets the stage for implementation of selected measures to reduce risk.
- Harbor Safety Committee—a principal building block in the national marine transportation system (MTS) coordinating structure. HSCs ensure that the United States' MTS is safe, secure, efficient, effective, accessible, globally competitive, dynamic, and environmentally responsible.

Source: *Marine Planning to Operate and Maintain the Marine Transportation System and Implement National Policy, COMDTINST 16003.2A, dated 18 November 2016*



Part of the Coast Guard's aids to navigation mission includes maintenance. Coast Guard photo



Deep draft routing along the Atlantic Coast. Coast Guard photo

**About the authors:**

Paul Crissy and George Detweiler are marine transportation specialists in the Office of Navigation Systems at U.S. Coast Guard headquarters. Mr. Detweiler has championed the development of international routing measures for several years. Mr. Crissy is assisting with the identification of Coast Guard marine planning processes within the Coast Guard's statutory authorization.

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12. Atlantic Coast Port Access Route Study Final Report, dated 8 July 2015, p. 1
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14. Title 33 Code of Federal Regulations (CFR), Navigation and Navigable Waters, Part 1 General Provisions, Subpart 1.01—Delegation of Authority; §1.01-30 Captains of the Port
15. Coast Guard Publication 1, p. 9
16. USCG Commandant's Strategic Intent 2015-2019, p. 14
17. USCG Commandant's Strategic Intent 2015-2019, p. 8

# Rollin' on the River

Mitigating environmental and economic impacts during high/low water seasons through government/industry collaboration

by LCDR HOWARD VACCO  
Chief, Waterways Management Division  
U.S. Coast Guard Sector New Orleans

*One who knows the Mississippi will promptly aver—not aloud, but to himself—that ten thousand river commissions, with the mines of the world at their back, cannot tame that lawless stream, cannot curb it or confine it, cannot say to it, go here, or go there, and make it obey; cannot save a shore which it has sentenced; cannot bar its path with an obstruction which it will not tear down, dance over, and laugh at. —Mark Twain*

The challenges experienced on the Mississippi River in Mark Twain's time still resonate with our maritime community today. As the seasons change, so do the various navigational challenges for those who brave operating on the mighty Mississippi. If you couple those ever-present issues with recent unexpected and extended weather patterns, you realize that the maritime community, as well as the agencies that regulate and support it, must remain nimble and vigilant. This requires the fostering of processes and programs that promote effective communication and collaboration when facing uncertain environmental hazards and conditions that significantly impact navigational safety and disrupt the maritime transportation system.

## Historical Perspective of High and Low Water Conditions

Throughout its existence, the Mississippi River has been entrenched in a multitude of high and low river events, some reaching historic proportions. One of the most famous and destructive river floods in the United States was the Great Mississippi River Flood of 1927. During that event, more than 26,000 square miles—or 16,800,000 acres—of land became flooded, displacing more than 700,000 people from their homes, killing 500 people, and causing about \$1 billion in damage, which was one-third of the federal budget at the time.<sup>1</sup> The flood's devastation was felt across the country—extending west to Texas, Oklahoma, and Kansas, north to Missouri, Illinois, and Kentucky, and dipping south into Arkansas, Mississippi, and Louisiana.

The impact to the government and its citizens was so significant that the United States Army Corps of

Engineers (USACE) was called upon to devise a plan to ensure a similar future catastrophe would not cause the same level of devastation. This paved the way for the 1928 Flood Control Act, which instituted the Mississippi River and Tributaries Project. This monumental project put in place a comprehensive, unified system of public works within the Lower Mississippi Valley that would provide unprecedented protection from the floods and supply an equally efficient navigation channel. USACE has cited that the project has four major features pertaining to levees or floodwalls, floodways, channel improvement and stabilization, and tributary basin improvements. During the decades following the 1928 act, the project was modified and expanded to include reservoirs, tributary improvements, cutoffs, and other channel improvement features. The current estimate for completion of this enormous, complex project involving layers of local, state, and federal agencies is 2031.

While high water events have caused navigational safety hazards and economic disruption for the river community, extreme low water also presents its own distinct challenges to the safe, efficient transport of goods on the river. During low water conditions, the river becomes much narrower and shallower, forcing vessels to navigate much closer together, even impacting nearby barge fleets and causing a potential increase in breakaways on the river.

One of the most severe low water periods occurred in 1988 when about 66 percent of the Mississippi River Basin experienced severe drought. At the time, it was one of the most devastating droughts in 100 years. The significant drop in river stage caused massive congestion, blocking numerous routes along the river with excessive shoaling



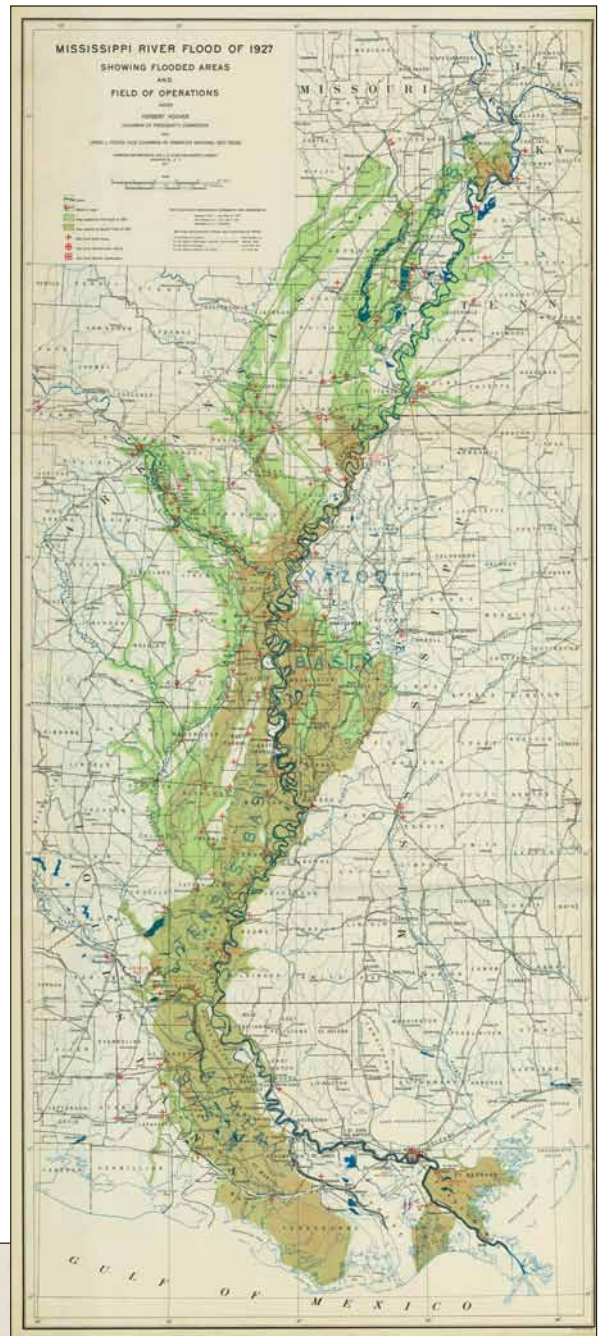
and lack of navigable water, costing billions of dollars in property damage and a reduction in commodity transportation.

### High and Low Water Conditions of Today and Stakeholder Coordination

While these are historical figures, it is important to remember that extreme river conditions are not just a thing of the past. Most recently, a 2015 El Niño (warmer) weather pattern present throughout most of the year shifted to a La Niña (cooler) pattern. This caused unusually heavy rains throughout the Mississippi River drainage basin during the late fall, catching many by surprise since low water is usually expected at that time of the year. The chain reaction of events impacted more than 1,000 miles of the Mississippi—from St. Louis to the Gulf of Mexico’s Southwest Pass. The response required the coordination and collaboration of industry, the Coast Guard, USACE, and a myriad of stakeholders to minimize disruption to hundreds of millions of dollars in commerce while avoiding the compromising of navigational safety.

While marine casualties did occur, if not for the exceptional communication and coordination of all parties, further delay to commerce and significant harm to personnel and the environment would have been much more prevalent. Mariners and industry stakeholders played their parts by communicating about what they were experiencing, which provided the Coast Guard and USACE critical information. Based on that information, appropriate traffic control measures were enacted and numerous spillways opened to divert the flood waters away from the overly stressed river system.

In 2012, a significant drought struck the Mississippi River. With water levels at their lowest since 1988 in some areas, USACE was called upon to feverishly work toward ensuring the largest inland marine system in the world



On April 20, 1927, the waterfront of Cape Girardeau, Missouri, was flooded as the Mississippi River rose to a stage of 40 feet. Coast and Geodetic Survey map and National Weather Service photo from "The Floods of 1927 in the Mississippi Basin," Frankenfeld, H.C., 1927 Monthly Weather Review Supplement No. 29

stayed passable. While most of the waterways remained open, towing vessel operators dealing with the shallower water had to reduce the number of barges they pushed while deep-draft vessels carried less cargo to reduce the draft. These actions came at a significant cost, but were necessary to prevent an accident that could cause further damage and waterway disruption.

During an incident, most actions the Coast Guard implements on the waterway will be communicated through Marine Safety Information Bulletins (MSIBs) or Broadcast Notices to Mariners (BNMs). Behind the scenes, carefully selected agency and port partner representatives within the captain of the port (COTP) zone known as Port Coordination Teams (PCTs) engage in conference calls with the COTP to discuss the current status on the waterway as well as any needed action from involved parties. From there, actions are implemented and the public notified. Additionally, by working with industry partners

and organizations, a larger contingent of operators can be reached to craft and implement longer-range contingency plans for future high- and low-water events.

The challenge for government agencies and industry is to keep the commerce flowing despite the increased level of safety concerns on the waterway. The question moving forward is: "What tools do we use to reduce the potential of marine casualties while concurrently working to limit maritime disruption?"

### Tools for Mitigating Risk

Much like working on a car or doing a home repair, a captain of the port will carefully select the best "tool" to effectively mitigate risk and achieve a positive outcome on the waterway. This is especially true during periods of extremely high- or low-water stages. One tool that most commercial operators may be familiar with is a captain of the port order. This is essentially a direct "order" from

the COTP to a commercial operator outlining specific requirements for safe operation. Since it is directed at a specific entity, it is limited in breadth and scope.

COTPs have a few additional tools in their risk mitigation arsenals, including safety zones and regulated navigational areas (RNAs). Safety zones are temporary measures employed to protect personnel, vessels, and the marine environment from hazards in an associated area on the waterway. While a bit more expansive than a captain of the port order, it also has limitations in its ability to outline multiple requirements, and requires a rulemaking procedure to enact.

RNAs prescribe procedures to a specified area to safely navigate during specific situations outlined in the regulation. While this is the most detailed and effective of the three, it requires a regulatory process that can be established only by the Coast Guard district commander—not the COTP. Consequently, once in place, it can be challenging to deviate from it if circumstances change during a specific high- or low-water river stage.

If you are fortunate enough to have a vessel traffic center (VTC) in your COTP zone, it can administer a vessel traffic service measure or direction. Since one of the VTC's

(Right) Dredge *Hurley* on the Mississippi River at Thebes, Illinois, in February 2013, dredging during extreme low water as part of efforts to keep the navigation channel open for use. Army Corps of Engineers photo by Jim Pogue  
(Bottom) The Mississippi River Basin. Image by Rainer Lesniewski | Shutterstock.com





The Dredge *Potter*, one of the U.S. Army Corps of Engineers' dustpan dredges, removes sediment from the mainstem of the Mississippi River channel to keep commercial navigation flowing during extreme low-water conditions between St. Louis and Cairo, Illinois, in January 2013. Army Corps of Engineers photo

purposes is to help manage the safe transit of vessels on the waterway, they have exceptional capability and authority to enact swift and detailed requirements during times of hazardous conditions on the waterway. However, since there are only 12 VTCs in the country, this is not an option for most COTPs. While these tools are appropriate and effective for many cases, they are not always adept at dealing with the dynamic circumstances occurring with high- or low-water challenges from year to year, and typically place a majority of the decision making on the COTP. With that said, any Coast Guard COTP will tell you that one of the major keys to success is the ability to work collaboratively with maritime stakeholders to mitigate risk on a waterway.

In addition to the aforementioned COTP tools, a waterway action plan (WAP) has been extremely effective in dealing with dynamic risk associated with high- and low-water stages. Drafted and signed by the Coast Guard, U.S. Army Corps of Engineers, and key river operators/stakeholders, a WAP is a living document that establishes a framework for all parties to use when taking proactive measures to respond to high- and low-water conditions.

The benefit of a WAP is the flexibility it provides for managing various river conditions. While the plan outlines elements of Coast Guard and USACE regulatory requirements, it also incorporates industry and mariner "best practices." This may come in the form of a reduction of tow sizes at certain river stages/locations, or the use of towing assist vessels at areas on the river that present navigation challenges. The plan also highlights effective communication processes, like when to expect MSIBs or BNMs, and outlines timelines for PCT calls.

The most successful processes are the ones where all interested parties come to the table and contribute to the process of safe navigation. As all members are aware, the operating conditions under which the agreements are made are not optimal, but with effective communication processes and best practices in place, there aren't many

challenges that mariners, industry, and agencies can't adapt to and overcome.

With each passing year, the demands we place upon the Mississippi River have continued to increase. Ships have become larger and tow sizes and fleets have steadily grown, increasing the demand for real estate to permit operations along the waterfront. While the expectations of how we use the Mississippi River have increased, the behaviors and challenges in dealing with extreme river conditions remain the same. Every seasoned captain who has operated on the Mississippi River will tell you that each day on the river has its own story to tell. What might have been true yesterday, may not hold true tomorrow. If the Mississippi River were a book, a captain's daily experience would contribute just one page to a chapter, offering its own unique perspective and experience toward telling the complete story.

However, as we look to the past for perspective to help grow our future, we will continue to find the answers in our ability to work together to craft policies and practices for safer and more efficient operations. Ultimately, our achievements are directly tied to how well maritime government agencies and industry stakeholders continue to cooperate and collaborate to overcome the challenges Mother Nature presents. When that happens, there's no feat we cannot accomplish. ▀

**About the author:**

*LCDR Howard "Howie" Vacco has served in the U.S. Coast Guard for more than 20 years. His experience includes port safety and security, waterways management, and vessel inspections. At the time this article was written, he was assigned as the chief of the waterways management division at Sector New Orleans. He has served in response to many incidents, most notably receiving personal and event awards for participation during Hurricane Maria, Deepwater Horizon, and hurricanes Katrina and Rita, as well as numerous high-water and flooding incidents on the Mississippi River.*

**Endnote:**

<sup>1</sup> Smith, James A.; Baeck, Mary Lynn (2015). "Prophetic vision, vivid imagination: The 1927 Mississippi River flood." *Water Resources Research*, 51 (12): 9964. <http://adsabs.harvard.edu/abs/2015WRR....51.9964S>

# A Tale of Two Rivers

by MATT LAGARDE  
*former Regulatory Compliance Director  
American Commercial Barge Lines*

The Mississippi River winds its way from northern Minnesota to the Gulf of Mexico over a course of 2,320 miles. The U.S. Army Corps of Engineers (USACE) provides a chart that shows the course of this great river, but that chart only provides part of the story.

I've had the pleasure of experiencing more of that story personally over my career of navigating tows, both large and small, over a large portion of this river. I've had the benefit of working with great captains who passed their knowledge and wisdom down to me as I learned the trade as a Mississippi River towboat pilot and then captain. You come to learn and appreciate that the river is alive and ever-changing.

The truth of the matter is that you cannot see this river one time and pretend to know what it has in store, nor can you examine a chart and grasp how to navigate safely. It takes years to appreciate the river's different ways of reacting to floods or droughts. The same mile of river can

require very different skill sets to navigate at different times of the year, and on the same hitch aboard the vessel, a person may need to employ several different skill sets to navigate safely during the voyage. Without this hands-on passing of knowledge, the task would be very daunting. I'm grateful to have had the opportunity to be taught by master riverboat captains.

## **Low Water Above Natchez**

Contrary to popular belief, the river is not always easier to navigate when water levels drop. As the river settles down into its natural channel, in some places the width of the river can be its own challenge. The water flow in a constricted channel below a sandbar can often increase in velocity in the same way a hose squirts water when you squeeze the end. Plugging that narrow hole with a tow only causes the velocity to worsen, sometimes causing the tow to nearly stall during upbound transits.



Low river levels forced river traffic to operate closer to each other on the Mississippi River near St. Louis in December 2012. Coast Guard photo



Workers contracted by the U.S. Army Corps of Engineers (USACE) clear rocks from the Mississippi River floor near Thebes, Illinois, in December 2012. The Coast Guard and USACE supervised these rock blasting operations in an effort to mitigate the low water situation on the Mississippi River. Coast Guard photo by Petty Officer 3rd Class Ryan Tippetts

These narrow channels limit the amount of room for a downbound tow to slide, requiring the tows to slow to current speed and “flank” the bend, whereas the captain allows the head of the tow to fall into the swift current in the bight of the bend, allowing the current to “wash” the head of the tow around the corner, thus limiting inertia in the steer and controlling the mass of the tow. Part of the wisdom that gets passed down is when to flank and when to steer a bend. The best advice is to work *with* the current—not against it.

These difficult transits through restricted channels also create traffic jams. The flanking of the bend can sometimes double the time it would take to transit the same stretch of river. As a result, upbound traffic is often obligated to wait on the downbound traffic below the sandbar. Often several boats will pile up before the downbound traffic subsides enough for the boats waiting below to make the jump up through the narrow area. Keep in mind, they are going to take a long time to shove up through the narrow spot with the increased velocity.

The depth of the water in certain spots can also be a challenge. As river levels go up and down, the draft of the tow when you depart New Orleans upbound could be an issue seven days later when you get up past Memphis and

beyond. After every high water event, the sandbars seem to shift and re-form, occasionally giving way to rock formations hidden beneath the surface. Every summer, after the spring floods have subsided, the towing vessels plying the mighty Mississippi have to feel their way up the river to discover what new surprises it has in store. Sometimes it’s a bar that built out, or sometimes the river channel completely shifts from one side of the river to another.

### **Low Water Below Natchez**

When there is low water in the areas below Natchez, Mississippi, where the river takes a more traditional channel and its width remains fairly consistent throughout the year, the current slows. Often this lazy river makes for easier steering on downbound transits and more speed on upbound transits.

It comes with its own set of challenges, though. Towboat captains use the river current to steer the tow one way or another when not making way, and to maintain control of the tow when waiting for traffic or tow work. This can be a real challenge when trying to hold position with empty barges in wind, for example, or when stopped along the bank waiting for service. The head of the tow becomes a little more difficult to control, and suction

from passing deep-draft traffic can make holding position nerve-racking. Just because the current has diminished and the water level has fallen does not mean that there is less work or stress on the pilothouse.

### High Water Above Natchez

Above Natchez, when the water levels get higher and the flows increase, the river starts to creep out across the sandbars, behind her islands, and through the woodlands. As the river breaks out of her channel and spreads, it has a chance to spread out and allow a lot more room to navigate. Narrow channels where tows had to flank before become wide enough to steer without issue. Narrow spots where tows could not meet are now wide enough that upbound traffic can stay in calmer water close to the bank and continue their journeys when meeting downbound tows. In fact, they are often able to navigate behind islands and completely out of the paths of other vessels. For these reasons, contrary to belief, sometimes high water is a pleasure.

Every river towboat pilot keeps good notes on the navigability of chutes and the amount of water over dikes and bars. The most critical thing about high water is that although the river channel itself has a tendency to widen with the increased water levels, bridges do not. The bridge spans are often not in line with the flow of the current out of a bend or across a point. At every different river stage, the bridges have a different personality, as well. Water flow becomes a greater consideration, and the effect of the current on the vessel and barges greatly increases the risk profile of the transit.

### High Water Below Natchez

When the water below Natchez rises enough that the USACE can control the river's course, keeping it on its path toward the sea, the river can't get any wider—it can only get faster. This is where the navigation of large tows becomes a real challenge. Traffic management becomes more of a concern, especially in the congested areas below Baton Rouge.

The captain has to listen closely for downbound ship traffic behind him because the act of flanking temporarily stops all other traffic at a particular bend in the river. It's in the best interest of the towboat to get the ship traffic past it before beginning the flank, because smaller tows and ships behind them may be unable to stop and wait with a following current. The ability to stop along the banks becomes more of a challenge as the water covers raised river beds and the proximity of tows to levees and embankments become more of a concern, greatly restricting the opportunities for safe berth. The lack of parking spots leads to more congestion and pressure on the fleets or the need to maintain a position in the river current while doing tow work.

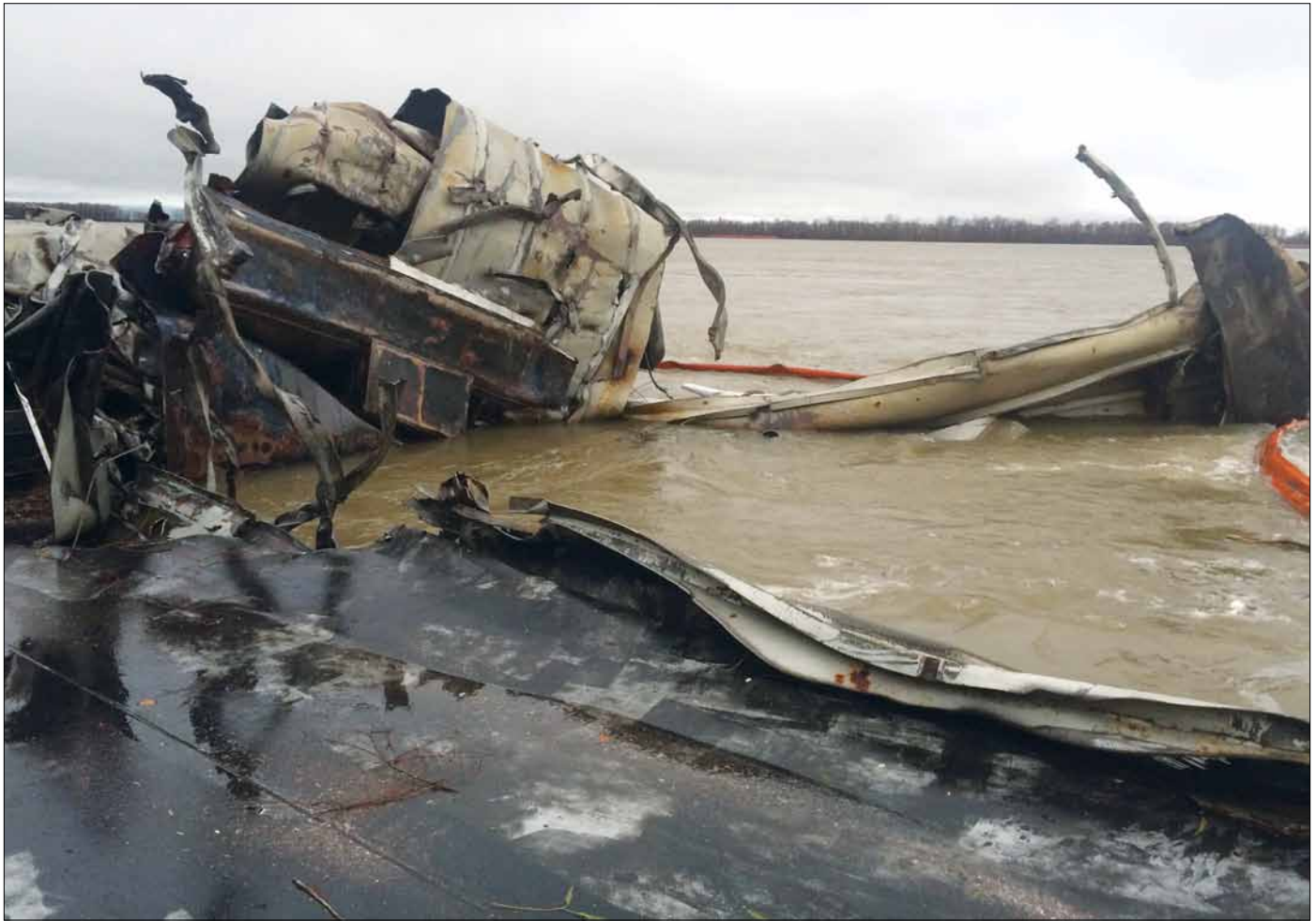
Drift poses another problem for tows during high water, where large trees and debris can jam a rudder or rob a boat of an engine for a few minutes. Another thing



Top: Crewmembers on the bridge of the Coast Guard Cutter *Harry Claiborne* guide the ship through the Mississippi River in 2010. Coast Guard photo by Petty Officer 3rd Class Barry Bena



Left: A red nun buoy lies on the levee bank of the Mississippi River, a casualty of the high water on the river. Coast Guard aids to navigation units replace and maintain aids to navigation on the rivers to maintain a safe, navigable waterway. Coast Guard photo by Petty Officer 3rd Class Lora Ratliff



A barge carrying slurry oil being pushed by the towing vessel *Amy Francis* allided with the Natchez-Vidalia Bridge on the Mississippi River in January 2016. The barge reportedly had a maximum potential of more than 1 million gallons of slurry oil on board. Coast Guard Sector Lower Mississippi River photo

to realize is that the current speed is not always perfectly aligned with the height of the water on the river gauge. No event is the same—any or all of the following may play a part in the expected velocity:

- whether certain tributaries are contributing to the flow
- whether spillways are being employed
- whether the river is rising or falling
- the rate and duration of the rise

### **Mitigation Strategies**

The industry has many different strategies for dealing with these difficult situations. First and foremost, they work with regulatory agencies and industry groups to craft waterway action plans from experience and insight. These collaborative efforts, when properly employed and regularly reviewed and amended, create a framework or set of ground rules upon which everyone can base decisions. Years of experience and practice go into planning. Often those with the experience and wisdom to make such decisions have gone on to calmer waters long ago,

but the legacy knowledge guides new mariners and Coast Guardsmen who rotate through positions that help monitor the river conditions.

Tow size restrictions are another method of reducing risk. The less tow-to-horsepower ratio a boat has generally means greater control of the tow and better speed through the water on upbound transits. Tow sizes are generally considered part of the waterway action plan and are usually based on numbers industry and Coast Guard find to be acceptable standards.

These tow-to-horsepower ratios were always considered with the knowledge that most vessel designs were the same, with steering rudders, flanking rudders, and conventional wheel and shaft setups. New technology and efficiencies—born with the influx of azimuthing drives (Z-drives) and bow thruster combinations—are changing how we determine adequate control of a tow for a given tow size.

Smaller tows on the vessels do not always eliminate all risks. There have been times when tow sizes were reduced so much that what had worked for pilots previously had

fundamentally changed, causing the current set at the bridge to not act on the tow as it had in the past. In such a case, the pilot would be counting on the current to push the tow in a certain direction, but the small tow and greater horsepower would cause an unanticipated action, and the tow would end up alliding with the bridge pier despite the preventative measures taken.


Information sharing is another hallmark of the inland towing industry. While we all compete for contracts in the marketplace, a grounding or collision on a narrow channel doesn't help anyone. In open waters, one could simply go around a problem, but on a river, an incident generally results in a closure impacting everyone's business. During times of water level extremes, river industry and Coast Guard personnel hold conference calls to share information, create strategies to minimize delays, and ensure everyone understands the risks and takes appropriate action to mitigate those risks. All experiences are passed along and recorded for inclusion into updated waterway action plans.

Self-help is another industry hallmark of cooperation and mutual care. The industry often provides boats at bridges and locks to assist other vessels and ensure the whole of the industry is able to continue to move commerce. The personnel on these helper boats are able to pass on valuable information and serve as a local expert, having witnessed transits through the area. They are also able to render assistance if the situation does not quite go as planned.

It is a large expense to provide these vessels and crews, but the movement of cargo and the flow of commerce is highly important to each and every company. Companies also regularly provide staff-to-traffic management posts where industry representatives partner with Coast Guard personnel to advise transiting crews and maintain a semblance of order as it applies to the large queues of boats that may build up during traffic restrictions. These volunteers help keep track of the list of boats as they arrive and advise the Coast Guard of handling characteristics, expectations, and abilities to provide efficiencies in getting traffic moving in the best way possible.

In all, the Mississippi is a single river with multiple personalities. From day to day and river stage to river stage, the river shows us a different side of itself, requiring different sets of skills to tame. One thing the river will teach you is that there is always something else to learn.

Together, the professional mariners plying the waters of the Mississippi, in close coordination with other industry partners and the Coast Guard, are working to ensure that commerce continues to flow. It takes a group effort to help alleviate some of the risks associated with an ever-changing river. Legacy knowledge of river navigation strategies, past experience, familiarity with emerging technology, and up-to-date information on changes in river currents and channels are all part of the strategy.

It is very important to understand that there is no one solution to these complex navigation problems, and every high river is different. With this in mind, it is important to capture the lessons learned and have a framework for mitigating risk, but to be flexible and have a team ready to work out problems unique to each river level event. 

**About the author:**

*Matt Lagarde wrote this article while serving as the regulatory compliance director for American Commercial Barge Lines. He is currently the director of tank barge operations for Ingram Barge Company. He holds a Master of Towing for Western Rivers, Great Lakes, and Inland waters, and has navigation experience throughout the Inland waters and Western Rivers navigating tows. He also has experience working shore-side in a support and advocacy role for the mariners throughout the industry. He has also served on numerous industry committees, including the last six years as a member of the USCG's Towing Safety Advisory Committee, and as a board member for the Maritime Navigation Safety Association for the last eight years.*



The U.S. Army Corps Dredge Potter works on the Mississippi just south of the Jefferson Barracks Bridge near St. Louis to ensure the channel is properly cleared and dredged in December 2012. Low water is also uncovering a sand bar near the southbound tow. Coast Guard photo



# Chicago's Waterway System

## Competing demands on Chicago's shared waterways

by LT JOHN RAMOS  
*Chief, Waterways Management Division*  
*Marine Safety Unit Chicago*  
*U.S. Coast Guard*

Welcome to Chicago! Located on the southwest corner of Lake Michigan, Chicago is a vital transportation hub connecting the five Great Lakes to the western rivers system. While early forms of land-based transportation, like transcontinental railroads, dominated connections between inner cities, Chicago's waterways were the key to solidifying the city's role as a commercial powerhouse.

Nearly 175 years ago, Louis Jolliet and Father Jacques Marquette were among the first to envision a continuous connection from the Atlantic Ocean to the Gulf of Mexico using the waterways near Chicago. Today, because of the 1822 congressional authorization of the Illinois and Michigan Canal, this dream is a reality, making Chicago's waterways the conduit to the Great Mississippi River and a welcoming point to the heartland of America.<sup>1</sup>

### Competition for Today's Waterway System

Downtown Chicago is divided by three navigable branches of the Chicago River—the north, south, and main branches. Water flows into the branches via the

Chicago Lock, which connects Lake Michigan to the river system. Originally, the river flowed into Lake Michigan, but polluted river water caused major contamination of the public drinking supply taken from the lake. This led to the creation of the Chicago Sanitary and Ship Canal (CSSC), and the reversal of the river to protect the area's source of drinking water. Construction of the 160-foot-wide engineered channel to support reversal of the Chicago River began in 1892 and was completed in 1900.<sup>2</sup>

These three branches of the Chicago River allow a diverse group of waterway users, from commercial traffic to human-powered craft, to transit through Chicago's major metropolitan areas. During the summer, Chicagoans and visitors regularly board passenger vessels and recreational boats to take advantage of all the city has to offer. This path through the city has naturally led entrepreneurs to develop popular commercial vessel tours for passengers. Under the officer in charge, marine inspection (OCMI) authority, the Coast Guard regulates many of these operations to ensure passenger vessels comply with applicable federal laws.



The Chicago skyline during the summer, showing Lake Michigan and the Chicago Harbor on the left. Boats are moored in the harbor and Lake Shore Drive winds around the city. Photo by Joseph Sohm | Shutterstock.com



Tug and barge traffic transits through the fish barrier at the Chicago Sanitary and Ship Canal. Coast Guard photo by CG Auxiliant Brian Hinton

through the CAWS supported more than 1.7 million jobs and \$102.5 billion in wages.<sup>3</sup>

Recreational boating is another entity competing for use of the waterways in Chicago. On Lake Michigan, recreational users gather near Chicago's 10 harbors located along the 14-mile lakeshore that makes up the largest municipal harbor system within the United States.<sup>4</sup>

The Coast Guard accomplishes this mission with marine inspectors who examine vessels and enforce laws using the Code of Federal Regulations.

Occasionally, large configurations of steel barges pass through Chicago carrying dry cargo like salt, sand, petroleum coke, and scrap metal. Normally these barges continue through the south branch of the river, headed for the CSSC. On the CSSC, barges are parked in spaces known as "fleeting areas." Barges in fleeting areas are typically parked side-by-side, waiting to be taken to a local facility to discharge cargo. With the possibility of upbound and downbound traffic many times carrying two barges wide, and a single parked barge measuring 35 feet wide, towing vessel masters are left with only 20 feet of open space in which to operate. If mariners continue further south, they navigate into the Des Plaines River, which creates a confluence with the Kankakee and Illinois rivers, that later connects to the mighty Mississippi near Grafton, Illinois.

The Chicago River, CSSC, and other waterways are the primary navigation channels comprising the commercial portion of the area commonly referred to as the Chicago Area Waterway System (CAWS). The CAWS is critically important to southern Lake Michigan ports like Chicago, Indiana Harbor, Gary, and Burns Harbor, Indiana, that receive cargo. A 2016 study showed that commerce



The major waterways included in the Chicago Area Waterway System. U.S Army Corps of Engineers graphic

The city of Chicago rekindled public interest in the waterway with its new Chicago Riverwalk, which fully opened in 2017. The 1.25-mile continuous walkway takes pedestrians along the navigable channel of the Chicago River's main branch from the lakefront to the heart of downtown. This walking path includes restaurants and concessions, lookout points, boat rentals and tours, and theater-style seating for pedestrians.

### Crowd-Drawing Events

The third most populous city in the nation, Chicago hosts numerous water-based marine events, including some of national significance. Under the Coast Guard's waterways management program, the service oversees the permitting of marine events when they occur on federally navigable waters. Since the Chicago River and the larger Chicago Area Waterway System act as a commercial highway for interstate commerce, Coast Guard Marine Safety

Unit (MSU) Chicago facilitates water-based marine events in accordance with Title 33 Code of Federal Regulations Part 2.36.

Common examples of annual marine events include the Chicago Air and Water Show, boat races, swim events, water-based filming, and fireworks displays. Larger intermittent events like the 2016 Louis Vuitton America's Cup—the first freshwater race in the event's 164-year history—and the famous Tall Ships Challenge Series of international sailing races, cruises, and maritime festivals also bring in tens of thousands of spectators. These events are either deemed marine events of national significance or earn a special event assessment rating from the Department of Homeland Security due to their significance and need for federal, state, and/or local resources.

Across the United States, local Coast Guard units use their captain of the port (COTP) authority under the Magnuson Act and the Ports and Waterways Safety



Spectators board vessels to participate in tours at the 2016 Tall Ships Challenge Series. Coast Guard photo by CG Auxiliast Brian Hinton

# Cuyahoga: The Burning River

## Waterway safety is a universal concern

Stretching roughly 85 miles, the Cuyahoga River, meaning Crooked River, has been vital to Cleveland since the city's 1796 incorporation. While its name may reflect the river's many hairpin turns, its nickname—the Burning River—is commentary on the number of times the river has caught fire because of pollution. The most recent incident was in 1969.

Historically, the Cuyahoga River has been used to transport iron ore, salt, and cement, but a spike in recreational boat usage in the 1980s created a dangerous mixture of small pleasure crafts and large freight ships in the extremely narrow, twisting waterway. The resulting marine casualties forced the Cleveland community to work together on ways to mitigate the risk.

One idea resulted in the creation of the Cuyahoga River Safety Task Force. Comprised of representatives

from the captain of the port (COTP) and commercial, recreational, and city stakeholders, the group went to work and proposed the designation of 11 safety zones that were ratified and federally mandated. Coordination of such a task force and safety zones are driven by authorities given to the COTP in 33 CFR. These efforts, combined with an economic downturn, quieted the waterway issues.

However, in 2012, a near-miss between a large passenger vessel and a tandem kayak reinvigorated a call for action to reexamine policies on the river and increase safety beyond the safety zone regulation. As such, the task force sought solutions to effectively reach users of human-powered craft to explain the “rules of the road” on the waterway.

The Cuyahoga River Safety Task Force developed a public outreach strategy to reach all waterway users. First,

the task force teamed with Cleveland Metroparks on a safety-focused press conference with local live news spots to discuss how citizens could use the parks along the Cuyahoga River in a manner that would ensure a safe return home. Next, we worked with the Lake Carriers Association for the freight ships as well as local paddling groups to develop a safety pamphlet to be distributed to paddlers at various “splash” locations along the river and at local marinas. The



The 630-foot U.S. freight vessel *Robert S. Pierson* navigates under the Willow Street Bridge in the Old River as it approaches Cleveland's Flats District. Encounters and near-misses have been on the rise as recreational and commercial traffic struggle to share this busy, narrow waterway. Photo by Jim Ridge courtesy of Share the River, found at <http://sharetheriver.com/>

Act to address safety concerns at marine events. The Magnuson Act and the Ports and Waterways Safety Act allow the Coast Guard to use its federal authorities to protect vessels, waterfront facilities, ports, harbors, and the general public. Typically, enforcement is conducted by on-site patrol commanders through safety and security zones prohibiting vessels from entering areas. Coast Guard small boat stations, like Stations Calumet Harbor and Wilmette Harbor, are the main patrol commanders within the Chicago area, with the Illinois Department of Natural Resources Conservation Police, Chicago

Police, and Chicago Fire Departments serving as force multipliers.

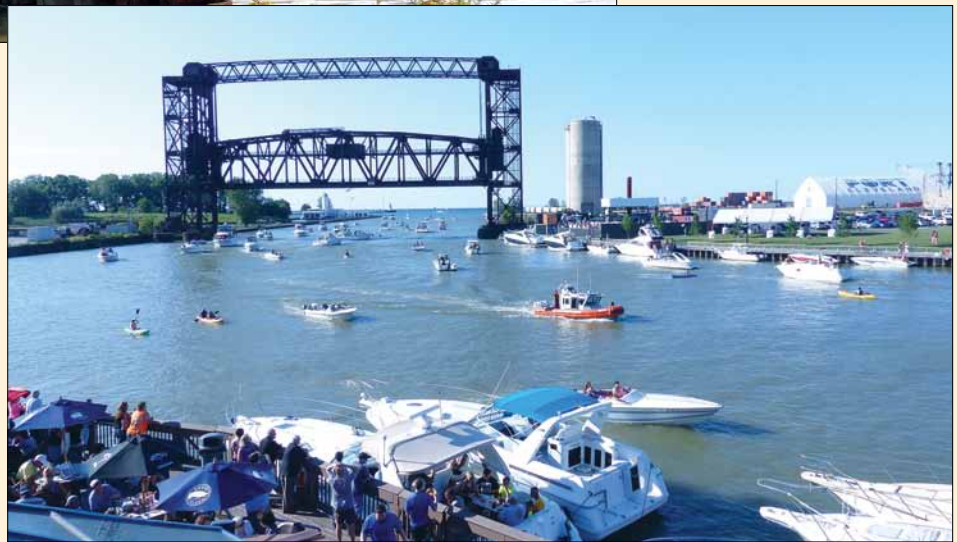
Outside of marine events, captains of the port, in coordination with their district commanders, may control vessel traffic in an area which is determined to have a hazardous condition by developing a regulated navigation area (RNA). The one on the CSSC in Romeoville, Illinois, for the Aquatic Nuisance Species Electric Dispersal Barrier System, is one example of an RNA unique to the Chicagoland area. Operated and maintained by the United States Army Corps of Engineers, the electric dispersal



(Left) Two eight-person crew teams pass the 635-foot U.S. freight vessel *Great Republic* while navigating under Cleveland's Eagle Ave. Bridge after exiting Collision Bend in the Cuyahoga River. (Below) A Coast Guard asset patrols the highly congested waters near Cleveland's Flats District on a typical weekend during the summer of 2017. Photo by Jim Ridge courtesy of Share the River, found at <http://sharetheriver.com/>

pamphlet contained information on how to interact with commercial freighters and a map of the Cuyahoga River that highlighted the specific areas on the river to avoid when freighters were transiting. Finally, and most successfully, the task force produced a Cuyahoga River safety video focused on educating recreational users. This video had representation from all users and explained safety procedures in an innovative and out-of-the-box manner. The video was distributed across multiple social media platforms, and has been viewed thousands of times in addition to being praised at the city and regional levels.

While the actions taken by the Cuyahoga River Safety Task Force will not fix all of the waterway issues, they are



a step in the right direction. Cooperation and collaboration among all users enable us to find tangible answers to our problems. //

—by LCDR MICHAEL J. DOUGHERTY  
*Commanding Officer, Marine Safety Unit Cleveland  
 U.S. Coast Guard*

barrier system deters the invasive Asian carp and other aquatic nuisance species from reaching the Great Lakes via the CSSC.

While effective, the electric dispersal barrier system is dangerous to common boaters. To mitigate the dangers, Coast Guard regulations prohibit personal or human-powered watercraft and vessels under 20 feet in length from transiting the area. In addition, the RNA requires personnel to remain inside a cabin or as inboard as practicable to prevent electrical shock while passing through the area.

### **The Chicago Harbor Safety Committee**

Coordination of RNAs, safety zones, security zones, and large marine events takes resources and constant communication with local industry stakeholders, including city, state, and federal agencies. Across the United States, many industry waterway stakeholders coordinate concentrated efforts through groups called harbor safety committees.

The Chicago Harbor Safety Committee (CHSC) was established on July 15, 2013, with the main purpose to “form a partnership between the private sector and

government agencies for identifying, assessing, and implementing measures that ensure the safe and efficient use of Chicago area waterways, including the Chicago River and Lake Michigan.”<sup>5</sup> The CHSC, in particular, is a very diverse and active group of stakeholders that works closely with the Coast Guard as well as other city,

**For more information**

**To view “Safe Boating in Chicago,” go to [www.chicagoharborsafety.org/movie](http://www.chicagoharborsafety.org/movie)**

state, and government agencies. The committee’s most recent accomplishment was the production of the short film “Safe Boating in Chicago” at the height of the 2017 summer boating season to reinforce safe boating on the area’s shared waterways. The professional film highlights safe boating techniques, local areas of concern, historical facts, and provides aerial footage of Lake Michigan’s lakefront and the Chicago River.

“The Chicago Harbor Safety Committee continues to serve as the ‘Gold Standard’ as shown by the time, effort, and resources invested in producing a safe boating video that will benefit Chicago’s waterway users,” CDR Zeita Merchant, commanding officer of Marine Safety Unit Chicago, said. “The making of this video is a great opportunity for the Coast Guard and other local first responders to collaborate with the diverse committee stakeholders to highlight the Chicago River and Lake Michigan as shared waterways that all can enjoy if done in a safe and informed manner.”

The strength of the CHSC comes from its uniquely designed subcommittees. To incorporate ideas and address concerns from a broad range of stakeholders, a member-elected board of directors leads groups of specific sector representatives that run the organization. Sector-specific subcommittees involved in the Chicago Harbor Safety Committee include, but are not limited to:

- Commercial/passenger vessel operators (49 passengers or less)
- Commercial/passenger vessel operators (50+ passengers)

- Commercial barge and towing, bareboat charter operators
- Recreational boating (powerboat and sailing)
- Human-powered craft (paddling and rowing)

These groups, combined with the board of directors, provide an insightful self-regulating forum “that promotes safe and efficient use of the Chicago-area waterways.”<sup>6</sup>

**Illegal Passenger Vessel Operations**

When major safety concerns arise on the water, often the harbor safety committee provides the Coast Guard with knowledge and expertise on the issues. Over several years, the CHSC has worked with the Coast Guard to prevent illegal passenger vessel operations through boating community outreach. In 2017, an effort to detect and deter an increasing number of illegal passenger vessel operations occurring on Chicago’s congested waterways began.

A more aggressive, unified approach, with the goal of preserving life, promoting maritime safety, and facili-



The Coast Guard and other state and local agencies provide safety tips to boaters during the taping of the Chicago Harbor Safety Committee’s “Safe Boating in Chicago” video. Coast Guard photo courtesy of MSU Chicago

tating commerce, was developed into a comprehensive intelligence-driven operation. The U.S. Coast Guard Investigative Service, MSU Chicago, Station Calumet Harbor, and Sector Lake Michigan’s intel division, in addition to other federal, state, and local partners, partnered to execute surge operations targeting illegal operators. During the course of the 2017 season, 24 operators were ordered to cease illegal passenger vessel operations via U.S. Coast Guard captain of the port orders.

In addition, MSU Chicago's investigation officers imposed \$45,500 in civil penalties, prosecuted licensed captains, and opened more than 30 federal criminal cases. These illegal passenger vessel charters are often cited for unsafe operations, including overloading passengers, no life jackets, and no required lifesaving equipment, as well as being operated by people without the proper merchant mariner licenses/credentials.

For vessel owners and operators who do not comply with U.S. Coast Guard captain of the port orders, it can lead to a civil penalty of not more than \$90,063, pursuant to 33 U.S.C. § 1232(a), with each day of continued operation constituting a separate violation. Furthermore, a willful and knowing violation of this order under 33 U.S.C. § 1232(b) constitutes a Class D Felony, which may expose the operator to a term of imprisonment not to exceed 10 years and a fine of up to \$250,000.

In an effort to educate the public before the enforcement initiative took place, MSU Chicago hosted several educational mariner outreach events, canvassed local marinas, and issued press releases to inform the public and bareboat charterers of the applicable requirements for having a safe and legal operation.

"My top priority is to ensure vessels carrying passengers on our waterways are operating safely and in accordance with the law. Vessels that do not adhere to federal regulations not only pose serious safety concerns to the public and the environment, but also adversely impact the livelihood of legitimate operators who do comply with federal regulations," CDR Merchant said. "Our joint efforts with federal and state agencies are helping to eliminate unsafe vessels and unlicensed operators that do not comply with state and Coast Guard regulations from operating on our shared waterways."

### Reintroducing Chicago by Water

Rich with maritime history, Chicago continues to play a vital role as a significant and constantly evolving U.S. port. As the city of Chicago promotes use of the water through major projects like the Riverwalk, congestion concerns rise as small passenger vessels, recreational vessels, and larger commercial entities compete for the



A MSU Chicago marine inspector and Station Calumet Harbor boarding officer question mariners on potential illegal passenger vessel operations. Coast Guard photo by Master Chief Petty Officer Alan Haraf

limited space on the rivers and within the breakwaters of Lake Michigan.

In the summer, spectators from all over the world participate in popular water-based marine events, necessitating that the Coast Guard use COTP authorities to enforce safety zones, RNAs, and regulations to ensure port and waterway safety. To manage coordination on the water, comprehensive planning is accomplished with support from specialized committees within harbor safety committees. If problems arise, the Coast Guard creates harmonized approaches for enforcement actions by working with local, state, and federal agencies.

As the connection between the Great Lakes and the western rivers, Chicago's dynamic waterway system will continue to play an important role for years to come. ▀

#### About the author:

Lieutenant John Ramos has worked as a marine inspector at Sectors New York and San Francisco. Following his marine industry training, he was assigned as the inspections division chief at Marine Safety Unit Chicago, and is now serving as the waterways management division chief.

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# Cook Inlet Ice Guidelines

A best practice for stakeholder engagement

by LTJG DAVID PARKER  
Waterways Management Division Chief, Sector Anchorage  
U.S. Coast Guard

CDR JUSTIN JACOBS  
Chief of Prevention, Sector Anchorage  
U.S. Coast Guard

**O**n February 2, 2006, the T/V *Seabulk Pride*, a double-hull oil tanker built in 1998 for the domestic energy market, was conducting routine cargo transfer operations at the Kenai Pipeline Dock in Nikiski,

Alaska, on Cook Inlet. Conditions at the time were typical for that region—a 4- to 5-knot current and significant ice. As the current carried ice past the vessel, it began to accumulate between the vessel and dock. The vessel

was then hit by an ice floe that parted her mooring lines. The crew unsuccessfully attempted to start the main engine before the vessel grounded on the opposite shore of the Cook Inlet. Despite significant damage to the vessel's hull, the cargo tanks were not breached, and none of the 5 million gallons of oil carried by the vessel spilled into the icy Alaskan waters.<sup>1</sup>

Several other vessels experienced similar incidents in Cook Inlet, where ice and swift currents create these dynamic and dangerous situations. Unlike other parts of the United States that experience ice, Cook Inlet is a unique 189-mile-long, freshwater marine estuary fed by multiple glaciers to the north and south of Anchorage. It is generally a shallow body of water that experiences the second-largest tidal range in the world at 29.5 feet. This tidal range creates extreme currents that are typically 4 knots, but have been reported to be as high as 8 knots in some areas.<sup>2</sup> The addition of sub-zero temperatures for multiple months each year adds fast-moving ice to an already-hazardous marine environment.

The Western Alaska captain of the port (COTP), in coordination with the port stakeholders and industry members, took decisive actions to enact best practices and work toward preventing a reoccurrence of these types of events in Cook Inlet during the 2007 ice season.



A satellite image shows a significant presence of ice extending into lower Cook Inlet. NOAA image





In January 2009, a large ice floe pinned the *M/V Monarch* against the leg of the Granite Point platform, causing the vessel to capsize and sink to the bottom of Cook Inlet. This incident resulted in increased bridge manning requirements during ice conditions. Coast Guard photo

### Ice Formation

Cook Inlet is located in south-central Alaska and connects the waters of the northern Pacific to the city of Anchorage and interior Alaska. Ice formation begins in the northern part of the inlet near Anchorage, where ice concentration is thickest. It proceeds incrementally toward the lower portion of the inlet as temperatures drop and snowfall increases. As the turbulent tidal activity combines with freezing winter temperatures, heavy snowfall, and strong wind patterns, sea ice is formed and scattered by the tide throughout the inlet.

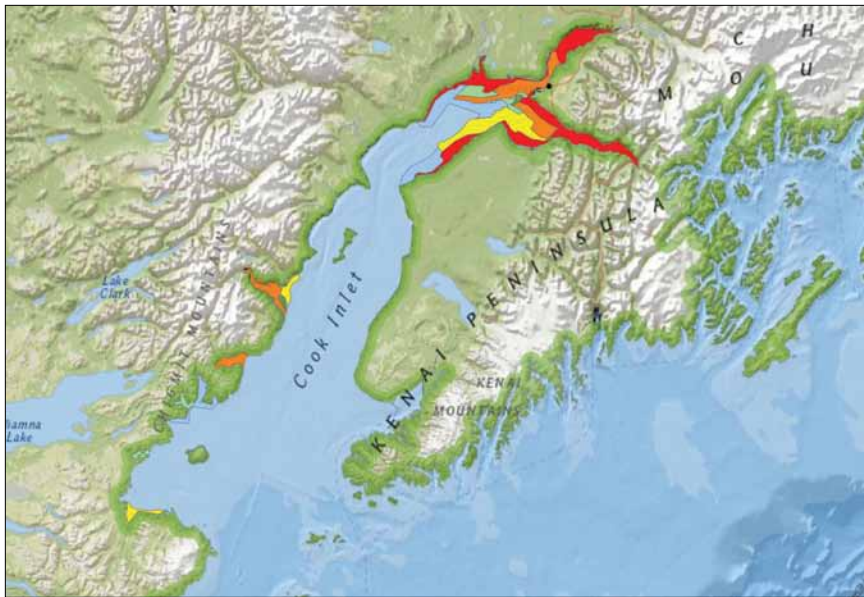
There are four major types of ice that form in Cook Inlet:<sup>3</sup>

- **Sea Ice**—ice crystals that form at various levels in the water column and aggregate on the surface of the water
- **Beach Ice**—upper layers of mud flats that freeze when exposed to air at low tide; water adjacent to the frozen mud freezes at a rate of about 1 inch per day
- **Stamukhi**—beach ice that is lifted by a flood tide and deposited on top of other beach ice, forming thick layers of ice in excess of 20 feet thick



The T/V *Seabulk Pride* grounded a half-mile north of the Kenai Pipeline Dock in Nikiski, Alaska. Coast Guard photo

- **Estuarine Ice**—freshwater ice formed in river drainages and pushed into the inlet; the hardest of all the ice forms



The National Weather Service's Alaska Sea Ice Program produces daily ice analyses showing ice concentration in Cook Inlet. This image shows the ice concentration on December 5, 2017. National Weather Service image

As each type of ice begins to form, the tidal cycle forces them to mix together, creating a concentration effect where large slabs, or pans, of ice travel up and down the inlet. Ice pans can flow as far as 5 miles a day,<sup>4</sup> presenting a major navigational challenge for ships transiting the inlet and for vessels alongside a pier. As the ice concentration thickens, it becomes increasingly difficult to maneuver vessels, especially large tankers and container ships delivering fuel and freight to Anchorage and Nikiski. Thankfully, large vessels are able to maneuver through Cook Inlet throughout the winter—albeit with increasing risk to their safety—because the tides and currents keep ice from solidifying into a conjoined mass.

### Infrastructure and Vessel Traffic

Cook Inlet is the source of Alaska's oldest producing oil fields and contains 17 oil and gas platforms.<sup>5</sup> Long known for its military, economic, and environmental significance, the inlet provides access to the city of Anchorage, the inland rail belt, and Alaska's four major military bases. Large refineries located in Nikiski provide petroleum products for military bases and the Anchorage International Airport. The Port of Alaska is the commercial and economic hub of the state and receives weekly shipments of fuel and waterborne freight. In fact, 90 percent of fuel used by Alaskans enters through this port, as well as 90 percent of all freight bound for points west of Cordova, Alaska.<sup>6</sup>

Maritime commerce is a year-round activity, even during heavy ice conditions in extremely cold winters. Although winters have become increasingly mild over the past decade, it was common during the 1980s and 1990s to have several consecutive weeks of temperatures as cold

as -20 to -30 degrees Fahrenheit.<sup>7</sup> Unlike other parts of the United States, Cook Inlet has no commercial or Coast Guard icebreaking capability to assist other vessels. The element of ice in motion adds multiple factors that affect the safety of a vessel's crew and the integrity of the surrounding marine environment.

### Stakeholder Involvement

The COTP Western Alaska has proactively engaged with the maritime industry and interested stakeholders to develop and implement best practices for vessel operators during ice conditions. The Cook Inlet Harbor Safety Committee is a major vehicle through which the COTP engages a diverse group of port partners, and is comprised of various stakeholders committed to developing sound marine practices unique to Cook Inlet.<sup>8</sup> From a

geographic perspective, it is likely one of the largest harbor safety committees in the United States and represents various members of the maritime industry and Cook Inlet region. These stakeholders include oil companies, commercial fishermen, tug operators, vessel owners and operators, environmental non-governmental organizations, and local city government representatives. It also has a large number of ex-officio members from federal, state, and local government agencies. Other organizations that participate in the process include:

- Cook Inlet Regional Citizens Advisory Council
- Southwest Alaska Pilots Association
- Alaska Department of Environmental Conservation
- Alaska Sea Ice Program, a division of the National Weather Service
- a stand-alone workgroup comprised of various marine operators that come together each winter to analyze detailed aspects of ice operations

One of the many achievements of collaboration between the COTP and the Cook Inlet Harbor Safety Committee is the development of standards of care for vessel and oil terminal operators known as the *Operating Guidelines for Ice Conditions in Cook Inlet*, or ice guidelines. The COTP, in consultation with the pilots, industry, and National Oceanic and Atmospheric Administration (NOAA) Sea Ice Program, activates the ice guidelines each winter via a navigation advisory<sup>9</sup> based on the concentration of existing sea ice and forecasted conditions by NOAA.<sup>10</sup> The implementation of the guidelines varies from year to year as weather patterns continue to change and industry practices evolve. Consequently, the ice guidelines are flexible and dynamic—a living document that can adapt quickly

to the recommendations of experienced mariners and growing expertise in ice operations.

Another best practice that has recently emerged from stakeholder engagement with the COTP came from corporate sponsorship of a vessel simulator training session at the Alaska Vocational Technical Center (AVTEC) in Seward, Alaska. This event was led by Andeavor, which owns the Kenai Pipeline Dock, and the Cook Inlet Citizens Advisory Council. The event included hands-on scenarios simulating actual vessels that operate in Cook Inlet and discussions afterwards to share lessons learned. AVTEC has three vessel simulators that can be synchronized to the same scenario, where each simulator served as a different vessel—the oil tanker, the tug boat, and the ice scout. Professional mariners with experience in Cook Inlet were given the opportunity to run more than 30 mooring evolutions and self-arrest scenarios in ice and used all three simulators to better understand the handling characteristics of these vessels.

### Ice Guidelines

The ice guidelines created by the Western Alaska COTP and Cook Inlet Harbor Safety Committee apply generally to all vessels greater than 300 gross tons that transit Cook Inlet during two potential ice phases: Phase I is a set of conditions when ice is present in the upper portion of Cook Inlet, and Phase II is an additional set of parameters when ice has extended to the lower portion of Cook Inlet. This two-phase approach allows a greater degree of flexibility in applying the guidelines, and better timeliness in exercising risk mitigation strategies. Since ice accumulation begins in the northern part of the inlet and then works its way south as it increases in concentration, Phase II is naturally a stricter set of parameters. There are also specific provisions for offshore supply vessels and tug and barge operations.

The ice guidelines are standards of care agreed on by various stakeholders and do not replace any regulations. Rather, the guidelines provide inexperienced mariners with best practices to assist them in safely navigating the waters of Cook Inlet. The ice guidelines address a wide range of issues from engineering controls and navigation principles to additional mooring equipment. For example, vessels are advised to monitor their draft and maintain ballast in order to keep the sea suction and propeller well below the

ice. Mariners are also advised to maintain a watch on the bridge and engine room during cargo operations so that the vessel can be navigated if it is pushed off the dock. It also requires that engines be ready for operation as soon as possible, if needed. The guidelines advise mariners to increase personnel on the bridge, to be ready for maneuvering when necessary, and not to force ice at any time.

### Ice Safety Exams

One of the most significant threats to a vessel's safety is ice buildup in the sea chest. When a vessel's sea chest freezes, cooling water can no longer circulate to the engines, resulting in overheating and loss of propulsion. The ice guidelines stipulate that all vessels deliver a heated medium—typically steam—to the primary and secondary sea chests to prevent the accumulation of ice or slush ice within the system.

Coast Guard marine inspectors from Sector Anchorage and Marine Safety Detachment Homer conduct ice safety



Members of Coast Guard Sector Anchorage and Marine Safety Detachment Homer participate in the 2017 winter operations meeting in Nikiski, Alaska. Coast Guard photo by LTJG David Parker

exams to verify the suitability of the steam lines and heating systems on board. These exams are conducted at the pilot station before the vessel transits Cook Inlet or prior to departure from Anchorage. In addition to verifying the status of the steam lines, Coast Guard marine inspectors also witness tests of the vessel's steering gear, mooring equipment, emergency procedures, and the adequacy of the crew's cold-weather clothing.



Large pans of ice, also known as “pancake ice,” comprise the most common ice concentrations in Cook Inlet. NOAA photo

The Ports and Waterways Safety Act empowers the Coast Guard with captain of the port authority to control marine vessel traffic in the interest of protecting navigation and the marine environment.<sup>11</sup> The Cook Inlet ice guidelines are an excellent example of the Coast Guard exercising this authority in an area where a unique set of hazards creates challenges unlike anywhere else in the United States. From the first committee meeting to the final ice exam, operating a vessel safely in Cook Inlet ice is a business that requires commitment and collaboration among every operator on the waterway. ▀

**About the authors:**

*LTJG David Parker is the waterways management division chief for Sector Anchorage, Alaska, the largest and most geographically diverse area of operations in the Coast Guard. He previously served as a deck watch officer aboard the USCGC Hickory, servicing aids to navigation throughout Western Alaska and the Arctic.*

*CDR Justin Jacobs is the head of the prevention department at Sector Anchorage, Alaska. He has served in the Coast Guard for 17 years in a variety of national and international assignments in the marine safety field. He holds master’s degrees in homeland security from American Military University and in transportation policy, operations, and logistics from George Mason University.*

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# Wildfires and the Captain of the Port

## Lessons learned from the Eagle Creek fire

by CAPT TOM GRIFFITTS  
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Marine Safety Unit Portland  
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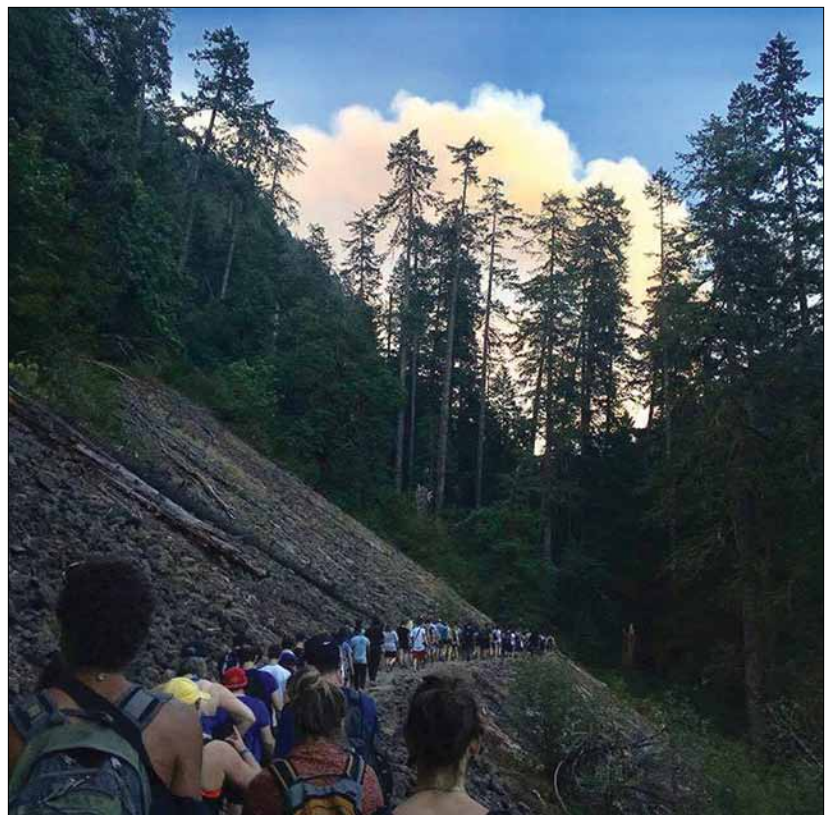
LCDR LAURA SPRINGER  
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For the Pacific Northwest region, 2017 was a difficult weather year. Winter brought a Canadian snowpack that was 260 percent above normal, which led to high water in the Columbia River Basin in the spring. The summer brought hot and dry conditions despite the heavy snow pack, increasing the chances of extreme fire danger as fall approached. By September 5, Washington State had nine fires burning more than 1,000 acres each. Oregon and Idaho had 19 fires over 1,000 acres, with each state's largest fire well over 150,000 acres. Across the Pacific Northwest, more than 234 square miles were consumed by fire.<sup>1</sup>

On September 2, 2017, a fire was reported in the Columbia Gorge National Scenic Area near Cascade Locks, Oregon. Just three days later, this fire, called the Eagle Creek Fire, had grown to more than 20,000 acres and jumped the Columbia River into Washington, starting the Archer Mountain Fire. At this point, the Eagle Creek Fire was deemed a National Incident Management System "Type 1" incident, evacuation orders were issued for residents of the area, and Interstate 84 was closed to all vehicular traffic.<sup>2</sup>

This section of the Columbia River is a major east/west transportation corridor routinely transited by tugs, barges, overnight passenger vessels, tribal and recreational fishing vessels, and recreational boating vessels. Every year about 26.5 million metric tons of grain moves through this river system. According to the Pacific Northwest Waterways Association, this makes the Columbia River the third-largest grain export corridor in the world behind the Mississippi River and South America's Parana River.<sup>3</sup> Closing the Columbia River for any amount of time significantly impacts farmers, grain terminals, and grain shippers.

Working closely with the Eagle Creek Incident Command staff, the captain of the port (COTP) determined that the fire posed a very real threat of igniting passing vessels, since hot ash and embers were flying across miles of the Columbia River. As a result of these conditions, on September 6 the COTP issued a safety zone barring all vessel traffic from passing between river mile 154 and 158 unless they had permission from the Captain of the Port.



Hikers head away from the Eagle Creek Trail toward the Indian Creek Fire plume in the Columbia River Gorge near Portland, Oregon, in September 2017. Air Force Technical Sergeant Robert Dones, 349th Medical Squadron surgical technician, helped guide the group safely out of the fire. Air Force photo provided by Sarah Carlin Ames

Not only did the safety zone protect those who would otherwise be on the river, it also allowed firefighting aircraft better access to the water. The safety zone also required commercial and recreational traffic to remain 500 yards away from all aircraft engaged in firefighting operations, such as bucket dips, on the river. The Coast Guard worked diligently with local maritime industry stakeholders and the incident commander (IC) to minimize the economic impact to the region and fully open the Columbia as soon as it was deemed safe to do so—which in this case was at 6 p.m. on September 10.

### Decision Making Process

The Columbia River hadn't been closed to traffic upriver since the 1980 Mount St. Helens eruption, and the Lower Columbia hadn't been closed since flooding in 1996, so this created a very unique situation. Sector Columbia River doesn't have a vessel traffic service, and between 1996 and the time of the Eagle Creek Fire, COTP authorities and responsibilities had moved to Warrenton, Oregon—about 95 miles from Marine Safety Unit (MSU) Portland and 145 miles from the area of the fire. Therefore, the Eagle Creek Fire occurred in a portion of the captain of the port zone in which MSU Portland did not typically operate. The nearest response unit was Station Portland, about 50 miles from the fire.

In this instance, the U.S. Army Corps of Engineers (USACE) was the closest federal entity with navigation safety responsibilities. Because the fire was burning within 200 yards of the Bonneville Dam complex—the

first upriver dam and lock on the Columbia River at river mile 146.1—they were concerned about embers impacting the area. During discussions with USACE, there was particular concern because vessels in the lock would be prone to significant danger with the hot embers falling into a somewhat enclosed area. A vessel on fire in the lock could result in serious injuries and potentially cause catastrophic damage to the lock gates. Damage to this critical infrastructure would affect vessel traffic on the entire Upper Columbia River System.

Realizing the complexity, fluidity, and uniqueness of the situation, close collaboration with our interagency partners and waterway users created better understanding of the fire dangers, risk to the lock, and the criticality of cargo, cruises, and tribal fisheries involved. While the zone was initially set between river miles 154 and 158, the rapidly changing fire prompted an expansion of the zone, resetting it for river miles 126 to 185.

### Lessons Learned

#### *Quickly embedding liaison officers into the ICP*

Initially, the incident was managed remotely from MSU Portland. When it was realized this was not the right approach and liaison officers needed to be embedded into the incident command post (ICP), MSU Portland developed a three-person rotation to staff the ICP. Though this proved difficult due to reduced staffing caused by deployments to hurricane response operations during the same time period, assigning personnel to the ICP proved crucial to remaining nimble and being able to adjust to the incident's requirements more quickly.

Sending personnel to the ICP allowed us to understand the needs of the firefighters and provided MSU Portland personnel with exposure to a Type 1 fire event. It also provided the most up-to-date situation briefs, allowing the Coast Guard to learn what the IC needed to respond to the incident. Strong communication with the IC also allowed us to lift safety zone restrictions as soon as the fire risk subsided.

#### *Traffic coordination*

Two major tug and barge companies service the Columbia River, routinely sending multiple tugs and tows up the river. Petroleum, lumber, and agriculture products are the primary commodities carried on the river. Additionally, various types of passenger vessels transit the river during the summer months.

Closing the river to all traffic could have been devastating to the local economy, which was already reeling from the largest wildfire in recent history. In order to allow traffic through, waterways personnel worked directly with industry to implement risk mitigation steps to allow tug and barge traffic through the area on a case-by-case basis. Mitigation strategies included charged fire hoses,



The wake created when helicopters dipped 500-gallon bambi buckets—like this one used to fight the 2017 Stouts Creek Fire near Canyonville, Oregon—into the Columbia River to fight the Eagle Creek Fire enticed kite surfers, causing danger to all involved. Oregon National Guard photo by Staff Sergeant Jason van Mourik



Heavy smoke from the Eagle Creek Fire hangs over the Bonneville Lock and Dam in September 2017. Mission-essential personnel remained at the dam to maintain safe operations and monitor the critical infrastructure. U.S. Army Corps of Engineers photo

additional watches, and minimizing time spent in the danger areas. Local towing companies also implemented additional safety measures, including the use of escort boats with firefighting equipment. Waterways management staff developed a tracker and briefed the COTP twice a day on expected transits. Keeping the river open to traffic was an “all hands on deck” evolution requiring risk-based decision making.

#### **Coordination with tribes and local government agencies**

In addition to being a major inland waterway, the Columbia River is a Usual and Accustomed Fishing Ground for four federally recognized Native American tribes, and there were multiple tribal fishery openings during this period. In order to make sure all entities were aware of the safety zone, it was vital to reach out to local emergency operations centers and tribal entities to understand their concerns. We worked with tribal leaders to warn fishermen of the risks associated with this fire while still allowing them to continue fishing.

#### **Bucket drop wakes and kite surfers**

In combating inland wildfires, bucket dips—a firefighting technique in which a helicopter dips a bucket into a large body of water, using what is collected to keep the fire from spreading—are commonly used. Kite surfers were interfering with firefighting efforts as they surfed in the wake created by the bucket dips.

To prevent further interruption of firefighting operations, we enacted a safety zone around all aircraft

involved. Through our ICP liaison, we worked closely with local law enforcement to get word about the safety zone out to the kite surfing community.

#### **Conclusion**

Wildfires are very common in West Coast states, but it is very uncommon for a fire to cross a navigable waterway. If faced with a wildfire or other situation that impacts navigation, it is imperative for Coast Guard personnel to embed themselves in the response organization and truly understand the needs of the incident commander, waterway stakeholders, and the safety risks associated with vessel transits. //

#### **About the authors:**

*CAPT Griffitts currently serves as the commanding officer of Coast Guard Marine Safety Unit Portland. He has 24 years of marine safety experience, including 6 years of port security liaison work based in Singapore and Japan. He also served as a traveling marine inspector as one of the Coast Guard’s foremost technical experts for inspection of commercial vessels.*

*LCDR Springer currently serves as the waterways management and facilities division officer at Marine Safety Unit Portland. She has completed tours in inspections, investigations, and planning. She is a licensed merchant mariner and a FEMA master exercise practitioner.*

#### **Endnotes:**

- [www.nasa.gov/image-feature/goddard/2017/smoke-and-fires-light-up-pacific-northwest](http://www.nasa.gov/image-feature/goddard/2017/smoke-and-fires-light-up-pacific-northwest)
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# Big Events in the Big Apple

## Marine events in Sector New York

by LT REBECCA MILLER  
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The Port of New York and New Jersey hosts myriad marine events requiring coordination with industry and other government agencies to ensure the safety of participants and spectators. This includes the largest fireworks show in the country, the largest parade of ships, roughly 25 swims, 35 regattas, and 15 film shoots annually. And these are just the events with an associated Coast Guard marine event application!

### Fleet Week New York

To kick off the 29th Fleet Week New York, thousands of sailors, Marines, and Coast Guardsmen sail into New York Harbor during the Parade of Ships, the only permitted marine event of the week. The 2017 parade featured a variety of U.S. naval vessels including U.S. Naval Academy yard patrol boats, at least one Canadian ship, and a

Coast Guard national security cutter. Fire Department New York (FDNY) fireboats, New York Police Department (NYPD) boats, and a National Oceanic and Atmospheric Administration (NOAA) research ship joined the procession.

While this event occurs every year, the parade participants are always changing, so we follow a method to ensure consistency and another smooth Fleet Week. It is essential to reach out early and often to key stakeholders, including Coast Guard units, the NYPD Harbor Unit, the FDNY Harbor Unit, NOAA, and the U.S. Navy to plan and coordinate the parade. The event sponsor—in this case, for 2017, the Navy—is required to submit a marine permit application 135 days prior to the event. This application provides information like the size of the event, number of participants, start and end times, route, potential traffic



The amphibious assault ship USS *Kearsarge* arrives at Pier 88 in downtown Manhattan for Fleet Week New York on May 24, 2017. Navy photo by Petty Officer 2nd Class Shamira Purifoy





Marines and sailors aboard the USS *Kearsarge* man the rails during the Parade of Ships on May 24, 2017. The event kicked off Fleet Week New York, during which U.S. Marines, sailors, and Coast Guardsmen interact with the public, demonstrate their services' capabilities, and teach people about America's sea services. Marine Corps photo by Pfc. Abrey D. Liggins

impacts, and whether any safety vessels are required. The sponsor gives the Coast Guard a general idea of how many ships will be coming into New York Harbor, but waits to provide a list of the exact vessels closer to the date of the event, as assets are often diverted to support operations at the last minute.

Since Fleet Week is a regularly occurring event outlined in the Code of Federal Regulations, we complete a Notice of Enforcement (NOE). Once the NOE is assigned a docket number, a unique identifying number used to track regulations, the captain of the port (COTP) signs it and returns it to HQ to be published in the Federal Register. Essentially, this announces to the public that the regulation will be enforced on the specified dates and times.

The parade, visible in upper and lower New York bays and along the Hudson River from the Verrazano Bridge to the George Washington Bridge, lasts about 5 hours. The parade is organized throughout the harbor, with berths in Manhattan, Brooklyn, and Staten Island. We pass the information we receive in the marine event application to the NYPD so they can set checkpoints and explosive detection sites along the spectator viewing areas.

In addition to working with external partners, it is essential to work with other divisions within our unit that can contribute to the safe transit of the ships. By communicating with the Sector New York Enforcement Division and Station New York, we arrange for security patrols to escort the fleet as it comes into port and maintain security once the ships are moored at their respective locations. The Coast Guard law enforcement small boats enforce a 500-yard Naval Vessel Protection Zone (NVPZ), defined as a security zone permanently in place around U.S. Navy ships, and any security zones our office created to protect visiting countries' naval vessels. As Fleet Week nears its end, the ships stagger their departures over the course of a few days so there is limited effect to the waterways, and no other actions are required by waterways management.

Arguably the most important part of the marine event process is the communication with the public regarding upcoming events. Since Fleet Week is such a large-scale event, we publish a Coast Guard Advisory Notice (CGAN) about one week prior to the start of the event outlining the basics of the NVPZs and route of the parade. Our waterways management office also produces a safety Broadcast Notice to Mariners (BNM) on the day of the event, which



Crewmembers from USCGC *Katherine Walker*, a 175-foot buoy tender based in Bayonne, New Jersey, watch the fireworks in New York City during the 2017 Macy's 4th of July fireworks show. Coast Guard photo by Petty Officer 3rd Class Steve Strohmaier

is very similar to a CGAN except that it is transmitted over VHF radio. In the case of Fleet Week, the CGAN and BNM include the times of the Parade of Ships, the security zones in place, and the channel impacts that boaters can expect to face.

### **Macy's Fourth of July Fireworks Display**

The Macy's Fourth of July Fireworks, held on the East River in New York Harbor, is the biggest fireworks show in the United States. The 2017 fireworks show, its 41st annual display, was the largest in over a decade. More than 3 million spectators watched the 25-minute display as it launched more than 60,000 shells—the largest being 10 inches in diameter and weighing 30 pounds—from five barges along the East River.

Planning for this monumental event begins in January, when our marine events branch reaches out to the Macy's event operation manager to begin gathering details. Those details include determining the approximate location of the display, the number of barges to be used, and the viewing locations for spectator vessels. Then, as with any other marine event, the manager of the event operation submits the application for marine event through

the Coast Guard's Homeport website, which generates a notification of the submission for our office.

The tool we use to establish areas for the fireworks barges and spectator vessels is called a special local regulation (SLR), which allows us to cater a zone to the needs of the Coast Guard, maritime community, sponsoring organization, other governmental agencies, and spectators. For example, we designated areas specifically for the fireworks barges, and also areas for spectator vessels, based on the size of the vessel—the smaller vessels were nearer the display, and larger vessels were further away.

Following the development of the SLR, a Notice of Proposed Rulemaking or a Temporary Final Rule is drafted. We work with our partners at Coast Guard District One and at Civil Engineering Unit Providence for legal review and our environmental review, respectively. Once the legal and environmental reviews are complete, the rule is ready for the captain of the port's approval and publication in the Federal Register.

As with any event, we need to be sure that any potential impacts to navigation are communicated to the public. Three weeks before the event, we publish a Coast Guard



Macy's 4th of July Fireworks—Kent Miller Studios photo courtesy of Macy's



Macy's fireworks light up the East River in New York City as crewmembers from the USCGC *Hawser*, homeported in Bayonne, New Jersey, keep spectators safe during the July 4, 2004, event. USCG photo by Petty Officer 2nd Class Mike Hvozda

Advisory Notice to Homeport, as well as a Local Notice to Mariners. These detail the information about the event so that members of the port can plan accordingly. On the day of the event, a Safety Broadcast Notice to Mariners is broadcast to mariners over VHF.

The culmination of all the behind-the-scenes communication and drafting of regulations is spectators loading onto boats, lining the streets and shoreline, and climbing to the rooftops to observe never-before-seen effects. Behind the pyrotechnics is a Unified Command Post

(UCP) full of bustling interagency partners—representatives from Macy's, NYPD, FDNY, the fireworks company, and the man behind the marine event permit, Petty Officer First Class Ron Sampert.

"All the big players from so many different organizations were there," he said about the atmosphere in the UCP. "Everyone was working together to celebrate our nation's independence and to ensure every spectator celebrating, whether on land or water, could do so safely without worry and without knowing what all went into making that event happen. It was a humbling experience."

As Petty Officer First Class Sampert alluded to, our regulation writing is a small part of what goes on to make the Macy's 4th of July Fireworks possible. There are several phone calls, conference calls, and meetings at city hall in Manhattan. We work with NYPD, FDNY, and other agency partners like the Staten Island Ferry in order to minimize impact on port operations. There are tactics and operations briefs assigning USCG, NYPD, and FDNY assets to the event. We field calls from local waterfront property owners and harbor cruise companies early in the year seeking details on where the display location will be so they can start selling spots on their vessels or in their venues for the fireworks show. As always, the communication with stakeholders is the most critical piece of the entire process. The culmination of months' worth of planning and organizing comes down to just a few hours during which the waterway is restricted, traffic is routed, recreational boaters are shepherded to designated viewing areas, and law enforcement patrols are actively underway all over the harbor.

One of the major takeaways from every marine event, no matter how large or small, is the importance of getting started early and communicating with all relevant stakeholders. Professional relationships within the mar-

itime community here in New York are at their best during harbor-wide events, when everyone comes together with the common goal of protecting the community and making the waterway safe and enjoyable for all. //

**About the author:**

*LT Rebecca Miller has served in the U.S. Coast Guard for 7 years. A 2011 Coast Guard Academy graduate, she has served as a deck watch officer on a National Security Cutter out of California, as a marine inspector at Sector Boston, and in the Waterways Management Division at Sector New York.*

# Florida's Future in Space Travel

## Pioneering Coast Guard support of the commercial space industry

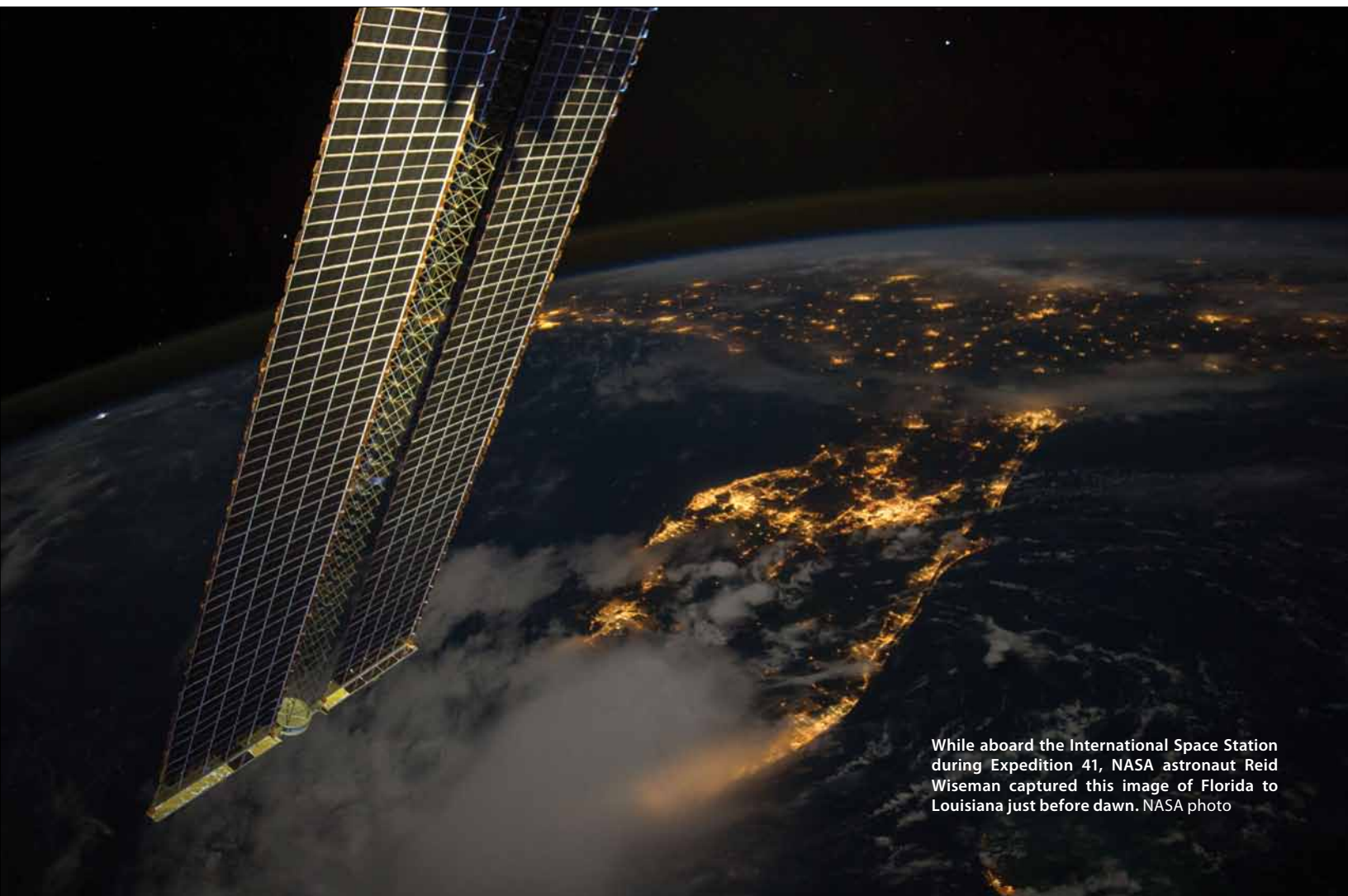
by A. EUGENE STRATTON

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**I**n October 2017, 13 senior members of the Seventh Coast Guard District staff in Miami and the leadership of Coast Guard Sector Jacksonville gathered at Cape Canaveral for two days of meetings with federal and state regulatory partners and commercial launch service operators. What sparked this tour? A growing awareness that the Coast Guard is at the center of a burgeoning

industry growing faster and pushing boundaries further than anything in recent memory.

Due to the inherently hazardous nature of launching large rockets into space, launch sites have been—and continue to be—predominantly located in coastal environments. The U.S. Air Force and the Federal Aviation Administration's (FAA) range clearance regulations<sup>1</sup>



While aboard the International Space Station during Expedition 41, NASA astronaut Reid Wiseman captured this image of Florida to Louisiana just before dawn. NASA photo



BMC Robert Martin gives a surveillance operations center overview to Coast Guard leadership. Coast Guard photo by Petty Officer 3rd Class Ryan Dickinson

program required a Coast Guard presence on the water—a presence that could only be managed with reservists called in to augment the small active duty Coast Guard station on Cape Canaveral to support each shuttle mission.

In the early 1980s, the Coast Guard developed strong working relationships with NASA and the Air Force's 45th Space Wing, creating a water-side support program that made full use of its maritime expertise and law enforcement authority to ensure the public safety and the security needs of America's critical launch infrastruc-

ture, launch vehicles, and payloads. The relationship was solidified in writing in a 1985 memorandum of agreement that formalized Coast Guard support for the Eastern Range, the area controlled by the 45th Space Wing and used for rocket launches out of Cape Canaveral Air Force Station and the Kennedy Space Center. The end of the space shuttle program and its focus on human space flight left the Cape Canaveral launch industry focused on much smaller payload delivery rockets and a reduction in Coast Guard support posture.

require that launch operators are able to ensure that people are not in the highest risk areas around and under the flight path of rockets bound for Earth's orbit and beyond. The largest concentration of active launch sites in the United States is located on Cape Canaveral, Florida. The National Aeronautics and Space Administration (NASA) and the Air Force have been launching missiles and rockets over the ocean from Cape Canaveral since the early 1950s.

As federal partners, the Air Force and NASA have historically relied on the Coast Guard and their broad authorities to control vessel traffic in order to clear, control, and monitor the ocean under and around the flight paths of their launch vehicles. While this relationship is well-established among traditional federal regulators, new developments have the industry seeing more and more traditionally governmental launch-related activity being conducted by private companies. With the current race to return human space flight to the cape, the Coast Guard has found itself in partnership with a new marine-related industry.

### The Space Shuttle Era

On July 21, 2011, the orbiter Atlantis landed at the Kennedy Space Center on Cape Canaveral to close out the 135th and last mission of the NASA space shuttle program—the end of 30 years of manned space flight in the United States.<sup>2</sup>

This also brought to an end a robust Coast Guard Reserve footprint at Coast Guard Station Canaveral that had been developed to support the program. The size, hazards, and public interest in America's space shuttle

While the shuttle program was winding down, a private firm, SpaceX, successfully launched its first Falcon 9 rocket from Launch Complex 40 in October 2012.<sup>3</sup> This feat initiated six years of extraordinary private growth and innovation in an industry once considered inherently governmental.

### The Rise of the Commercial Space Industry

With the Dragon spacecraft aboard, the SpaceX Falcon 9 rocket launches from pad 39A at NASA's Kennedy Space Center in Cape Canaveral, Florida, in June 2017. Dragon carried almost 6,000 pounds of science research, crew supplies, and hardware to the International Space Station. NASA photo by Bill Ingalls



A key component of making commercial space launch and recovery services profitable involves driving down costs associated with the traditional system of unrecoverable rocket stages. SpaceX proved that it was possible to recover a rocket's first stage when they successfully guided the first stage of a Falcon 9 rocket back to Earth and landed it on the autonomous barge *Of Course I Still Love You*. SpaceX continued developing its first-stage recovery capability by making a successful first-stage fly-back landing at a pad located on Canaveral Air Force Station. With the March 2017 re-flight of a recovered first-stage rocket, SpaceX unequivocally proved the viability of their pioneering business model. In completing this recovery and reuse cycle, SpaceX has fundamentally changed the way rockets are launched.

Other companies like Blue Origin have already made a heavy capital investment in the area and will likely also follow this new model of orbital launch services. This change resonates with Col. Burton H. Catledge of the Air Force's 45th Operations Group so much that he says, "Landing is the new launching."

Federal agencies such as the FAA, USAF, and Coast Guard are under new pressure to adjust to this unprecedented shift from a primarily governmental partnership to a more complex public and private partnership model. Under a memorandum of agreement with the 45th Space Wing, signed in 2013—the most current at the time—the Air Force maintained one enlisted reserve billet to fund a Coast Guard representative to staff the surveillance operation (SCO) room. That individual also ensures that the waters under the rockets' flight paths are clear of vessels.

In the shuttle days, in contrast, the Coast Guard and other maritime partners had over 84 active duty, reserve, and auxiliary members employed for four days prior to a shuttle launch.<sup>4</sup> Due to changes in perceived risk and shifts in mission priorities, Coast Guard support had dwindled to five active duty Coast Guard members and one reservist in the 45th Space Wing's SCO when a SpaceX Falcon 9 rocket exploded in 2015.

### **An Anomaly's Impact**

That June 28, 2015, explosion—an anomaly—occurred on a SpaceX Falcon 9 rocket shortly after launch, causing it to self-destruct, scattering debris up to 150 miles offshore.<sup>5</sup> Before this incident, coordination with the Coast Guard for rocket launches had primarily taken the form of Notifications to Mariners in consultation with the Air Force's Eastern Test Range to alert mariners of the upcoming launches, activations of safety and security zones, and monitoring and control of vessels that may encroach upon those zones.

The explosion and subsequent concern for the public's safety and impacts to port and waterways operations exposed gaps in coordination among the Coast Guard, the agencies, and companies engaged in orbital launch services. Sector Jacksonville and its subordinate commands in the Cape Canaveral area suddenly found themselves engaged in a technological/transportation revolution in ways few had anticipated. The incident prompted Coast Guard leaders to take a hard look at where the commercial launch industry was in its evolution, where it is going, and what it means for the maritime public.



## Orbital Launch Services

The value of the global space services industry is estimated at about \$335 billion. That estimate includes everything associated with space, from rockets to satellites and the services they provide. Of that estimate, orbital launch services—carrying cargo into space—are estimated to account for \$5.4 billion of that global total.<sup>6</sup> In 2016, service providers conducted a total of 85 orbital launches from seven countries. U.S. providers like SpaceX and the Boeing/Lockheed partnership United Launch Alliance are beginning to capture market share from international providers due to rapid commercial development following the end of the U.S. space shuttle program.<sup>7</sup>

The U.S. space industry captured about \$126 billion of the global market share in 2015, which saw launch service providers accounting for about \$1.8 billion of the global total revenue. This represents 34 percent of global launch services,<sup>8</sup> and projections anticipate a sharp uptick in demand and growth in capacity in the coming years. Global trends in civil and commercial space activities predict growth from an estimated \$330 billion annually to some \$600 billion by 2024.<sup>9</sup>

What will this mean for the Coast Guard and other supporting agencies? Industry analysts forecast a global average of about 41 commercial cargo and passenger launches per year from 2017 through 2026. Of those launches, 79 commercial crew and cargo launches are also predicted from 2017 to 2026. The vast majority of these will be to service and resupply the International Space Station.<sup>10</sup> Both NASA and private companies are feverishly competing to bring human space flight back to U.S. launch sites, and with it, the national attention and safety and security posture once needed for space shuttle missions.

## Florida's Response

The state of Florida and Cape Canaveral have been at the center of the U.S. space program from its earliest days. With the Commercial Space Act of 1998 driving more and more launch service business to private entities, and the impending conclusion of the space shuttle program, the governor's office commissioned a report in 2006. This report ultimately recommended a single-state entity to serve Florida's aerospace

interests and to promote and facilitate the growth of the commercial space industry in Florida.

When the Space Florida Act of 2006 was passed, Space Florida was created with a mission to attract and expand the "next generation" of industry businesses with the goal of generating opportunities and strengthening Florida's position as the global leader in aerospace research, investment, exploration, and commerce.<sup>11</sup> One of the specific goals of the newly minted state agency was to "... preserve the unique national role served by the Cape Canaveral Air Force Station and the John F. Kennedy Space Center by reducing costs and improving regulatory flexibility for commercial sector launches while pursuing the development of complementary sites for commercial horizontal launches."<sup>12</sup>

Pursuant to this mission, Space Florida has been working to facilitate the creation of the Cape Canaveral Spaceport and to help a growing number of companies interested in operating in the area to navigate the regulatory, infrastructure, and partnering landscape inherent to the industry. The effectiveness of this decision to focus on attracting commercial operators to the Cape Canaveral area is evident in the number of major industry players investing heavily in local infrastructure and pursuing various regulatory approvals for future operations. The list of companies operating in the area includes SpaceX, Blue Origin, United Launch Alliance, Boeing, Moon Express, OneWeb, Airbus, and Astrotech, among others. The capital resources these companies bring to bear, as well as their unlimited ambitions, are creating the kind of



A Coast Guard Station Canaveral 45-foot response boat-medium patrols off the coast of Kennedy Space Center in Cape Canaveral prior to the launch of Space Shuttle Atlantis in July 2011. The launch was the 135th and final launch of NASA's 30-year space shuttle program. Coast Guard photo by Bryan S. Lilley





European Space Agency astronaut Alexander Gerst, Expedition 41 flight engineer, takes a photo from a window in the cupola of the International Space Station as the SpaceX Dragon commercial cargo craft approaches in September 2014. NASA photo

industry boom the Florida legislature likely hoped for and the jobs and investment the area and residents needed.

### **The Coast Guard's Role**

How will the Coast Guard best support this industry while also providing for maritime public health and safety? Historically, launch activities were inherently governmental aerospace affairs where the Coast Guard used its authorities to support the Air Force or NASA. The shift to private ownership and control of more and more aspects of orbital launch services, technological shifts to coastal and ocean-based recovery operations, and competitive pressures increasing the frequency of launches are rendering the industry a de facto maritime industry.

New autonomous barges and vessels conducting hazardous operations at sea and transiting in and out of Port Canaveral require the Coast Guard prevention offices to rethink regulatory and inspection criteria as it applies to new and rapidly evolving uses. Coast Guard incident management officers are fully integrated into local emergency operations centers (EOC) to orchestrate waterside response in the event that a launch mission goes awry and

the rocket, payload, or parts thereof fall into the waterways, presenting hazards to public safety. Perhaps most importantly, the Coast Guard's authority to control vessel traffic and to create limited access areas under the flight paths of rockets is critical to the success of America's space programs.

Other regulatory agencies and private launch service providers are waking up to the idea that the Coast Guard is a fundamental partner in their launch operations. Without the Coast Guard's comprehensive captain of the port authorities—particularly the ability to control vessel traffic—commercial launch sites could not meet safety regulations to operate in the continental United States. It is the location of launch sites adjacent to the Atlantic Ocean and the ability to control the range under their easterly flight paths that help make launching commercial rockets and payloads a feasible business enterprise. Without the authority entrusted to Coast Guard captains of the port, no commercial launch service provider would be able to satisfy range safety requirements required by the Federal Aviation Administration and the Department of Defense.

The FAA's Office of Commercial Space Transportation (AST) is the federal agency authorized to regulate the

commercial space industry, issuing licenses, permits, and safety approvals for commercial launches and reentry of orbital and suborbital rockets and vehicles. It also issues licenses for launch or reentry site operators, or “spaceports.” The office represents the FAA’s only space-related line of business. Their overall mission is to “... ensure public safety and safety of property while protecting the national security and foreign policy interests of the United States during commercial launch and reentry activities.” Simply said, they exist to encourage, facilitate, and promote U.S. commercial space transportation.<sup>13</sup>

Included in the requirements to obtain an FAA site operator’s license is an agreement with the U.S. Coast Guard district office to “... establish procedures for the issuance of a Notice to Mariners prior to launch and other such measures as the Coast Guard deems necessary to protect public health and safety.” Other FAA regulations refer either directly or indirectly to Coast Guard coordination, but 14 CFR 420.31 effectively makes each Coast Guard district a party to the licensing process of new commercial spaceports. This regulation is essentially referring to the applicant’s responsibility to ensure that the range under and around their flight path is controlled.


Given the inherent complexities and hazards of space flight and the growing impact on the waterways around these launch sites, the Coast Guard is heavily weighing the last 15 words of that regulation “... other such measures as the Coast Guard deems necessary to protect public health and safety.” This has prompted Sector Jacksonville and the Seventh Coast Guard District to consider implications and interpret regulations in bold new ways. It has spurred unprecedented and highly productive collaboration with the FAA and other partner agencies to develop flexible and innovative solutions to support the industry while also protecting the public interest.

### What Does the Future Hold?

Few things are certain in this emerging industry where capital investment is abundant and ambition boundless. NASA is restarting its human space flight program in the next year with their Orion vehicles, and the Air Force is on a steady march to support an operational pace of 48 launches a year. Space Florida is planning for the expansion of space-related activities on existing government sites as well as the creation of new commercial launch sites in the Canaveral area. Blue Origin has built a rocket factory and leased launch site facilities at Kennedy Space Center. SpaceX has proven its viability as a launch service provider and is on target to reach a frequency of space flight that rivals the operational tempo of international airports.

If nothing else, it is becoming certain that the airways of the Space Coast will likely be streaked with rocket trails on a weekly basis in the very near future. Tragically,

not all of these events will go as planned, making Coast Guard incident management coordination even more critical.

The checklist needed to launch a payload into space is mind-boggling to industry outsiders. For the Coast Guard, each of these events require safety zones to be activated, EOCs to be staffed, law enforcement vessels to be on scene, and frequent vessel inspections to be conducted. This is in addition to the normal, busy task loads Coast Guard units in the Canaveral area already have year-round. Coast Guard staffs are heavily involved with shaping the near- and long-term support posture needed to carry out statutory missions and responsibilities. They are working with partner agencies to establish best practices and develop new roles and agreements. They are also increasingly developing relationships with private operators to help support their endeavors while protecting public health, safety, and freedom of navigation. 

### Acknowledgment:

LT Jessica Thornton of the Sector Jacksonville Incident Management Division and BMC Robert Martin, U.S. Coast Guard rep to the 45th Space Wing’s surveillance operations center, contributed to this article.

### About the author:

A. Eugene Stratton has served the Coast Guard in various military and civilian capacities for 20 years. Currently, he is responsible for marine planning as well as oversight of the waterways management and aids to navigation planning programs for the Seventh Coast Guard District. He has received numerous awards for excellence and holds degrees from the University of Miami and the University of Washington, and is a certified planner with the American Institute of Certified Planners.

### Endnotes:

1. 14 CFR 417
2. Space Florida, Jan. 2017, *Cape Canaveral Spaceport Master Plan*. Exploration Park, Florida: Space Florida.
3. Ibid.
4. S.E. West, 2016, *Report on Space Operations in Canaveral given to District Commander*. Port Canaveral.
5. Ibid.
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9. Space Florida, Jan. 2017, *Cape Canaveral Spaceport Master Plan*. Exploration Park, Florida: Space Florida.
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11. Space Florida, *In Florida, the future of space is always launching*. Retrieved December 3, 2017, from Spaceflorida.gov: www.spaceflorida.gov
12. Florida Statute 331, Part II, Sections 331.3011, 331.360, and 331.305
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# Coast Guard Sectors and Bridge Program Management

by BRIAN DUNN  
Office of Bridge Programs  
U.S. Coast Guard

The Coast Guard, with jurisdiction over bridges and causeways spanning the navigable waters of the United States, monitors about 20,000 bridges, ensuring they are not unreasonable obstructions to navigation. Its authorities include approving proposed bridge locations and clearances, alteration of unreasonably obstructive bridges, bridge lighting and other signals, and regulation of drawbridge operations.

## Coast Guard Bridge Program Functions

The Coast Guard bridge program preserves the public right of navigation through the various statutes, U.S. environmental laws, and pertinent regulations. This mission contributes to the development of a safer, more efficient, and more convenient marine and land transportation system that effectively uses and conserves the nation's resources in a cost-efficient manner. It also provides for the well-being, general safety, security, and interests of all Americans.

The bridge program carries out the responsibilities detailed in the bridge statutes (see page 86) by executing in four functional areas:

- **Permitting:** Issuing permits for the location and clearances for construction or alteration of bridges over navigable waters
- **Regulation:** Ensuring that the operation of movable bridges meets the reasonable needs of navigation, that all bridges are properly marked and lighted to facilitate the safe passage of vessels beneath, and that discrepancies are corrected
- **Construction monitoring:** Monitoring bridge construction, maintenance, and repair operations to ensure minimal impact to navigation, as well as coordinating navigation impacts with waterway users
- **Alteration:** Identifying bridges that are unreasonable obstructions to navigation and reviewing, inspecting, and managing design and construction contracts when the federal government is the primary source of funding through the Truman-Hobbs Program

## Bridge Program Transfer to the Coast Guard

Much like the creation of the Department of Homeland Security, the 1966 Department of Transportation Act (Public Law 89-670) brought 31 previously scattered federal elements into one cabinet-level department. Prior to the creation of the Department of Transportation (DOT), the Under Secretary of Commerce for Transportation administered many of the functions now associated with the DOT.<sup>1</sup> The Coast Guard's historic involvement in



The Coast Guard Cutter *Bertholf*, a 427-foot national security cutter homeported in Alameda, California, enters San Francisco Bay to participate in the area's 2011 Fleet Week Parade of Ships. Coast Guard photo by Petty Officer 3rd Class Seth Johnson



Workers tie rebar to set the foundation of the Río Abajo Bridge in Utuado, Puerto Rico, on January 27, 2018. The bridge collapsed due to debris from Hurricane Maria. FEMA photo

maritime transportation and safety<sup>2</sup> earned the service a place in the new department, which also included four federal transportation administrations—the Federal Aviation Administration, the Federal Highway Administration, the Federal Railroad Administration, and the Saint Lawrence Seaway Development Corporation.

The act also moved a number of transportation-related functions conducted by other entities into the new department. Additionally, it transferred the laws and provisions relating to drawbridge operating regulations, obstructive bridges, and approval of the location and clearances of bridges and causeways from the secretary of the Army to the secretary of Transportation. These functions were then delegated to the commandant of the United States Coast Guard. As a result, since April 1967 the Coast Guard has had jurisdiction over bridges and causeways that span navigable waters of the United States.

The effectiveness of the bridge program is largely due to the Coast Guard's inherent maritime expertise, its familiarity with the maritime community, and its close working relationship with that community. As a core element within the Marine Transportation System Directorate, the bridge program works closely with waterways managers at the headquarters and district levels to facilitate effective

and efficient movement of commerce and promote a safe, secure, and environmentally sound national transportation network. The existing Coast Guard field organization implements sectors that combine the legacy group operations and captain of the port (COTP) roles and authorities into a single command, which offers an opportunity to better coordinate bridge and waterway operations with the needs of navigation.

### **Bridge Program Roles and Authorities**

The authority delegated to the district commander in 33 CFR 1.01-60(b)<sup>3</sup> to issue certain bridge permits cannot be further delegated. District commanders have, however, delegated to their respective bridge program offices the authority to issue temporary deviations from drawbridge regulations—particularly regarding operating schedules. As a result, the bulk of the bridge program's day-to-day activities take place at the district bridge offices, which serve as the front line for coordination with the bridge owners and waterway users. These offices are responsible for a host of activities, including:

- coordinating bridge projects and operations with the bridge owner, sector/COTP, and waterway users

- monitoring bridge construction and maintenance activities
- notifying mariners of potential impacts to navigation
- enforcing drawbridge operating regulations
- prescribing bridge lighting through the approval of a bridge lighting plan

Prior to the implementation of the Coast Guard “sector” concept, field operations within a single port area fell under multiple mission-based commands—groups, marine safety offices, and air stations—that were physically dispersed, had unique chains of command, and had different program managers at Coast Guard headquarters. These commands lacked a common voice to the public and a unity of effort, which often led to some mission overlap.

Under the sector construct, the Coast Guard began to consolidate field activities for the mission-based commands under one local sector command. The

organizational change eliminated the historical segregation of operations and marine safety activities at the local level, creating a comprehensive unit to bring together field activities, authorities, and resources to provide a more effective and unified command organization.

Prior to the implementation of sector organization, most bridge operation decisions were made at the district level. This was done primarily because neither the operations nor the marine safety field organizations held the proper authorities, nor were they staffed to oversee the bridge projects and operations. At times, those decisions temporarily impacted the safety and movement of navigation, which led to issues for multiple field units. These circumstances created challenges when trying to balance bridge program needs with those of the field commanders and waterway users.

As the bridge program has become more accustomed to the sector construct, the importance of involving the



Coast Guard members from Maritime Safety and Security Team San Francisco conducted K-9 and remote operated vehicle pier sweeps before the March 2015 arrival of *USS Freedom* in San Francisco. MSST San Francisco’s primary missions include ports, waterways, and coastal security and defense readiness. Coast Guard photo by Petty Officer 3rd Class Loumania Stewart

## Bridge Statutes

Through the enactment of various bridge statutes, Congress has established exclusive jurisdiction for all bridges over all navigable waters of the United States. When combined with the implementing regulations found in Title 33, Code of Federal Regulations Parts 114–118, these statutes form the basis for the Coast Guard's bridge program.

These statutes are intended to help maintain freedom of navigation on navigable waters and to prevent interferences with navigation resulting from the placement of bridges, dams, dikes, or other obstructions without the express permission of the United States. The decision as to whether to issue a bridge permit or promulgate a drawbridge operation must take into consideration the effect such action will have on the reasonable needs of navigation.

The **Rivers and Harbors Act of 1899** focuses on preventing interference with navigation and protecting U.S. waters from pollution.

The act establishes the federal authority for:

- Approval of the construction of bridges over or in navigable waterways (33 USC 401)
- Penalties for wrongful construction of bridges, piers, etc., or removal of structures (33 USC 406)
- Alteration, removal, or repair of bridge or accessory obstructions to navigation

The act also provides for:

- Civil and criminal penalties for violation
- Alteration or removal of unreasonably obstructive bridges (not subject to the Truman-Hobbs Act)
- Notice and hearing, specification of changes, time for compliance, notice to United States attorney, misdemeanor, fines, new offenses, and proper repair requirements (33 USC 502)
- Establishment of special and general anchorages (33 USC 471, 474)

The **Bridge Acts of August 18, 1894; 1906; and August 2, 1946** prohibit the construction of any bridge across navigable waters of the United States unless first authorized by the Coast Guard. The Coast Guard approves the location and clearances of bridges through the issuance of bridge permits or permit amendments. A permit is required for new construction, reconstruction, or modification of a bridge or causeway over waters of the United States.

The Bridge Act of August 18, 1894, provides for the regulation of drawbridge operations and prescribes civil and criminal penalties for bridge and vessel owners and operators for violation of regulations (33 USC 499).

The [General] Bridge Act of 1906 requires approval of location and plans for construction of certain bridges, provides for removal or alteration of obstructive bridges, provides authority for requiring navigation lighting of

bridges, and prescribes civil and criminal penalties for violations (33 USC 491-495).

The Congressional (Secretarial) Consent for Bridge Construction, Codification of the General Bridge Act of 1946:

- Delegates to the secretary of the department in which the Coast Guard is operating the consent of Congress for the construction, maintenance, and operation of bridges over the navigable waters of the United States
- Requires approval by the secretary of location and plans for construction of those bridges prior to construction
- Prescribes civil and criminal penalties for violation of lawful orders relating to maintenance and operations of bridges (33 USC 525 (except (c)), 530, and 533)
- This act also provides the requirements for marking wrecks or other obstructions in the navigable waters of the United States or waters above the continental shelf (33 USC 409)

The **Truman-Hobbs Act (Bridge Act of June 21, 1940)**, *Alteration of Bridges* (33 USC 511–524), authorizes the alteration of bridges determined to be unreasonable obstructions to navigation, provides for the apportionment of cost for federal funding, prescribes procedures for relocation of bridges, and contains provisions addressing the applicability of the Administrative Procedure Act and the availability of judicial review.

Prior to passage of the Truman-Hobbs Act, the removal or alteration of bridges determined to be unreasonable obstructions to navigation and so ordered by the Secretary of the Army was at the expense of the persons owning or operating the bridge.

The **International Bridge Act of September 26, 1972** (33 USC 535–535i) governs the construction, maintenance, operation, and sale or transfer of bridges connecting the United States to any foreign country.



The fourth-longest steel arch bridge at the time of its completion in 1931, the Bayonne Bridge connects Bayonne, New Jersey, with Staten Island, New York. The process of raising the road bed from a height of 155 feet to deck to a height of 215 feet began in 2013 to accommodate New Panamax ships. The new road bed was opened to traffic in February 2017 and the process of removing the original deck began. Photo courtesy of Port Authority of New York and New Jersey

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As a guideline, the sector commander **CAN**:

- restrict access/movement of vessels in the vicinity of a bridge for safety and security
- establish safety and security zones
- issue permits and special regulations for marine events
- control the movement of vessels
- take action necessary to prevent damage to any bridge

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sector in the coordination and decision-making process for bridge projects and operations that may affect management of their waterways has become more apparent. In many cases, required actions are not a matter of being a program expert, but rather being the waterways management expert. The bridge program has started to consider alternative program constructs to better align programmatic activities that can be integrated with other Coast Guard activities that provide for the safety of navigation, such as sector waterways management.<sup>4</sup>

The district bridge offices have implemented, and continue to successfully implement, all of the bridge program functions, but the sectors offer capabilities that would benefit the bridge program, including:

- unified statute and regulatory authorities inherent to the sector commander
- day-to-day oversight of waterway operations
- local knowledge of and coordination with waterway users (harbor safety committees, pilot associations, facility operators, etc.)
- 24-hour watch capability to respond to reported discrepancies and incidents
- investigators and other specialists to assist with discrepancy response and enforcement

The district commander and the sector commander each have authorities that can impact bridge operations and navigation on a waterway. For example, the sector commander could establish a safety or security zone for a special event in the vicinity of a bridge, effectively closing the waterway and preventing navigation from passing through the bridge. Conversely, the district commander could approve a temporary deviation from the draw-bridge operating regulations for maintenance, allowing a bridge to remain closed to navigation, preventing traffic from passing through the bridge, and effectively closing the waterway. In either situation, coordination between the district and the sector, and appropriate notification to the maritime community, should be included in the decision-making process.

While there is not yet any formal district or sector guidance on coordinating bridge projects or operations, here are some situations to consider for coordination:

As a guideline, the sector commander **CANNOT** directly authorize a bridge owner to:

- construct, modify, or alter a bridge
- depart from approved permit plans
- deviate from approved operating regulations
- change the vertical or horizontal clearance during construction or maintenance
- change bridge lighting or other signals

- *Event requests that will temporarily affect bridge operations*
  - Waterway/vessel restrictions that do not require a change to the bridge operating schedule (sector approval)
  - Temporary changes to the bridge operating schedule (district commander approval)
- *Bridge construction/maintenance projects that affect vessel navigation*
  - Waterway/vessel restrictions in or around a bridge (sector approval)
  - Temporary changes to vertical or horizontal clearances (district commander approval)
- *Permanent or temporary changes to a bridge operating regulation*
  - Changing operating schedules (district commander approval)
  - Changing to remote operations (district commander approval)
- *Investigation of bridge allisions and potential regulation violations*
- *Preplanned actions for:*
  - Failure to open with ship in extremis
  - Notifications for vessel allision with the bridge for local authorities and or owner/operator
  - Heavy weather preparations, coordination with state/local EOCs<sup>5</sup>
  - Initial reports and follow-up on enforcement actions

(See sidebar page 88)

## Conclusion

The sector organizational construct offers an opportunity to modernize and align the bridge program with other waterways management activities. The authorities available to the sector commander and interactions with the maritime community provide a single point for the coordination of waterways management activities not previously available to the bridge program. Additionally, the program should work to develop guidelines and practices that use the sectors' inherent and unique capabilities.

# Coordinating Roles and Authorities

In all of the following examples, the sector and the district should coordinate with waterway users and develop appropriate public notices for the events.

1. Sector Coast Guard received a special event request for the Big Run Marathon. Marathon City is requesting that the Run Bridge remain closed to navigation from 0600–1800 on the day of the marathon. The Run Bridge is a two-leaf bascule bridge which is required to open on demand for navigation. What should the sector do? Does this situation require a deviation for the bridge operating regulation?

In this situation it does appear that a safety or security zone is required for the event, but a temporary deviation will be required in order to allow the bridge to remain in the “closed to navigation” position for the requested period. The sector should forward the request to the district bridge office in order to initiate a temporary deviation in accordance with 33 CFR § 117.35.

2. Sector Coast Guard received a report from the owner of the Fixed Bridge that, during a scheduled painting project, their contractor found significant rust in the center span of the bridge. The contractor said they will need to hang a platform 10 feet below the bridge deck for 30 days to replace the damaged metal. Can the sector authorize the work? What should the sector do?

The sector cannot authorize the work because it requires a temporary reduction in the vertical clearance of the bridge. The sector should forward the report to the district bridge office for action.

3. The district bridge office has been notified that the state DOT plans to replace the I-95 drawbridge with a fixed bridge. How should the district go about determining the required vertical clearance for the fixed bridge? What can the sector do?

The district bridge office will require the applicant to complete a navigation study to gather information about waterways users and vessels that use the waterway. Reviewing the bridge tender logs will also provide information on the types of vessels and number of vessels that have previously required an opening to pass through the bridge. The sector can coordinate with local waterway users and provide information to conduct the navigation study.

4. Sector Coast Guard received a special event request for the 4th of July fireworks show. The city has requested a

safety zone to limit vessel traffic within one mile of the City Drawbridge for a period to extend from two hours before the fireworks until two hours after the fireworks. What should the sector do? Is a deviation from the operating regulations required?

The sector can establish the requested safety zone in accordance with 33 CFR § 1.05-1(f), which would limit navigation through the bridge during that period. The sector should notify the district bridge office. Though it does not appear that a temporary deviation is required, as the waterway will be closed during the period, the district should notify the bridge owner.

5. Sector Coast Guard received a report at 2230 from the M/V *Captain* that the channel lights on the Metropolitan Bridge are extinguished. What should the sector do? What should the district bridge office do?

The sector should issue a Broadcast Notice to Mariners to inform mariners that the lights on the bridge are extinguished. If there are Coast Guard units or other vessels in the area, the sector should request verification of the lighting discrepancy and notify the district bridge office of the discrepancy as soon as possible. The district bridge office will contact the bridge owner to coordinate the discrepancy response. The district bridge office will prepare a notice for the Local Notice to Mariners, if needed.



Coast Guard Cutter *Mackinaw* escorts the freighter *Canadian Olympic* (on horizon) under the Mackinac Bridge. Cutter *Mackinaw* keeps the Great Lakes navigable for freighters shipping goods around the region during the winter. Coast Guard photo by Petty Officer 3rd Class William B. Mitchell





A Coast Guard 47-foot motor lifeboat is moored at Coast Guard Station Golden Gate in Sausalito, California, in December 2015. Coast Guard photo by Petty Officer 3rd Class Loumania Stewart

A timeline for completion of analysis and formal implementation of sector-level bridge program management has not yet been determined. In the interim, establishing open communications and local processes between the districts and sectors for the coordination of bridge projects and operations will help facilitate better management of the maritime transportation system and service to the maritime public. //

**About the author:**

*As the chief of the Office of Bridge Programs, Brian Dunn is responsible for the approval of plans and location of bridges and causeways across navigable waters of the United States, operating regulations for drawbridges, lights and signals on bridges required for safe navigation, and the*

*alteration of bridges found to be unreasonable obstructions to navigation. Prior to retiring from active duty, he served as the chief of waterways management for the Fifth Coast Guard District and served nine years on Coast Guard cutters, including two tours as commanding officer.*

**Endnotes:**

- <sup>1</sup> Creation of Department of Transportation – Summary, February 3, 2016, [www.transportation.gov/50/creation-department-transportation-summary](http://www.transportation.gov/50/creation-department-transportation-summary)
- <sup>2</sup> Creation of a 12th Cabinet Post, March 9, 1966, [www.transportation.gov/50/creation-12th-cabinet-post](http://www.transportation.gov/50/creation-12th-cabinet-post)
- <sup>3</sup> 33 CFR 1.01-60(b)—Delegation for Issuance of Bridge Permits and 33 CFR 1.05-1(e)(1)(iii)—Delegation for Issuance of Drawbridge Regulations
- <sup>4</sup> Bridge Program Strategic Plan 2015-2020
- <sup>5</sup> 33 CFR §117.33 – Closure of Draw for Natural Disasters or Civil Disorders. Drawbridges need not open for the passage of vessels during periods of natural disasters or civil disorders declared by the appropriate authorities unless otherwise provided for in Subpart B or directed to do so by the district commander.



# Chemical of the Quarter

## Understanding Tetrachloroethylene

by HILLARY SADOFF

Chemical Engineer, Hazardous Materials Division

U.S. Coast Guard

### What is it?

Tetrachloroethylene (C<sub>2</sub>Cl<sub>4</sub>), also known as PERC, PCE, or Perchloroethylene, is a halogenated alkene. It is a volatile organic compound or solvent that dissolves oils, greases, and waxes. There are four grades available, each differentiated by its level of purity and the amount of stabilizers added to prevent the decomposition of tetrachloroethylene.

Tetrachloroethylene was first developed in 1821, with commercial production in the United States beginning in 1925. It is commonly used as a fabric cleaner at dry cleaners and as a metal vapor degreaser in industry. Other industry purposes include use as a component in paint removers, printing inks, glues, polishes, and lubricants. It is also found in household products like shoe polish, spot removers, and wood cleaners. PERC is also used as a precursor to chlorofluorocarbons and other rubber coatings. It is even a precursor to ground-level ozone, which is an antioxidant that irritates the respiratory system.

### Why should I care?

#### ► Shipping Concerns:

Tetrachloroethylene is a poisonous, nonflammable, colorless liquid at room temperature. Most people can smell the sweet, ether-like odor of PERC at 1 part in 1 million parts of air (1ppm). The vapor is heavier than air. It is a recognized marine pollutant. Liquid PERC can be transported a number of ways, including by truck, train, plane, barge, or ship, provided it is transported according to the applicable regulations.

#### ► Fire or Explosion Concerns:

This material is stable at room temperature and atmospheric pressure, but containers can explode if the material is heated. It is only slightly soluble in water, but mixes easily with alcohol, ether, chloroform, benzene, hexane, and other oils. Tetrachloroethylene reacts with chemically active metals such as aluminum, barium, beryllium, lithium, and zinc. It also reacts to sunlight and with acids, bases, oxidizing materials, and combustible materials. When this product thermally decomposes, it creates phosgene, hydrogen chloride, and chlorine. Therefore, PERC should be stored in the dark and not near sources of heat or ignition. Furthermore, it should be segregated from food and feedstuffs.

#### ► Health Concerns:

Tetrachloroethylene is considered a likely carcinogen. Additionally, the EPA has identified PERC as one of 33 hazardous

air pollutants presenting the greatest threat to public health in urban areas.

The major routes of exposure to tetrachloroethylene include inhalation and ingestion through consumption of something that has been contaminated. There is little dermal exposure risk for this product, as studies have shown it does not pass through the skin, but the product may cause skin irritation and dryness by removing the oils from within the skin. This material also causes central nervous system effects such as headaches, dizziness, impaired coordination, sleepiness, confusion, and nausea, and is likely to cause damage to the liver and kidneys. Those working with tetrachloroethylene should work in a well-ventilated area and wear personal protective gear such as special clothing, gloves, safety goggles or face shield, and a respirator with a filter for organic gases and vapors.

### What is the Coast Guard doing about it?

The Coast Guard enforces maritime transportation requirements for poisonous materials like tetrachloroethylene to minimize the risk associated with transporting them. Regulations found in 49 CFR Subchapter C set requirements for marking, labeling, and transporting the material in packages, and 46 CFR Subchapter O sets regulations for carriage requirements of bulk liquids.

Additionally, the U.S. Coast Guard operates the National Response Center, which is the sole federal point of contact for reporting chemical spills. In the event of a spill or emergency with tetrachloroethylene, call (800) 424-8802. ■■■

#### About the author:

Hillary Sadoff is a chemical engineer in the Hazardous Materials Division in the Office of Design and Engineering Standards. Her primary responsibilities revolve around areas of packaged hazardous materials shipment by water. She serves as the USCG subject matter expert for rulemaking projects harmonizing international and domestic packaged hazardous materials regulations. She earned her B.S. and Master of Engineering degrees in chemical engineering at the University of Maryland, College Park, and has a graduate certificate in project management from Boston University.

#### References:

<https://ntp.niehs.nih.gov/ntp/roc/content/profiles/tetrachloroethylene.pdf>

<http://www.inchem.org/documents/icsc/icsc/eics0076.htm>

<https://www.epa.gov/sites/production/files/2017-02/documents/perchloroethylene.pdf>

<https://www.cancer.org/cancer/cancer-causes/tetrachloroethylene-perchloroethylene.html>

# Nautical Engineering Queries

Prepared by NMC Engineering  
Examination Team



1. What is the rotor speed of a six-pole, 60-cycle induction motor operating at full load with 3% slip?
  - A. 3492 RPM
  - B. 1800 RPM
  - C. 1164 RPM
  - D. 1746 RPM

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2. When using a sling psychrometer to determine relative humidity, the indicated difference between the dry bulb and wet bulb reading is known as what?
  - A. relative humidity
  - B. dew point
  - C. wet bulb "depression"
  - D. partial saturation temperature

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3. A diesel engine exposed to widely varying ambient temperatures should use lubricating oil with \_\_\_\_\_.
  - A. a high viscosity index
  - B. a low viscosity index
  - C. extreme pressure additives
  - D. no additives

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4. Before a shipboard fire can be declared completely out, which of the following conditions must be established?
  - A. The cause of the fire is to be known.
  - B. The fire area is safe for people to enter without a breathing apparatus.
  - C. The fire area is sufficiently cooled so that accidental skin burns will not occur.
  - D. All of the above.

1. A. 3492 RPM      Incorrect answer. This RPM corresponds to the rotor speed of a two-pole, 60-cycle induction motor operating at full load with 3% slip.
- B. 1800 RPM      Incorrect answer. This RPM corresponds to the synchronous speed of a four-pole, 60-cycle induction motor.
- C. 1164 RPM      **Correct answer.** Reference: *Operation, Testing, and Preventive Maintenance of Electrical Power Apparatus*, Hubert. Solution is as follows:  

$$n_s = 120f/p = 120(60)/6 = 1200 \text{ RPM synchronous speed}$$

$$n_r = n_s (100 - s)/100 = 1200 (100 - 3)/100 = 1164 \text{ RPM rotor speed}$$
- D. 1746 RPM      Incorrect answer. This RPM corresponds to the rotor speed of a four-pole, 60-cycle induction motor operating at full load with 3% slip.
- 
2. A. relative humidity      Incorrect answer. Relative humidity is defined as the amount of water vapor in the air, expressed as a percentage of the maximum amount that the air could hold at a given temperature. Although the relative humidity will impact the indicated difference between the dry bulb and wet bulb readings of a sling psychrometer, the actual difference is NOT known as relative humidity.
- B. dew point      Incorrect answer. The dew point is defined as the highest temperature at which airborne water vapor will condense to form water droplets (dew). The dew point varies with the barometric pressure and the moisture content of air (humidity).
- C. wet bulb "depression"      **Correct answer.** The wet bulb "depression" is defined as the difference between the dry bulb and wet bulb temperatures associated with the use of a sling psychrometer. If the surrounding air is dry, there is a greater difference between the temperatures of the two thermometers. If the surrounding air is saturated with moisture—100% relative humidity—there is no difference between the two temperatures. Reference: *Modern Refrigeration and Air Conditioning*; Althouse, Turnquist, and Bracciano.
- D. partial saturation temperature      Incorrect answer. The total pressure of air is the sum of the individual constituent gas partial pressures. Saturation temperature is the temperature at which vapor will condense—or its liquid will evaporate—at a given pressure.
- 
3. A. a high viscosity index      **Correct answer.** A lubricating oil with a high viscosity index exhibits a high resistance to viscosity change as the temperature changes, which is a highly desirable property for an oil to have as used in engine applications subject to widely varying ambient temperatures. As the temperature changes, the oil viscosity of oils with a high viscosity index remains relatively stable, providing optimal lubrication and reliable starting. Reference: *Diesel Engineering Handbook*, Stinson.
- B. a low viscosity index      Incorrect answer. A lubricating oil with a low viscosity index has a low resistance to viscosity change as the temperature changes, which is NOT a desirable property for an oil to have as used in engine applications subject to widely varying ambient temperatures. As the temperature changes, the oil viscosity of oils with a low viscosity index will change significantly, providing less-than-optimal lubrication and unreliable starting.
- C. extreme pressure additives      Incorrect answer. Extreme pressure additives are generally associated with reducing tooth wear in reduction gear applications and are generally not associated with motor oils. Geared steam turbine drive lubricating oils would feature extreme pressure additives, for example.
- D. no additives      Incorrect answer. High viscosity index oils used in engine applications subject to widely varying ambient temperatures are formulated with additives to improve the viscosity index.
- 
4. A. The cause of the fire is to be known.      Incorrect answer. A fire may be completely extinguished and a declaration made to that effect without knowing the cause of the fire.
- B. The fire area is safe for people to enter without a breathing apparatus.      **Correct answer.** In order for the inspection team to enter the area to do their work unencumbered by breathing apparatus, the area must first be properly ventilated. Reference: *Marine Fire Fighting*, Oklahoma State University.
- C. The fire area is sufficiently cooled so that accidental skin burns will not occur.      Incorrect answer. A fire area may have sufficiently cooled, but without properly ventilating the area first, it is not safe for the inspection team to enter.
- D. All of the above.      Incorrect answer. Although the fire must be sufficiently cooled before it is safe to ventilate the fire area, the cause of the fire need not be known before the fire can be declared completely out.

# Nautical Deck Queries

Prepared by NMC Engineering  
Examination Team

# Q

uestions

1. **When shall signals be sounded by a power-driven vessel intending to overtake another vessel?**
  - A. if any vessel is within half a mile of that vessel
  - B. if the other vessel is power-driven, and both are in sight of one another
  - C. if both are in sight of one another
  - D. if another power-driven vessel is within half a mile

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2. **Which statement is TRUE for the directive force of a gyrocompass?**
  - A. The force increases as the latitude increases, being maximum at the geographic poles.
  - B. The force decreases as the latitude increases, being maximum at the geographic equator.
  - C. The force is greatest when a vessel is near the Earth's magnetic equator.
  - D. The force remains the same at all latitudes.

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3. **You are transporting dangerous cargo on your vessel. Who is required to sign the Dangerous Cargo Manifest acknowledging to its correctness?**
  - A. only the master
  - B. the U.S. Coast Guard marine inspector
  - C. the shipper
  - D. the master or his authorized representative

---
4. **IMO requires minimum standards for initial metacentric height for cargo and passenger vessels. Which is the minimum metacentric height for these vessels?**
  - A. not less than 0.15m
  - B. not less than 0.20m
  - C. not less than 0.25m
  - D. not less than 0.27m

1. A. if any vessel is within half a mile of that vessel      Incorrect answer.
- B. if the other vessel is power-driven, and both are in sight of one another      **Correct answer.** Reference: 33 CFR 83. Also IAW Inland Rules 83.34(c)(i), which state:
- (c) *When in sight of one another:*
- (i) *power-driven vessel intending to overtake another power-driven vessel shall indicate her intention by the following signals on her whistle:*
- (1) *One short blast to mean, "I intend to overtake you on your starboard side;"*
- (2) *Two short blasts to mean, "I intend to overtake you on your port side"*
- C. if both are in sight of one another      Incorrect answer.
- D. if another power-driven vessel is within half a mile      Incorrect answer.
- 
2. A. The force increases as the latitude increases, being maximum at the geographic poles.      Incorrect answer.
- B. The force decreases as the latitude increases, being maximum at the geographic equator.      **Correct answer.** Reference: The American Practical Navigator, 2002 edition, states the following on page 94:
- "The directive force is maximum at the equator and decreases to zero at the poles."*
- C. The force is greatest when a vessel is near the Earth's magnetic equator.      Incorrect answer.
- D. The force remains the same at all latitudes.      Incorrect answer.
- 
3. A. only the master      Incorrect answer.
- B. the U.S. Coast Guard marine inspector      Incorrect answer.
- C. the shipper      Incorrect answer.
- D. the master or his authorized representative      **Correct answer.** IAW 49 CFR 176.30(c) states:
- The carrier and its agents shall ensure that the master, or a licensed deck officer designated by the master and attached to the vessel, or in the case of a barge, the person in charge of the barge, acknowledges the correctness of the dangerous cargo manifest, list, or stowage plan by his signature.*
- 
4. A. not less than 0.15m      **Correct answer.** The International Code on Intact Stability (2008) states the following on page 20:
- 2.2.4 *The initial metacentric height  $GM_0$  shall not be less than 0.15m.*
- B. not less than 0.20m      Incorrect answer.
- C. not less than 0.25m      Incorrect answer.
- D. not less than 0.27m      Incorrect answer.

# In the News: Sector Boston pollution response team

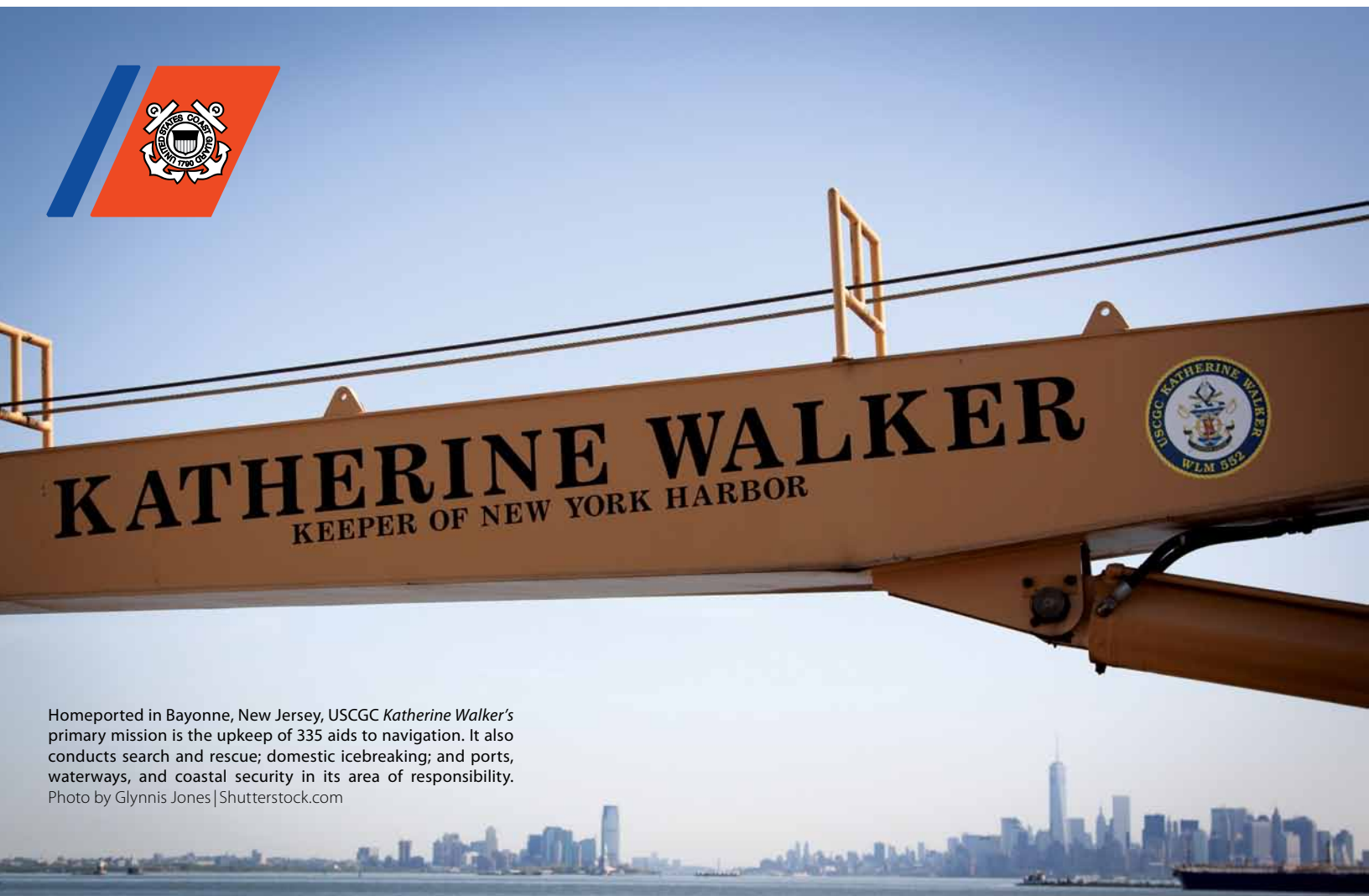


On April 13, 2018, a Sector Boston pollution response team and the Massachusetts Department of Environmental Protection responded to reports of a sheen on the Mystic River near the Amelia Earhart Dam between Somerville and Everett. An intensive investigation revealed that a damaged electrical conduit allowed dielectric fluid—a highly refined mineral oil—to seep into the surrounding soil and the storm drain system before reaching the Mystic River. The pipe was permanently repaired May 9. Coast Guard photo by LT Brandon Aten

**COMMANDANT (CG-DCO-84)**  
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Homeported in Bayonne, New Jersey, USCGC *Katherine Walker's* primary mission is the upkeep of 335 aids to navigation. It also conducts search and rescue; domestic icebreaking; and ports, waterways, and coastal security in its area of responsibility.  
Photo by Glynnis Jones | Shutterstock.com