Testimony of

The Honorable Jennifer Homendy
Chair
National Transportation Safety Board

Before the

Subcommittee on Coast Guard and Maritime Transportation

Committee on Transportation and Infrastructure
United States House of Representatives

— On —

A Review of Coast Guard Efforts to Improve Small Passenger Vessel Safety

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Good morning, Chairman Carbajal, Ranking Member Gibbs, and members of the subcommittee. Thank you for inviting the National Transportation Safety Board (NTSB) to testify, discuss our marine accident investigations and the lessons we have learned from those investigations, and reiterate how critical it is for our federal agency partners, our partners in industry, and for the Congress to heed those lessons learned and take action to help avoid future accidents.

As you know, the NTSB is an independent federal agency charged by Congress with investigating every civil aviation accident in the United States and significant events in other modes of transportation—highway, rail, marine, pipeline, and commercial space. We determine the probable cause of the events we investigate, and issue safety recommendations aimed at preventing future occurrences. In addition, we conduct special transportation safety studies and special investigations, and coordinate the resources of the federal government and other organizations to assist victims and their family members who have been impacted by major transportation disasters. We also serve as the appellate authority for enforcement actions involving aviation and mariner certificates issued by the Federal Aviation Administration (FAA) and the United States Coast Guard, and we also adjudicate appeals of civil penalty actions taken by the FAA.

The NTSB does not have authority to promulgate operating standards, nor do we certificate organizations, individuals, or equipment. Instead, we advance safety through our safety recommendations. Those recommendations are issued to any entity that can improve safety, including the United States Coast Guard (USCG).[1] Our goal is to identify issues and advocate for safety improvements that, if implemented, would prevent tragedies and injuries, and save lives.

Marine Safety and Reauthorization

Before we get too far, I do want to thank the Coast Guard for collaborating with us to investigate marine casualties and improve marine safety. We conduct our marine safety investigations concurrent with the USCG's, and we often reach the same conclusions; on the occasions when we reach different conclusions, we regularly make recommendations to address identified issues in the USCG's regulations and processes. Either way, we approach these investigations with mutual respect and with the goal of improving safety on our nation's waterways.

We have a broad mandate when it comes to marine safety. The NTSB investigates "major marine casualties,"[2] which can be anywhere in the world if a US-flagged vessel is involved. Our

[1] There are currently 93 open safety recommendations to the USCG, 32 of them with the status "Open—Unacceptable Response." Of the 93 recommendations, 24 are associated with our Most Wanted List of Transportation Safety Improvements item, "Improve Passenger and Fishing Vessel Safety," and 8 of those are currently classified "Open—Unacceptable Response." These recommendations are included in the appendix to this testimony.

[2] Defined in 49 *Code of Federal Regulations* 850.5 as a "casualty involving a vessel, other than a public vessel, that results in (1) The loss of six or more lives; (2) The loss of a mechanically propelled vessel of 100 or more gross tons; (3) Property damage initially estimated as $500,000 or more; or (4) Serious threat, as determined by the Commandant and concurred in by the Chairman, to life, property, or the environment by hazardous materials."

work touches vessels owned by the US government as well as private vessels. We also investigate select catastrophic marine casualties involving foreign-flagged vessels in international waters, especially if US citizens are on board.

Our current authorization expires at the end of this fiscal year. We have transmitted to Congress a reauthorization proposal to provide more resources and flexibilities which will allow us to hire, invest in our workforce in terms of training and development, and purchase equipment. Even as we have seen tremendous growth and change in transportation over the last two decades, the agency is the same size as it was in 1998. In just the last ten years, the NTSB's Office of Marine Safety has dramatically increased its number of investigations. Before 2012, the office investigated and developed six reports annually on average. Subsequently, the office has been investigating all major marine casualties. Now, the caseload is over 40 per year, and at times over 50, while the cases have also grown more complex. However, our marine investigative staff has not grown with that increase, and we currently have 11 marine investigators. It is critical to have additional resources to respond to casualties without impacting timeliness, quality, and our independence. Our reauthorization proposal to Congress included a request for resources and hiring flexibilities to increase the number of investigators in our Office of Marine Safety, as well as in our other modes. These resources will allow us to hire professionals with the needed skills, purchase the equipment necessary for those skilled professionals to do their jobs, and invest in staff training and development. Our workforce is our greatest asset and is essential to our mission.

The *Conception*: Lessons Learned

I want to thank you, Chairman Carbajal, your colleagues in the California delegation, and the members of this committee for your commitment to marine safety and for enacting small passenger vessel safety provisions as part of the Elijah E. Cummings Coast Guard Authorization Act of 2020.[3] This legislation addressed 11 NTSB recommendations to improve small passenger vessel safety. Of those, 7 were made to the USCG as a result of our investigation of the September 2, 2019, fire and resulting sinking of the *Conception* here, near Santa Cruz Island, California. The *Conception* was a 75-foot commercial diving vessel on its last night of a 3-day diving trip with 39 people on board. The vessel caught fire while anchored in Platts Harbor, and 33 passengers and one crewmember died, making this the largest loss of life in a US marine casualty in decades and the greatest maritime loss of life in California in more than 150 years.

We determined the probable cause of the accident was the failure of the operator, Truth Aquatics, Incorporated, to provide effective oversight of its vessel and crewmember operations. The lack of both oversight and adherence to certain safety requirements allowed a fire of unknown cause to grow, undetected. In addition, the lack of a USCG regulatory requirement for smoke detection in all accommodation spaces and inadequate emergency escape arrangements from the vessel's bunkroom contributed to the undetected growth of the fire and the high loss of life.

The *Conception* investigation was my first maritime investigation as an NTSB Board member, and the experience deepened my commitment to improving marine safety. During my

[3] Enacted as part of the National Defense Authorization Act for Fiscal Year 2021 (PL116-283, Division G, sec. 8441).

time on scene, I met with the families of those on board the vessel and gave them the only promise we at the NTSB have to give: that we would find out what caused the fire aboard the *Conception*, to prevent similar suffering for other families.

Today, I will share some of the lessons learned from our investigation of the *Conception* accident and the roughly 50 marine accidents that we typically investigate annually. In particular, I will focus on the importance of safety management systems (SMSs); fire safety aboard small passenger vessels; safety issues unique to amphibious vessels, known as DUKW boats; and adequate options for emergency escapes in all cases. Additionally, although beyond the scope of this hearing, we have made equally important recommendations to the USCG to improve fishing vessel safety. These recommendations, which are included in the appendix, remain open because the USCG has taken unsatisfactory or no action to address them.

The NTSB has made multiple recommendations to the USCG and the maritime industry that must be implemented to close known safety gaps and to avoid another tragedy like the *Conception.* These recommendations specifically address:

- inadequate company oversight;
- voyage data recorders;
- insufficient regulations for means of emergency egress;
- lack of regulations requiring fire and smoke detection in machinery and all accommodation spaces of small passenger vessels;
- neglected nighttime roving patrols;
- insufficient reserve buoyancy; and
- insufficient watertight integrity of vessels.

Safety Management Systems

For two decades, the NTSB has advocated for all passenger vessel operators to implement an SMS: a comprehensive, documented system to enhance safety. This call to action was first on our Most Wanted List of Transportation Safety Improvements over 10 years ago, and is again on our current list under "Improve Passenger and Fishing Vessel Safety."[4] In fact, the NTSB has recommended SMSs in all modes of transportation—aviation, rail and transit, pipelines, marine, even manufacturers. In 2015, the Federal Aviation Administration (FAA) required commercial airliners to develop a comprehensive SMS to improve safety for the flying public, and this mandate has contributed to the remarkable record of safety in commercial passenger aviation. In fact, in 7 of the last 10 years, there have been no major commercial airline passenger fatalities. The number of accidents, the number of fatalities, and the fatality rate across the aviation industry have also decreased.

As an example, the FAA requires commercial airlines to develop and implement an SMS with four components:

[4] 2021–2022 Most Wanted List of Transportation Safety Improvements. Improve Passenger and Fishing Vessel Safety. Washington, DC: NTSB.

- A safety policy that outlines the methods, processes, and organizational structure needed to support safe operations.
- A safety risk management process to constantly identify new hazards and control risk.
- Safety assurance methods, such as audits, to evaluate if the desired safety outcomes are being achieved.
- Safety promotion, also known as safety culture, which is a less tangible—but no less vital—aspect of a successful SMS.

For marine passenger vessels, regardless of a company's size, an SMS ensures that each crewmember is given standard and clear procedures for routine and emergency operations. An SMS specifies crewmember duties and responsibilities, as well as delineates supervisory and subordinate chains of command, so that each crewmember understands what to do during critical vessel operations and emergency scenarios. Developing an SMS includes creating plans for crewmember responses to a range of possible emergency situations. SMSs also include procedures for performing and tracking preventive maintenance, as well as for crew training, emergency preparedness, documentation and oversight, and other actions that prioritize safe operations.

Since 2012, following the allision of the passenger ferry *Andrew J. Barberi* with a terminal at Staten Island, New York, the NTSB has recommended the USCG require all operators of US-flagged passenger vessels to implement an SMS, taking into account the characteristics, methods of operation, and nature of service of these vessels, and, with respect to ferries, the sizes of the ferry systems within which the vessels operate.[5] This is consistent with requirements imposed by the International Maritime Organization (IMO). In 2010, Congress mandated that the USCG develop appropriate SMS regulations for all US-flagged passenger vessels. As a result of the *Conception* investigation, we reiterated this recommendation, and the USCG published an advance notice of proposed rulemaking (ANPRM), "Safety Management Systems for Domestic Passenger Vessels," in January 2021.[6] The Board submitted comments to the ANPRM and subsequently updated the status of this safety recommendation to "Open—Acceptable Response."[7]

The NTSB's investigation of the *Andrew J. Barberi* was hampered by a lack of voyage data recorder (VDR) information. A VDR is a fire- and crash-protected recorder that captures critical vessel information as well as audio from the bridge environment. This information can be accessed by investigators following accidents and reviewed by vessel operators as part of their SMS programs to help prevent accidents. In 2014, we recommended that the USCG require installation of VDRs on new and existing ferry vessels, where technically feasible, and develop a standard for smaller ferry vessels.[8] These recommendations are currently classified "Open—Unacceptable Response."

Further, we have recommended that the USCG require that companies operating domestic passenger vessels develop and implement a preventive maintenance program for all systems affecting the safe operation of their vessels, including the hull and the mechanical and electrical

[5] Safety Recommendation M-12-3.
[6] Safety Management Systems for Domestic Passenger Vessels. 89 *Federal Register* (*FR*) 3899.
[7] NTSB Comments on USCG-2020-0123.
[8] Safety Recommendations M-14-3, -4, and -5.

systems.[9] We generally expect recommended actions to be completed in 5 years, but this has languished for 20 years and, therefore, is in an unacceptable status. This is our oldest open marine safety recommendation. We have kept it open because the USCG has informed us since 2012 that it would include this action as a component of a broader requirement for SMS.

We continue to believe that an SMS is an essential tool for enhancing safety on board all US passenger vessels, and that the USCG is the appropriate authority to require such systems. We fully support the requirement mandated by Congress. We also believe that an SMS is not a substitute for important safety regulations that are issued by the USCG. Safety regulations need to be implemented and an SMS enhances the impact of those regulations.

Fire Safety for Small Passenger Vessels

As a result of the *Conception* disaster, we issued seven new safety recommendations specifically related to fire safety and egress. All seven were addressed by the Elijah E. Cummings Coast Guard Authorization Act of 2020 and are currently classified "Open—Acceptable Response."

To ensure fire safety aboard small passenger vessels, redundancy is critical. First, we made several recommendations to the USCG to update its regulations regarding accommodation spaces in all passenger vessels, including those constructed prior to 1996. We recommended that they require all accommodation spaces, for new vessels and those currently in service, have smoke detectors".[10] Second, we recommended that the USCG develop and implement an inspection procedure to ensure that operators are conducting "roving patrols" as required by regulations and which has been codified in US law since 1871. [11] The current statute states that "the owner, operator, or charterer of a vessel carrying passengers during the nighttime shall keep a suitable number of watchmen in the vicinity of cabins or staterooms and on each deck to guard against and give alarm in case of fire or other danger."[12] This was not the practice on *Conception*, other vessels owned by Truth Aquatics, nor, according to interviews, other dive boats in Southern California.

Even if a fire breaks out, loss of life is still preventable with adequate options for and awareness of emergency egress. The *Conception* had two means of escape from the bunkroom: spiral stairs forward and an escape hatch aft, accessible from either port or starboard aisles by climbing into one of the top aftermost inboard bunks. However, both paths led to the salon, which was filled with heavy smoke and fire, and the salon compartment was the only escape path to exterior (weather) decks. Therefore, because there was fire in the salon, the passengers and one crewmember housed below were trapped and were not able to escape. If regulations had required the escape hatch to exit to a space other than the salon, optimally directly to the weather deck, the passengers and crewmember in the bunkroom would have likely been able to escape. For those reasons, we recommended that the USCG update its regulations for small passenger vessels with overnight accommodations, including those constructed prior to 1996, to require a secondary

[9] Safety Recommendation M-02-5.
[10] Safety Recommendations M-20-14, -15, and -16.
[11] Safety Recommendation M-20-17.
[12] 46 *United States Code (USC)* 8102

means of escape into a different space so a single fire will not affect both escape paths and to ensure there are no obstructions to egress.[13] These recommendations are currently classified "Open—Acceptable Response," because we understand that the Coast Guard has initiated a rulemaking project to implement the recommendations for all small passenger vessels with overnight accommodations, including vessels constructed prior to 1996.

In addition to fire safety in vessels with accommodation spaces, prior to the *Conception* tragedy, we issued two recommendations to the USCG regarding unmanned spaces. We recommended that they require fire-detection systems in unoccupied spaces with machinery or other potential heat sources on board small passenger vessels, and for them to issue a marine safety information bulletin regarding the need to use only approved material and components in fuel tank level-indicator systems.[14] The USCG has issued the bulletin and the recommendation has been closed successfully, but further action is needed to require additional fire detectors.

Again, we appreciate Congress addressing these safety issues in legislation, and for the cooperation and partnership of the USCG. We look forward to the USCG issuing a final rule to implement our recommendations and improve safety.[15] Until that time, the recommendations will remain open. In the meantime, operators of vessels with overnight accommodations can act now to improve the safety of their passengers and crew. They can start with the following even before the USCG completes rulemaking:

- Install smoke detectors in sleeping quarters and ensure they are interconnected so when one detector goes off, they *all* do. The *Conception* crewmember who discovered the fire could not hear the fire alarm from the crew berthing on the upper deck.
- Ensure that the primary and secondary emergency escape paths do not lead to the same space, which can be blocked by a single hazard. The *Conception* had two means of escape from the lower deck bunkroom, but both led into the salon, which was filled with heavy smoke and fire. Tragically, the salon compartment was the only escape path to the weather deck. Because there was fire in the salon, the passengers were trapped.
- Keep the escape routes unobstructed at all times.
- Remind crewmembers to perform roving patrols and why they are so important. Our investigation found that the *Conception* fire was uncontrollable by the time it was discovered because the crewmember, who ultimately died, was asleep in the bunkroom.

Amphibious Passenger Vessel Safety: The Importance of Action

Unfortunately, we know that the consequences of failing to address the lessons learned from our safety investigations can be further tragedies. Almost 20 years after the sinking of an amphibious passenger vessel that killed 13 people in Arkansas, we investigated the sinking of a DUKW amphibious passenger vessel, *Stretch Duck 7*, on Table Rock Lake near Branson, Missouri.[16] We discovered that long-known safety issues caused the sinking and resulted in the

[13] Safety Recommendations M-20-18, -19, and -20.
[14] Safety Recommendations M-18-13 and -14.
[15] Fire Safety of Small Passenger Vessels. 86 *FR* 73160.
[16] Sinking of Amphibious Passenger Vessel Stretch Duck 7, Table Rock Lake, near Branson, Missouri, July 19, 2018. (NTSB, MAR 20/01).

loss of 17 lives. I want to thank you for addressing these safety issues in H.R. 6865, the Coast Guard Authorization Act of 2022.

DUKW amphibious vehicles were designed and built in the 1940s for military use during World War II; some were later converted for commercial service.[17] They are unique vessels with special challenges that must be addressed to ensure passenger safety.

Five minutes into its voyage on July 19, 2018, the *Stretch Duck 7*, with 31 passengers aboard, encountered a severe storm known as a derecho. While trying to reach land, 7 minutes into the voyage, the vessel took on water and sank approximately 250 feet away from the exit ramp. Passengers were caught by the vessel's canopy as it sank. Only a few of the surviving passengers stated that they were able to float free without encountering any obstructions. Several hours prior to the accident, the National Weather Service had issued a severe thunderstorm watch for the area, followed by a severe thunderstorm warning a minute before the vessel departed.

NTSB investigators found that the accident vessel was originally constructed with a low freeboard, an open hull, and no subdivision or flotation, resulting in a design without adequate reserve buoyancy. We determined the probable cause of the sinking was the operator's continued operation of waterborne tours after a severe thunderstorm warning was issued for Table Rock Lake, exposing the vessel to a derecho, which resulted in waves flooding through a non-weathertight air intake hatch on the bow. Contributing to the sinking was the USCG's failure to require sufficient reserve buoyancy in amphibious passenger vessels. Contributing to the loss of life was the Coast Guard's ineffective action to address emergency egress on amphibious passenger vessels with fixed canopies, such as the *Stretch Duck 7*, which impeded passenger escape.

As noted, these safety issues were not new when the *Stretch Duck 7* sank. They were identified after the 1999 sinking of the *Miss Majestic*, another DUKW amphibious passenger vessel, on Lake Hamilton, near Hot Springs, Arkansas.[18] As a result of that sinking, 13 passengers died. Survivors of the *Miss Majestic* accident confirmed that the vehicle sank less than a minute after the deck edge at the stern was submerged, leaving insufficient opportunity for passengers to escape. Vessel maintenance, reserve buoyancy, and survivability—specifically, impediments to passenger egress caused by the vessel's canopy—were among the major safety issues identified by our investigation of the *Miss Majestic* accident.

As a result of the *Miss Majestic* sinking, we recommended that the USCG require greater stability and reserve buoyancy in amphibious passenger vessels.[19] Further, until the goals of that recommendation were achieved, we urged the USCG to require—among other measures—that canopies be removed from waterborne vessels, or that such vessels have installed a USCG-approved canopy that does not restrict horizontal or vertical escape by passengers in the event of

[17] *DUKW* (pronounced "duck") is an acronym that signifies the characteristics of the WWII amphibious vessel: D = 1942 (the year of design); U = utility; K = front-wheel drive; and W = two rear-driving axles. DUKW *vessels* are also referred to as *vehicles* due to their dual function of being operated on land and in water.
[18] Sinking of the Amphibious Passenger Vehicle Miss Majestic, Lake Hamilton, Near Hot Springs, Arkansas, May 1, 1999. (NTSB, MAR 02/01).
[19] Safety Recommendation M-02-1.

sinking.[20] These recommendations were closed unacceptably in 2003 and 2007, respectively. Regrettably, had these recommendations been implemented, a future tragedy could have been avoided.

More than 15 years later, because of the *Stretch Duck 7*, we recommended again that amphibious passenger vessels have sufficient reserve buoyancy so they remain upright and afloat in the event of damage or flooding, and that for DUKW vessels without sufficient reserve buoyancy, that they require the removal of canopies, side curtains, and their associated framing during waterborne operations to improve emergency egress in the event of sinking.[21] The USCG has not been able to identify a feasible solution to achieve the necessary level of reserve buoyancy, and contracted with the National Academy of Sciences (NAS) to conduct an independent review of potential modifications. The USCG has also issued a marine safety information bulletin recommending removal of canopies as an initial step.[22] For these reasons, both recommendations remain classified "Open—Acceptable Response."

In 2015, we investigated a highway crash of a DUKW in Seattle, Washington. [23] As a result, we recommended the USCG amend its Navigation and Vessel Inspection Circular (NVIC) 1-01, a guidance document that relies on voluntary compliance, to ensure passengers unbuckle before waterborne operations and the crew confirms that passengers have complied.[24] Following the *Stretch Duck 7* sinking, we recommended reviewing and revising the NVIC.[25] Although the USCG has communicated to us it will make the recommended revisions, the NVIC has not been updated; therefore, these recommendations remain classified "Open—Acceptable Response."

Lastly, the benefits of these safety improvements are not realized if crews have insufficient awareness. Accordingly, we have recommended that the USCG review and revise training, especially as it relates to severe weather.[26]Each of these recommendations is on our 2021–2022 Most Wanted List. Again, thank you for addressing these issues in the pending Coast Guard authorization.

Conclusion

The loss of 34 lives on the *Conception*, less than 100 feet from shore, shook this community and the country. It reminds us that the potential for catastrophe is always present, including on small passenger vessels, and we must do what we can to prevent needless deaths and mitigate injuries. Passenger vessels should have SMSs and provide adequate fire detection and extinguishing systems and enhanced emergency egress options. Inaction can lead to further tragedy, as we saw with the *Stretch Duck 7* almost 20 years after the *Miss Majestic* sinking. We

[20] Safety Recommendation M-02-2.
[21] Safety Recommendations M-19-15 and-16.
[22] US Coast Guard Marine Safety Information Bulletin. Recommendation for DUKW Passenger Vessel Canopy Removal. Washington, DC: 2020. MSIB-15-20.
[23] Amphibious Passenger Vehicle DUCK 6 Lane Crossover Collision with Motorcoach on State Route 99, Aurora Bridge, Seattle, Washington, September 24, 2015. (NTSB, HAR-16/02)
[24] Safety Recommendation M-16-26.
[25] Safety Recommendation M-20-2.
[26] Safety Recommendation M-20-3.

recognize the progress that has been made, yet, there remains room for improvement. The NTSB stands ready to work with you and this Committee to continue improving passenger vessel safety.

Thank you again for the opportunity to testify today. I am happy to answer your questions.

Appendix: Open Safety Recommendations issued to the US Coast Guard (as of March 8th, 2022)

Rec. Number	Status	Most Wanted List (2021-22)	Recommendation Text
A-14-069	Open—Acceptable Response		Work with the US Department of the Interior, Bureau of Safety and Environmental Enforcement to identify and develop comprehensive systems and procedures to mitigate the risk of ingestion of raw gas discharges, such as methane, by helicopters operating in the vicinity of offshore oil platforms.
A-14-070	Open—Acceptable Response		After appropriate mitigations are developed as recommended in Safety Recommendation A-14-69, require mobile offshore oil platform operators to implement these systems and procedures.
M-02-005	Open—Unacceptable Response	Yes	Require that companies operating domestic passenger vessels develop and implement a preventive maintenance program for all systems affecting the safe operation of their vessels, including the hull and the mechanical and electrical systems.
M-09-004	Open—Unacceptable Response		Require mariners to report to the Coast Guard, in a timely manner, any substantive changes in their medical status or medication use that occur between required medical evaluations. (Supersedes M-05-005)
M-11-012	Open—Acceptable Response		Establish a structured data monitoring program for your small boats that reviews all available data sources to identify deviation from established guidance and procedures.
M-11-013	Open—Unacceptable Response		Conduct a ports and waterways safety assessment for the Sabine-Neches Waterway, determine from that whether the risk is unacceptable, and if so, develop risk mitigation strategies.
M-11-023	Open—Unacceptable Response	Yes	Establish standards for new and existing commercial fishing industry vessels of 79 feet or less in length that (1) address intact stability, subdivision, and watertight integrity and (2) include periodic reassessment of the vessels' stability and watertight integrity.
M-11-024	Open—Unacceptable Response	Yes	Require all owners, masters, and chief engineers of commercial fishing industry vessels to receive training and demonstrate competency in vessel stability, watertight integrity, subdivision, and use of vessel stability information regardless of plans for implementing the other training provisions of the 2010 Coast Guard Authorization Act.
M-11-027	Open—Unacceptable Response	Yes	Require all crewmembers to provide certification of completion of safety training before getting under way on commercial fishing industry vessels, such training to include both prevention of and proper response to emergency situations as well as actual use of emergency equipment.
M-12-003	Open—Acceptable Response	Yes	Require all operators of U.S.-flag passenger vessels to implement safety management systems, taking into account the characteristics, methods of operation, and nature of service of these vessels, and, with respect to ferries, the sizes of the ferry systems within which the vessels operate. (Supersedes Safety Recommendation M-05-006)

Appendix: Open Safety Recommendations issued to the US Coast Guard (as of March 8th, 2022)

Rec. Number	Status	Most Wanted List (2021-22)	Recommendation Text
M-12-008	Open—Acceptable Response		Align your standards for postaccident toxicological testing of Coast Guard military personnel with the requirements specified in 46 Code of Federal Regulations 4.06-3.
M-12-009	Open—Acceptable Response		Align your standards for postaccident toxicological testing of Coast Guard civilian personnel, seeking appropriate legislative authority if necessary, with the requirements specified in 46 Code of Federal Regulations 4.06-3.
M-12-010	Open—Acceptable Response		Disseminate guidance within the Coast Guard so that commanding officers have unambiguous instruction detailing the requirements for timely drug and alcohol testing of Coast Guard military and civilian personnel whose work performance may be linked to a serious marine incident.
M-13-002	Open—Acceptable Response		Work with the US Department of State to develop a written agreement between the government of Mexico, the US Coast Guard, and the National Transportation Safety Board that will ensure mutuality with regard to: timely accident notification; expeditious access to accident sites; unimpeded ability to gather evidence, interview witnesses, and establish facts; logistical assistance on scene; and continuing liaison so that problems and differences are minimized and promptly resolved.
M-13-007	Open—Acceptable Response		Develop procedures to identify bridges having chronic navigation lighting problems and work with the states that own those bridges to rectify underlying problems in a timely manner.
M-13-008	Open—Acceptable Response		Review the process and means of delivering broadcast notices to mariners and identify and implement methods for providing timely and easily accessible navigation information to mariners.
M-14-001	Open—Acceptable Response		Develop and implement human factors standards for the design of critical vessel controls for US-flag ships to include clearly identifiable and understandable audible alerts and displays indicating which mode is engaged.
M-14-003	Open—Unacceptable Response	Yes	Require installation of voyage data recorders that meet the International Maritime Organization's performance standard for voyage data recorders on new ferry vessels subject to 46 Code of Federal Regulations Subchapters H and K. (Supersedes Safety Recommendations M-10-005 and M-10-006)
M-14-004	Open—Unacceptable Response	Yes	Require installation of voyage data recorders that meet the International Maritime Organization's performance standard for simplified voyage data recorders on existing ferry vessels subject to 46 Code of Federal Regulations Subchapters H and K. (Supersedes Safety Recommendations M-10-005 and M-10-006)

Appendix: Open Safety Recommendations issued to the US Coast Guard (as of March 8th, 2022)

Rec. Number	Status	Most Wanted List (2021-22)	Recommendation Text
M-14-005	Open—Unacceptable Response	Yes	Develop a US voyage data recorder standard for ferry vessels subject to 46 Code of Federal Regulations Subchapter T and require the installation of such equipment where technically feasible. (Supersedes Safety Recommendations M-10-005 and M-10-006)
M-15-008	Open—Acceptable Response		Revise your existing guidance to define inspection requirements clearly, including the frequency of inspection, for each bridge in your jurisdiction.
M-15-009	Open—Acceptable Response		Evaluate the activities and performance of each branch office in the bridge program to identify areas that need improvement; then take the actions necessary to ensure the effectiveness of existing policy, procedures, and regulations related to drawbridge operations and the overall safety of navigation.
M-16-004	Open—Acceptable Response		Address the risks associated with watch stander fatigue by implementing Commandant Instruction 3500.2, Crew Endurance Management, issued on March 30, 2006, in all operational units.
M-16-005	Open—Unacceptable Response		Revise and align Title 33 Code of Federal Regulations Part 161, the Vessel Traffic Service [VTS] National Standard Operating Procedures Manual, VTS center internal operating procedure manuals, and training curricula, as necessary, to ensure that VTS authority is consistently applied across the US Coast Guard VTS system.
M-16-006	Open—Unacceptable Response		Incorporate additional training that emphasizes realistic vessel traffic service (VTS) simulation exercises, including detecting and responding to unsafe traffic situations, in your initial training and proficiency requirements for all VTS watchstanders in the US Coast Guard VTS system.
M-16-007	Open—Unacceptable Response		Require standard on-the-job training (OJT) mentor selection criteria, including appropriate vessel traffic service operator work experience levels and instructor training requirements, for all OJT mentors.
M-16-008	Open—Unacceptable Response		Require all vessel traffic service (VTS) watch supervisors to achieve a VTS operator qualification and complete a minimum work experience requirement as an operator before serving as a supervisor.
M-16-009	Open—Unacceptable Response		Modify your Vessel Traffic Service [VTS] National Standard Operating Procedures Manual, VTS center internal operating procedure manuals, and training curricula, as necessary, to ensure that VTS watchstanders share a common understanding of how to identify and respond to situations requiring navigational assistance.
M-16-011	Open—Unacceptable Response		Conduct or sponsor research, with input from appropriate subject matter experts, to develop more effective procedures or methods for monitoring vessel communications on the bridge-to-bridge radio frequency to identify and address developing unsafe situations in vessel traffic service areas.

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Rec. Number	Status	Most Wanted List (2021-22)	Recommendation Text
M-16-012	Open—Unacceptable Response		Once the research recommended in Safety Recommendation M-16-11 is completed, revise your Vessel Traffic Service [VTS] National Standard Operating Procedures Manual, VTS center internal operating procedure manuals, and training curricula, as necessary.
M-16-013	Open—Unacceptable Response		Work with the American Pilots' Association and the American Waterways Operators to conduct or sponsor research to evaluate and determine the feasibility and benefits of professional mariner representation on the watchfloor at each of the US Coast Guard vessel traffic service (VTS) centers, and establish such representation at VTS centers, as appropriate, based on the findings of that research.
M-16-014	Open—Unacceptable Response		Revise your Vessel Traffic Service [VTS] National Standard Operating Procedures Manual, VTS center internal operating procedure manuals, training curricula, and VTS user manuals, as necessary, to ensure that VTS watchstanders use standard VTS communication phrasing and message markers from the International Maritime Organization Standard Marine Communication Phrases during radio communications with mariners when appropriate.
M-16-015	Open—Unacceptable Response		Work with the Radio Technical Commission for Maritime Services and the American Waterways Operators to modify regulations, procedures, and equipment standards, as necessary, to ensure that vessels engaged in towing operations broadcast accurate automatic identification system information regarding tow size and tow configuration as well as vessel size.
M-16-016	Open—Unacceptable Response		Develop a continuous risk assessment program to evaluate and mitigate safety risks for each vessel traffic service (VTS) area in the US Coast Guard VTS system that includes input from port and waterway stakeholders.
M-16-017	Open—Unacceptable Response		Develop a program for conducting periodic risk assessments of the entire US Coast Guard vessel traffic service system that includes input from port and waterway stakeholders to evaluate and mitigate system-wide safety risks.
M-16-018	Open—Unacceptable Response		Develop or revise, as necessary, your definitions of the activity and incident data collected by vessel traffic service (VTS) centers as necessary to ensure standardized and routine reporting across the entire US Coast Guard VTS system.
M-16-019	Open—Unacceptable Response		Establish a program to periodically analyze the activity and incident data collected by vessel traffic service (VTS) centers to assess the safety performance of each VTS center and the entire US Coast Guard VTS system.

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Rec. Number	Status	Most Wanted List (2021-22)	Recommendation Text
M-16-021	Open—Unacceptable Response		Establish a program to periodically review each of the 12-vessel traffic service (VTS) areas and seek input from port and waterway stakeholders to identify areas of increased vessel conflicts or accidents that could benefit from the use of routing measures or VTS special areas, and establish such measures where appropriate.
M-16-026	Open—Acceptable Response		Amend Navigation and Vessel Inspection Circular 1-01 to ensure that (1) amphibious passenger vehicle (APV) operators tell passengers that seat belts must not be worn while the vessel/vehicle is operated in the water and (2) before the APV enters the water or departs the dock, the master or other crewmember visually checks that each passenger has unbuckled his or her seat belt.
M-17-001	Open—Acceptable Response		Establish a process whereby, at regular intervals, all harbor safety committees identify the safety risks posed by the interaction of commercial and recreational vessels in their respective geographic areas; where necessary, develop and implement practices to mitigate those risks; and share successful practices among all harbor safety committees.
M-17-002	Open—Acceptable Response		Seek statutory authority that requires all recreational boat operators on waters subject to the jurisdiction of the United States to demonstrate completion of an instructional course or an equivalent that meets the National Association of State Boating Law Administrators standards.
M-17-003	Open—Acceptable Response		Work with the National Association of State Boating Law Administrators and the National Water Safety Congress to review and update A Guide to Multiple Use Waterway Management at regular intervals.
M-17-006	Open—Acceptable Response		Ensure that, at all times, at least one crewmember on board each type of response boat is adequately trained in the types of medical emergencies expected in a marine environment and qualified in the use of all first-aid and/or trauma equipment carried on board.
M-17-007	Open—Acceptable Response		Develop a standard for the contents of First-Aid and Trauma (FAT) kits for each type of Coast Guard response vessel.
M-17-017	Open—Acceptable Response		In collaboration with the National Weather Service, provide timely broadcasts of the Tropical Cyclone Forecast/Advisories, Intermediate Public Advisories, and Tropical Cyclone Updates to mariners in all regions via medium-frequency navigational TELEX (NAVTEX), high-frequency voice broadcasts (HF VOBRA), and high-frequency simplex teletype over radio (HF SITOR), or appropriate radio alternatives (and appropriate future technology).

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Rec. Number	Status	Most Wanted List (2021-22)	Recommendation Text
M-17-022	Open—Unacceptable Response		Propose to the International Maritime Organization that design maximum operating angles of inclination for main propulsion and other critical machinery be included in damage control documents, stability instruments and booklets, and in the safety management systems for all applicable vessels.
M-17-023	Open—Unacceptable Response		Propose to the International Maritime Organization that all watertight access doors and access hatch covers normally closed at sea be provided with open/close indicators both on the bridge and locally.
M-17-024	Open—Acceptable Response		Propose to the International Maritime Organization that on new and existing vessels, seawater supply piping below the waterline in all cargo holds be protected from impact.
M-17-025	Open—Acceptable Response		Propose to the International Maritime Organization to require that new cargo vessels be equipped with bilge high-level alarms in all cargo holds that send audible and visible indication to a manned location.
M-17-026	Open—Acceptable Response		Propose to the International Maritime Organization to require that existing cargo vessels be retrofitted with bilge high-level alarms in all cargo holds that send audible and visible indication to a manned location.
M-17-027	Open—Acceptable Response		Propose to the International Maritime Organization that any opening that must normally be kept open for the effective operation of the ship must also be considered a downflooding point, both in intact and damage stability regulations and in load line regulations under the International Convention on Load Lines.
M-17-029	Open—Unacceptable Response		Propose to the International Maritime Organization that existing cargo vessels operating under the International Convention for the Safety of Life at Sea be required to have damage control plans and booklets on board that meet current standards.
M-17-030	Open—Unacceptable Response		Propose to the International Maritime Organization that damage control plans and booklets required by the International Convention for the Safety of Life at Sea be class-approved.
M-17-031	Open—Acceptable Response		Publish policy guidance to approved maritime training schools offering bridge resource management courses to promote a cohesive team environment and improve the decision-making process, and specifically include navigational and storm-avoidance scenarios.
M-17-032	Open—Acceptable Response		Require recurring bridge resource management training for all deck officers when renewing their credentials.
M-17-033	Open—Acceptable Alternate Response		Require that all deck officers, at both operational and management levels, take a Coast Guard–approved advanced meteorology course to close the gap for mariners initially credentialed before 1998.

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Rec. Number	Status	Most Wanted List (2021-22)	Recommendation Text
M-17-034	Open—Acceptable Response		Publish policy guidance to approved maritime training schools offering management-level training in advanced meteorology, or in an appropriate course, to ensure that the curriculum includes the following topics: characteristics of weather systems including tropical revolving storms; advanced meteorological concepts; importance of sending weather observations; ship maneuvering using advanced simulators in heavy weather; heavy-weather preparations; use of technology to transmit and receive weather forecasts (such as navigational telex or weather-routing providers); ship-routing services (capabilities and limitations); and launching of lifeboats and liferafts in heavy weather.
M-17-035	Open—Acceptable Response		Provide policy guidance to approved maritime training schools offering operational-level training in meteorology to ensure that the curriculum includes the following topics: characteristics of weather systems, weather charting and reporting, importance of sending weather observations, sources of weather information, and interpreting weather forecast products.
M-17-036	Open—Unacceptable Response		Require that vessels in ocean service (500 gross tons or over) be equipped with properly operating meteorological instruments, including functioning barometers, barographs, and anemometers.
M-17-037	Open—Acceptable Response		Revise Title 46 Code of Federal Regulations 170.110 (stability booklet) to require (1) stability instructions, guidance, or data on wind velocity used to calculate weather criteria; (2) list of closures that must be made to prevent unintentional flooding; (3) list of closures that must be made for an opening not to be considered a downflooding point; and (4) righting arm curve (metacentric height) table to note the angle at which initial downflooding occurs; also, add a windheel table for vessel full load displacement or the condition of greatest vulnerability to windheel.
M-17-038	Open—Unacceptable Response		Update the guidance in Navigation and Inspection Circular 4-77 (Shifting Weights or Counter Flooding During Emergency Situations), based on the circumstances of the El Faro accident, to include a warning that actions by ship personnel intended to correct a list can produce dangerous results if roll-on/roll-off cargo is already adrift and water has reduced the coefficients of friction for lashed cargo.
M-17-039	Open—Acceptable Response		Conduct a complete review of the Alternate Compliance Program to assess the adequacy and effectiveness of the program.

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Rec. Number	Status	Most Wanted List (2021-22)	Recommendation Text
M-17-040	Open—Acceptable Response		Review and implement training of Coast Guard inspectors and accredited classification society surveyors to ensure that they are properly qualified and supported to perform effective, accurate, and transparent vessel inspections, meeting all statutory and regulatory requirements.
M-17-041	Open—Acceptable Alternate Response		Review and implement training of Coast Guard inspectors and accredited classification society surveyors to ensure that they are properly qualified and supported to perform effective, accurate, and transparent vessel inspections, meeting all statutory and regulatory requirements.
M-17-043	Open—Await Response		Require that open lifeboats on all US-inspected vessels be replaced with enclosed lifeboats that meet current regulatory standards and freefall lifeboats, where practicable.
M-17-044	Open—Acceptable Response		To prevent future errors in converting position data such as occurred in the El Faro accident, work with manufacturers of Global Maritime Distress and Safety System equipment, communication providers, and land earth stations to remove ambiguity from the Inmarsat-C distress alert position reports.
M-17-045	Open—Unacceptable Response	Yes	Require that all personnel employed on vessels in coastal, Great Lakes, and ocean service be provided with a personal locator beacon to enhance their chances of survival.
M-17-046	Open—Unacceptable Response		Modify guidance and training for marine inspectors to ensure that voyage data recorder annual performance tests include the replacement of locator beacons prior to expiration and that audio used to evaluate quality is recorded while a ship is under way using its main propulsion unit.
M-17-047	Open—Acceptable Response		Propose to the International Maritime Organization to amend resolution MSC.333(90) to specify that "normal operations" are defined as when a ship is under way using its main propulsion unit and to assess voyage data recorder problems, including not capturing both sides of internal phone calls on the bridge electric telephone and unrecorded very-high-frequency communications, and identify steps to remedy them.
M-17-048	Open—Acceptable Alternate Response		If the actions recommended to the National Oceanic and Atmospheric Administration in Safety Recommendation M-17-52 establish that the automatic identification system (AIS) is a viable means by which to relay (with acceptable time delay) meteorological and oceanographic data and metadata from vessels at sea for use by global meteorological authorities, propose to the International Maritime Organization that vessels required to use AIS also be equipped with meteorological and oceanographic sensors including, at a minimum, sensors for barometric pressure and sea-

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Rec. Number	Status	Most Wanted List (2021-22)	Recommendation Text
			surface temperature that will automatically disseminate the data at high-temporal resolution via AIS.
M-17-049	Open—Acceptable Alternate Response		Propose to the International Maritime Organization that vessels under regulations of the International Convention for the Safety of Life at Sea that are not already automatically disseminating meteorological and oceanographic data by other means be required to manually disseminate such data while at sea via the automatic identification system or the Voluntary Observing Ship program at the times of 0000 coordinated universal time (UTC), 0600 UTC, 1200 UTC, and 1800 UTC.
M-18-001	Open—Acceptable Alternate Response		Require operators to perform full function tests of quick-closing valves during inspections and examinations, ensuring that the associated systems shut down as designed and intended.
M-18-002	Open—Acceptable Response	Yes	Evaluate the feasibility of creating a passenger vessel safety specialist billet at each sector that has the potential for a search and rescue activity characterized by the need for immediate assistance to a large number of persons in distress, and staff sector-level billets, as appropriate, based on the findings of that evaluation.
M-18-013	Open—Acceptable Response	Yes	Require fire detection systems in unmanned spaces with machinery or other potential heat sources on board small passenger vessels.
M-19-006	Open—Acceptable Response		In collaboration with the Corps of Engineers, develop a policy to ensure fleeting areas are maintained in compliance with permit requirements.
M-19-007	Open—Acceptable Response		Develop a regulated navigation area for the Pittsburgh region that would ensure the integrity of fleeting areas and include detailed requirements for barge moorings during highwater and ice conditions.
M-19-015	Open—Acceptable Response		Require DUKW amphibious passenger vessels (commonly referred to as original and/or “stretch” DUKWs) to have sufficient reserve buoyancy through passive means, so that they remain upright and afloat with a full complement of passengers and crewmembers in the event of damage or flooding.
M-19-016	Open—Acceptable Response		For DUKW amphibious passenger vessels without sufficient reserve buoyancy (commonly referred to as original and/or “stretch” DUKWs), require the removal of canopies, side curtains, and their associated framing during waterborne operations to improve emergency egress in the event of sinking.
M-20-001	Open—Acceptable Response	Yes	Require that amphibious passenger vessels equipped with forward hatches enable operators to securely close them during waterborne operations to prevent water ingress.

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Rec. Number	Status	Most Wanted List (2021-22)	Recommendation Text
M-20-002	Open—Acceptable Response	Yes	Review the circumstances of the Stretch Duck 7 sinking and other amphibious passenger vessel accidents, and revise Navigation and Vessel Inspection Circular (NVIC) 1-01 to address the issues found in these accidents, including operations during imminent severe weather and emergency egress during rapid sinking.
M-20-003	Open—Acceptable Alternate Response	Yes	Examine existing training and knowledge requirements for understanding and applying fundamental weather principles to waterborne operations for Coast Guard-credentialed masters who operate small passenger vessels; and, if warranted, require additional training requirements for these ratings on recognition of critical weather situations in pre-departure planning and while under way.
M-20-014	Open—Acceptable Response		Revise Title 46 Code of Federal Regulations Subchapter T to require that newly constructed vessels with overnight accommodations have smoke detectors in all accommodation spaces.
M-20-015	Open—Acceptable Response		Revise Title 46 Code of Federal Regulations Subchapter T to require that all vessels with overnight accommodations currently in service, including those constructed prior to 1996, have smoke detectors in all accommodation spaces.
M-20-016	Open—Acceptable Response		Revise Title 46 Code of Federal Regulations Subchapter T and Subchapter K to require all vessels with overnight accommodations, including vessels constructed prior to 1996, have interconnected smoke detectors, such that when one detector alarms, the remaining detectors also alarm.
M-20-017	Open—Acceptable Response		Develop and implement an inspection procedure to verify that small passenger vessel owners, operators, and charterers are conducting roving patrols as required by Title 46 Code of Federal Regulations Subchapter T.
M-20-018	Open—Acceptable Response		Revise Title 46 Code of Federal Regulations Subchapter T to require newly constructed small passenger vessels with overnight accommodations to provide a secondary means of escape into a different space than the primary exit so that a single fire should not affect both escape paths.
M-20-019	Open—Acceptable Response		Revise Title 46 Code of Federal Regulations Subchapter T to require all small passenger vessels with overnight accommodations, including those constructed prior to 1996, to provide a secondary means of escape into a different space than the primary exit so that a single fire should not affect both escape paths.
M-20-020	Open—Acceptable Response		Review the suitability of Title 46 Code of Federal Regulations Subchapter T regulations regarding means of escape to ensure there are no obstructions to egress on small passenger vessels constructed prior to 1996 and modify regulations accordingly.

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Rec. Number	Status	Most Wanted List (2021-22)	Recommendation Text
M-21-005	Open—Await Response		Conduct a study to evaluate the effects of icing, including asymmetrical accumulation, on crab pots and crab pot stacks and disseminate findings of the study to industry, by means such as a safety alert.
M-21-006	Open—Await Response		Based on the findings of the study recommended in Safety Recommendation M-21-05, revise regulatory stability calculations for fishing vessels to account for the effects of icing, including asymmetrical accumulation, on a crab pot or pot stack.
M-21-007	Open—Await Response		Revise Title 46 Code of Federal Regulations 28.530 to require that stability instructions include the icing amounts used to calculate stability criteria.
M-21-008	Open—Await Response		Develop an oversight program to review the stability instructions of commercial fishing vessels that are not required to possess a load line certificate for accuracy and compliance with regulations.
M-21-015	Open—Await Response		Propose to the International Maritime Organization to eliminate International Maritime Dangerous Goods Code special provision 961 for used and damaged flammable-liquid-powered vehicles transported by roll-on/roll-off vehicle carriers.