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COAST GUARD

**Mission Performance
Challenged by the
Declining Condition and
Rising Costs of its Legacy
Vessel Fleet**

Statement of Stephen L. Caldwell, Director
Homeland Security and Justice Issues



G A O

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Chairman LoBiondo, Ranking Member Larsen, and Members of the Subcommittee:

Thank you for the opportunity to discuss the condition of the Coast Guard's legacy vessel fleet, and challenges the Coast Guard faces in sustaining these vessels and meeting mission requirements. The Coast Guard, within the Department of Homeland Security, is the principal federal agency responsible for maritime safety, security, and environmental stewardship. The legacy vessel fleet is critical for executing Coast Guard missions, which include defense operations; search and rescue; and securing ports, waterways, and coastal areas. My comments will focus on the legacy 378-foot high endurance cutters, 270-foot and 210-foot medium endurance cutters, and 110-foot patrol boats, and are based on findings from the report we released in July 2012.¹

The legacy high endurance cutters, medium endurance cutters, and patrol boats are either approaching the end of or are past their originally-expected service lives, with a number of these vessels having entered into service in the 1960s and 1970s. Coast Guard officials report that these legacy vessels have become increasingly costly to maintain and their degraded condition has negatively affected the Coast Guard's operational capacity to meet mission requirements. The Coast Guard is in the midst of a long-term recapitalization plan that could cost as much as \$29 billion to replace legacy vessels, aircraft, and other related systems.² However, since beginning the acquisition program in 1996, the Coast Guard has experienced cost, management, and oversight problems that have led to considerable delays in the delivery of new vessels—by as much as 13 years. In turn, delays in delivery of the replacement vessels have created uncertainties regarding how the Coast Guard will sustain its legacy vessels and meet mission requirements.

¹ Our published report provides additional details on the sizes and capabilities of each of these vessels. See GAO, *Coast Guard: Legacy Vessels' Declining Conditions Reinforce Need for More Realistic Performance Targets*, [GAO-12-741](#) (Washington, D.C.: July 31, 2012).

² The Coast Guard's asset recapitalization plan includes projects to build or modernize five classes each of vessels and aircraft and undertake procurement of other capabilities, such as improved command, control, communications, computers, intelligence, surveillance, and reconnaissance. This report focuses only on the legacy vessel fleet. For more information on the recapitalization effort as a whole, see GAO, *Coast Guard: Action Needed As Approved Deepwater Program Remains Unachievable*. [GAO-11-743](#) (Washington, D.C.: July 28, 2011).

My testimony today summarizes the findings of our July 2012 report and addresses (1) how the physical condition of the Coast Guard's legacy vessel fleet changed from fiscal years 2005 through 2011, and key actions the Coast Guard has taken related to the physical condition of its legacy fleet; (2) key annual maintenance expenditure trends for the legacy vessel fleet, and the extent to which the Coast Guard's cost estimating process has followed established best practices; and (3) the operational capacity of the legacy vessel fleet and the extent to which the Coast Guard faces challenges in sustaining the legacy vessel fleet and meeting mission requirements.

For our report, we analyzed Coast Guard data from fiscal years 2005 through 2011 on the legacy vessels' condition, cost, and operational performance. We interviewed relevant Coast Guard headquarters officials and conducted site visits to five Coast Guard field locations where legacy vessels were based or undergoing maintenance. We also compared the documentation that the Coast Guard uses to compute its annual legacy vessel maintenance cost estimates against established best practices.³ We reviewed Coast Guard documents and other evidence that outlined challenges the Coast Guard faces in sustaining its legacy vessels and meeting mission requirements given delays in deploying replacement vessels. Further, we evaluated the Coast Guard's actions against Office of Management and Budget guidance.⁴ We conducted this work in accordance with generally accepted government auditing standards. Our July 2012 report provides further details on our scope and methodology.⁵

³ GAO, *GAO Cost Estimating and Assessment Guide: Best Practices for Developing and Managing Capital Program Costs*, [GAO-09-3SP](#) (Washington, D.C.: Mar. 2, 2009).

⁴ Office of Management and Budget, *Program Assessment Rating Tool Guidance Number 2007-2*, (Washington, D.C.: Jan. 29, 2007).

⁵ [GAO-12-741](#).

Legacy Vessel Fleet's Condition Is Poor and Generally Declining Despite Coast Guard Maintenance Efforts

From fiscal years 2005 through 2011, the physical condition of the Coast Guard's legacy vessels was generally poor. A primary Coast Guard measure of a vessel's condition—the operational percent of time free of major casualties—shows that the high endurance cutters, medium endurance cutters, and patrol boats generally remained well below target levels from fiscal years 2005 through 2011.⁶ For example, over this 7-year period, the operational percent of time free of major casualties averaged about 44 percent for the high endurance cutters and about 65 percent for the medium endurance cutters versus a target of 72 percent; and the patrol boats averaged approximately 74 percent versus a target of 86 percent. Other evidence, such as our review of vessel condition assessments and inspections the Coast Guard conducts of the legacy vessels, also shows that the condition of the legacy vessel fleet is generally declining. For example, a variety of Coast Guard assessments show that legacy vessels' critical operating systems—such as main diesel engines—have been increasingly prone to mission-degrading casualties. In addition, Coast Guard senior maintenance officials and vessel crew members we interviewed noted increased maintenance challenges because of the advanced age of the legacy vessels. In particular, the maintenance managers for both the high endurance and medium endurance cutters reported that the performance of critical systems on these legacy vessel classes has become increasingly unpredictable and refurbishments of these vessel classes' least reliable systems have brought limited returns on the investments. Maintenance officials and vessel crew members also reported devoting increasing amounts of time and resources to troubleshoot and resolve maintenance issues because some systems and parts on these legacy vessel classes are obsolete.

The Coast Guard has taken two key actions to improve the condition of its legacy vessels. First, in 2009, the Coast Guard reorganized its maintenance command structure to focus on standardization of practices. Under this reorganization, the Coast Guard eliminated its two Maintenance and Logistics Commands and replaced them with a centralized command structure—the Surface Forces Logistics Center—whereby a single product line manager oversees the maintenance of

⁶ A major casualty is a deficiency in mission essential equipment that causes the major degradation or loss of a primary mission.

similar classes of vessels.⁷ Coast Guard officials reported that this change was made to enable better oversight of the condition of entire classes of the vessel fleet, reduce the workload on vessel crews by providing centralized support for procurement of replacement parts, and implement centralized maintenance plans to address commonly occurring casualties.⁸ Second, Coast Guard officials also reported that the Coast Guard was on schedule to complete a 10-year, almost half-billion dollar set of sustainment projects to refurbish selected patrol boats and upgrade medium endurance cutters, known as Mission Effectiveness Projects, which are intended to improve legacy vessel operating and cost performance. Our July 2012 report provides additional information regarding these actions but, as noted in the report, the condition of these legacy vessels continues to decline despite these efforts.

⁷ The Coast Guard established the Surface Forces Logistics Center under which Coast Guard vessels are grouped into five product lines whose mission support, maintenance procedures, priorities, and funds are overseen by a single product line manager. The product lines are the (1) Long Range Enforcer (which includes the high endurance cutter and the national security cutter); (2) Medium Endurance Cutter; (3) Ice Breaker, Buoy Tender and Construction Tender; (4) Patrol Boat (which includes the 110-foot patrol boat and fast response cutter); and (5) Small Boat.

⁸ According to Coast Guard officials, vessel crews had previously been responsible for managing procurement of replacements for minor casualties. According to these officials, doing so could be time consuming for crews. Under the reorganization, the Surface Forces Logistics Center manages a greater share of the procurement of replacement parts and systems to both reduce the workload of crews and provide better oversight across the vessel fleet. Additionally, the new organization is structured to provide a single point of accountability (the product line manager) for all maintenance, system upgrades, and supply functions for a vessel class.

Maintenance Expenditures Have Recently Increased, and the Process for Estimating Costs Does Not Fully Meet Best Practices

Expenditures for the two key types of legacy vessel annual depot-level maintenance—scheduled and unscheduled maintenance—declined from fiscal year 2005 to fiscal year 2007, and then rose from fiscal year 2007 to fiscal year 2011.⁹ For example, scheduled maintenance expenditures rose from about \$43 million in fiscal year 2007 to about \$70 million in fiscal year 2011. Coast Guard officials attributed the increase in scheduled maintenance expenditures to better identifying maintenance needs, increasing the prioritization of completing all scheduled maintenance, and the receipt of supplemental funding. In contrast, unscheduled maintenance expenditures varied by vessel class from fiscal years 2005 through 2011, but the high endurance cutter fleet consistently incurred the greatest share of unscheduled maintenance expenditures. For example, high endurance cutters accounted for 86 percent of all unscheduled maintenance expenditures in fiscal year 2011. Coast Guard officials attributed the comparatively high unscheduled maintenance expenditures to the high endurance cutters' advanced age and size.¹⁰

Further, annual depot-level maintenance expenditures often exceeded the Coast Guard's budgeted funds for depot-level maintenance for the legacy vessels—known as Standard Support Levels—from fiscal years 2005 through 2011. For example, actual depot-level maintenance expenditures for the high endurance cutters were about 3.6 times higher than Standard Support Levels in fiscal year 2009—\$55.5 million compared with \$15.5 million. The Standard Support Levels have generally remained unchanged over decades and do not reflect the rising costs to maintain the legacy vessels as they have aged.¹¹ Senior Coast Guard vessel maintenance officials cited this funding gap as a challenge,

⁹ Depot-level maintenance is vessel maintenance that is beyond the capability of the operating units.

¹⁰ Coast Guard officials told us that major casualties on three high endurance cutters—the *CHASE*, *DALLAS* and *GALLATIN*—contributed disproportionately to these expenditures in fiscal years 2010 and 2011. The Coast Guard has since decommissioned the *CHASE* and *DALLAS* on May 13, 2011 and March 30, 2012, respectively.

¹¹ According to Coast Guard officials, Standard Support Levels are established when a vessel class enters service or undergoes a service life extension program. For example, the Coast Guard reset the Standard Support Level for the high endurance cutters after conducting a service life extension program between 1987 and 1992—the Fleet Renovation and Modernization Program—but has not reset the Standard Support Levels for the medium endurance cutters or patrol boats. Coast Guard officials indicated that the Coast Guard increases Standard Support Levels using non-pay inflation, but it has not done so every year.

noting that supplemental funding had been critical to enable the Coast Guard to fund necessary maintenance for the legacy vessel fleet. Our July 2012 report provides further information regarding the Coast Guard's annual depot-level maintenance expenditures.

Our review found that the Coast Guard's process for estimating legacy vessel annual depot-level maintenance costs does not fully reflect relevant best practices. GAO's Cost Estimating and Assessment Guide states that a high-quality and reliable cost estimate includes certain best practice characteristics. We determined that the three characteristics relevant to the Coast Guard's cost estimation process are that the process should be (1) well-documented, (2) comprehensive, and (3) accurate. Our assessment showed that the Coast Guard's legacy vessel maintenance cost-estimating process partially met the three characteristics, as follows:

- **Partially comprehensive:** The Coast Guard's process for estimating annual legacy vessel depot-level maintenance costs defines the program, among other things, but does not document all cost-influencing ground rules and assumptions (e.g., inflation rate).
- **Partially well-documented:** The Coast Guard's process for estimating annual legacy vessel depot-level maintenance costs discusses the technical baseline description, and the data in the baseline are consistent with the estimate; however, the Coast Guard did not provide documentation that discusses key cost estimating factors, such as how the data were normalized or the reliability of the data.
- **Partially accurate:** The Coast Guard's process for estimating annual legacy vessel depot-level maintenance costs contains few, if any, minor mathematical mistakes and is regularly updated to reflect significant program changes and current status. However, we assessed the cost estimate as being not fully accurate because Coast Guard officials could not provide us with documentation that would allow us to assess the reliability of the historical data used, the accuracy of the calculations, the relationship of the data to the historical contractor bids, or the final estimates for all maintenance costs.

To address these issues, in our July 2012 report, we recommended that the Secretary of Homeland Security direct the Commandant of the Coast Guard to ensure that the Coast Guard's annual depot-level maintenance

cost estimates conform to cost estimating best practices. DHS concurred with this recommendation and described actions the Coast Guard has taken or plans to take, but these actions may not fully address the intent of this recommendation. For example, DHS noted that given current fiscal constraints, the Coast Guard will focus on improvements that do not require additional resources. While we agree that federal resources are limited, aligning the cost estimating process for legacy vessel maintenance with best practices would not necessarily require an increased investment of resources. Rather, having a well documented cost estimating process and using accurate historical data should enable the Coast Guard to operate more efficiently.¹²

Declining Condition of the Legacy Vessel Fleet Makes Operational Capacity Targets Increasingly Unachievable

The operational capacity of the Coast Guard's legacy vessel fleet declined from fiscal years 2006 through 2011. In particular, while performance varied across the legacy vessel classes, two key Coast Guard metrics—operational hours and lost cutter days—show that the legacy vessels did not meet their operational capacity targets and lost considerable planned operational time. For example, the high endurance cutters and 210-foot medium endurance cutters did not meet any of their operational hour targets from fiscal years 2006 through 2011, and the 270-foot medium endurance cutters met their targets only in fiscal year 2008. Specifically, operational hours for the high endurance cutters declined by about 32 percent from fiscal year 2008 to 2011,¹³ and the combined operational hours of the 210-foot and 270-foot medium endurance cutters declined nearly 21 percent from fiscal year 2007 to fiscal year 2011.¹⁴ In addition, Coast Guard data show the high and medium endurance cutters, collectively, averaged about 618 lost cutter days per year from fiscal years 2006 through 2011. Further, the number of lost cutter days for the high endurance cutters has been nearly

¹² See the July 2012 report for more information on DHS's comments and our evaluation of them.

¹³ Coast Guard headquarters officials reported that two high endurance cutters were decommissioned in fiscal year 2011 for a total reduction of 3,330 operational hours from that achieved in fiscal year 2010.

¹⁴ Coast Guard officials attributed declines in the medium endurance cutters' capacity primarily to increased unscheduled maintenance. However, the officials also reported that because medium endurance cutters were taken out of service on a rotating basis to undergo the Mission Effectiveness Project, doing so may have also decreased the medium endurance cutters' operational hours by as much as 9,900 hours annually.

equivalent to three high endurance cutters being out of service for an entire year in each of the last 3 fiscal years. Moreover, lost cutter days for both the 210-foot and 270-foot medium endurance cutters combined more than doubled, from 122 lost cutter days in fiscal year 2006 to 276 lost cutter days in fiscal year 2010.¹⁵ Coast Guard headquarters officials reported that the declining operational capacity of its legacy vessel fleet—particularly the high and medium endurance cutters—has been a prime contributor to the Coast Guard’s declining ability to meet mission requirements and intercept threats beyond U.S. territorial waters.

Coast Guard officials also reported that delays in the delivery of replacement vessels will require the Coast Guard to continue to operate its legacy vessels beyond their originally-expected service lives and result in a widening operational capacity gap.¹⁶ As a result, these officials expect the Coast Guard’s legacy vessels to become increasingly unreliable, have increasingly diminished operational capacity, and be increasingly costly and challenging to maintain. In the next few years, the operational capacity gap that exists for the high endurance cutter and patrol boat fleets is expected to increase because of actions the Coast Guard plans to take to better balance the needs of the legacy fleet with the acquisition of replacement vessels. For example, by the end of fiscal year 2012, the Coast Guard plans to end the “High Tempo/High Maintenance” program for eight of its patrol boats.¹⁷ Then, in fiscal year 2013, the Coast Guard plans to decommission the next two most degraded and costly high endurance cutters, as well as three patrol boats. While these actions will reduce legacy fleet expenditures, they will

¹⁵ Coast Guard officials attributed the majority of the high endurance cutter lost cutter days to propulsion system casualties. For example, the Coast Guard reported that catastrophic engine failure rendered the high endurance cutters *DALLAS*, *CHASE*, and *GALLATIN* inoperative for 1 year, 1 year and 5 months, and 2 years, respectively, during this time period. As stated previously, the Coast Guard has since decommissioned the *CHASE* and *DALLAS*.

¹⁶ The *Naval Engineering Manual* defines remaining service life as the time period during which no major expenditures will be required for hull and structural repairs or modernizations, or for machinery or system modernizations based solely on the vessel’s capability to meet existing mission requirements.

¹⁷ The “High Tempo/High Maintenance” program was designed to mitigate the loss of eight patrol boats to hull failure and six to deployment to Bahrain by doubling the operational hour output of eight patrol boats through the use of double crews and increased maintenance. Coast Guard officials reported that these eight patrol boats will return to normal operations at the end of fiscal year 2012.

also increase the vessel fleet's operational capacity gap because the Coast Guard will not receive sufficient numbers of replacement vessels during this time period to make up for the lost capacity.

The ongoing delivery of replacement vessels is expected to help mitigate the existing operational capacity gap for the legacy high endurance cutter and patrol boat fleets. However, Coast Guard officials reported, and our analysis of Coast Guard documents confirms, that the medium endurance cutter fleet will be most affected by delays in delivery of replacement vessels. The Coast Guard is refurbishing its medium endurance cutters through the Mission Effectiveness Project to increase these cutters' reliability and reduce longer-term maintenance costs, and third-party assessments show that the performance of those medium endurance cutters that have completed the project has improved.¹⁸ Even if the most optimistic projections were realized, though, and the Mission Effectiveness Project was to extend the medium endurance cutters' service lives by 15 years, the medium endurance cutters would remain in service increasingly beyond the end of their originally-expected service lives before full deployment of their replacement vessels—the offshore patrol cutters. In particular, according to current plans, some of the 270-foot medium endurance cutters are to remain in service as late as 2033—up to 21 years beyond the end of their originally-expected service lives—before they are replaced. Coast Guard officials reported that a further refurbishment of the medium endurance cutters will be necessary to meet operational requirements and that the Coast Guard is in the early stages of developing plans for addressing the expected gap between remaining medium endurance cutter fleet service lives and the delivery of the replacement offshore patrol cutters.

Coast Guard efforts to sustain its legacy vessel fleet and meet mission requirements until the replacement vessels are delivered are also challenged by uncertainties regarding the future mix of vessels, as well as the implementation of a rotational crew concept for the replacement vessel for the high endurance cutters, known as the national security

¹⁸ The Coast Guard has contracted with the Department of Transportation, Research and Innovative Technology Administration's Volpe National Transportation Systems Center to conduct annual assessments of the effectiveness of the Mission Effectiveness Project.

cutter.¹⁹ The Coast Guard's fiscal year 2013 to 2017 5-year Capital Investment Plan does not allocate funds for the acquisition of the last two replacement national security cutters, as called for by the program of record, and it is unclear how this could affect the decommissioning schedule of the high endurance cutters, the last of which the Coast Guard currently plans to decommission in fiscal year 2023.²⁰

The Coast Guard has established operational hour targets for the number of hours its vessels are expected to conduct operations or missions each fiscal year and uses these targets to inform planning decisions, such as setting performance targets and corresponding resource allocations. Although senior Coast Guard headquarters officials reported considering various factors when setting overall mission performance targets annually, these officials reported doing so based on the assumption that vessel class assets will achieve 100 percent of their operational hour targets. Our analysis of Coast Guard data, though, makes it clear that the Coast Guard's legacy vessel fleet has increasingly fallen below operational hour targets in recent years, and this trend is expected to continue. In addition, Coast Guard officials reported that the decline in legacy vessel operational capacity has challenged the Coast Guard's ability to meet its mission performance targets. Further, Coast Guard operational commanders reported taking actions to mitigate the effect of declining legacy vessel capacity, such as diverting vessels tasked to other missions to help complete operations. Nevertheless, the Coast Guard has not revised legacy vessel operational hour targets because, according to Coast Guard officials, doing so would lower its mission performance targets. However, these targets have gone unmet because of the declining operational capacity of the legacy vessel fleet. Because it sets mission performance targets and allocates resources on the assumption that legacy vessels will achieve 100 percent of operational hour targets, the Coast Guard's allocation of resources is not realistic. Further, because the Coast Guard uses vessels' operational hour targets

¹⁹ The Coast Guard's program of record assumes that the new national security cutter fleet will achieve more operational capacity than the legacy high endurance cutter fleet by implementing a rotational crew concept in which the Coast Guard would have four sets of crew staff and operate three national security cutters on a rotating basis to increase the vessels' operational time.

²⁰ The Coast Guard recently revised the high endurance cutter decommissioning schedule to delay the decommissioning of the last high endurance cutter from 2020 to 2023 in its fiscal years 2013-2017 *Capital Investment Plan*.

to set agency-wide performance targets and to allocate resources, consistent achievement of its performance targets is at increased risk.

In our July 2012 report, we recommended that the Secretary of Homeland Security direct the Commandant of the Coast Guard to adjust legacy vessel fleet operational hour targets to reflect actual capacity, as appropriate by class. DHS did not concur with this recommendation and noted, among other things, that reducing the operational hour targets would fail to fully utilize those assets not impacted by maintenance issues. We disagree with DHS's position because, as noted in the July 2012 report, while senior Coast Guard officials reported that the Coast Guard adjusts its mission performance targets annually, it does not also adjust legacy vessel operational hour targets annually. These officials also stated that the Coast Guard's mission performance targets are based on each vessel class's capacity, with the assumption that each vessel will operate at 100 percent of its planned operating time. Thus, we do not believe that reducing the operational hour targets would result in a failure by the Coast Guard to fully utilize assets not impacted by maintenance challenges and continue to believe that this recommendation has merit.²¹

Chairman LoBiondo, Ranking Member Larsen, and members of the subcommittee, this completes my prepared statement. I would be happy to respond to any questions you may have at this time.

GAO Contact and Staff Acknowledgements

For questions about this statement, please contact Stephen L. Caldwell at (202) 512-9610 or caldwells@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this statement. Individuals making key contributions to this statement include Christopher Conrad (Assistant Director) and Michael C. Lenington. Additional contributors include Jason Berman, Chloe Brown, and Lara Miklozek.

²¹ See the July 2012 report for more information on DHS's comments and our evaluation of them.

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