

GAO

Report to the Subcommittee on Oceans,
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COAST GUARD

Strategies for Mitigating the Loss of Patrol Boats Are Achieving Results in the Near Term, but They Come at a Cost and Longer Term Sustainability Is Unknown




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Highlights

Highlights of [GAO-08-660](#), a report to the Subcommittee on Oceans, Atmosphere, Fisheries, and Coast Guard, Committee on Commerce, Science, and Transportation, U.S. Senate

Why GAO Did This Study

The Coast Guard's 110-foot patrol boats are used for a number of missions, such as enforcement of fisheries laws, and the interdiction of migrants and illicit drugs. As part of the Coast Guard's initial plans to replace many of its vessels, it intended to convert its 110-foot patrol boats into 123-foot patrol boats with increased capabilities until the replacement vessel, the Fast Response Cutter (FRC), became operational. However, structural problems on the eight converted 123-foot boats led the Coast Guard to remove these boats from service. Faced with a loss of operational hours, especially in the Coast Guard's Florida-based District 7 where these boats operated, the Coast Guard implemented mitigation strategies to recover lost operational hours.

This report provides information on Coast Guard patrol boat operations and, in particular, addresses: (1) operational challenges created by the removal from service of the 123-foot patrol boats and the Coast Guard's strategies for mitigating their loss; (2) effects these mitigation strategies have had on overall Coast Guard operational hours, as well as operating and maintenance costs, patrol boat crews, and mission performance; and (3) issues that could affect the sustainability of these strategies.

To conduct its work, GAO analyzed data and other documentation on patrol boat operations and mitigation strategies, and interviewed Coast Guard officials.

To view the full product, including the scope and methodology, click on [GAO-08-660](#). For more information, contact Stephen L. Caldwell at (202) 512-8777 or caldwells@gao.gov.

COAST GUARD

Strategies for Mitigating the Loss of Patrol Boats Are Achieving Results in the Near Term, but They Come at a Cost and Longer Term Sustainability Is Unknown

What GAO Found

The removal from service of eight 123-foot patrol boats in November 2006 created operational challenges by reducing patrol boat operational hours across the Coast Guard and exacerbating an existing gap between the Coast Guard's operational hour target for its fleet of patrol boats and what it was achieving. To mitigate the loss of the District 7-based 123-foot patrol boats and their associated operational hours in fiscal year 2007 and beyond, the Coast Guard implemented a number of strategies. These mitigation strategies include: using the crews from the eight patrol boats removed from service to augment the crews of eight District 7-based patrol boats (i.e., double-crewing); periodically deploying vessels from other districts to perform missions in District 7; increasing the operational hours of 87-foot patrol boats in District 7; and acquiring four new 87-foot patrol boats, among others.

The mitigation strategies have had a number of impacts on Coast Guard operations—both positive and negative. On the positive side, these strategies collectively provided approximately 21,000 additional operational hours to District 7 in fiscal year 2007, and are projected to provide additional operational hours in future years. On the negative side, these strategies have increased operating and maintenance costs; reduced the availability for some on-board crew training; and affected the performance of some missions, such as fisheries enforcement, in districts providing vessel support to District 7.

Several issues, such as greater resource and maintenance needs, can affect the longer-term sustainability of the mitigation strategies. The Coast Guard notes that sustainment of the operational hour gains it achieved through double-crewing patrol boats is dependent, in large part, on continued funding at current levels. Similarly, any operational hour gains it plans to achieve by revising the patrol boat maintenance and upgrade project could be impacted by any reductions in funding. Sustaining the mitigation strategies is also dependent on the Coast Guard's continued ability to delay performing certain missions in some districts to increase mission performance in District 7. Finally, any potential delays in the delivery of the replacement FRC vessel, expected in 2010, will make sustainment more difficult. The Department of Homeland Security, of which the Coast Guard is a component, concurred with our report.

One of the Coast Guard's 110-foot Patrol Boats



Source: Photo courtesy of the U.S. Coast Guard.

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United States Government Accountability Office
Washington, DC 20548

June 23, 2008

The Honorable Maria Cantwell
Chair
The Honorable Olympia Snowe
Ranking Member
Subcommittee on Oceans, Atmosphere, Fisheries, and Coast Guard
Committee on Commerce, Science, and Transportation
United States Senate

The Coast Guard's 110-foot patrol boats serve as key assets for a number of Coast Guard missions, particularly living marine resources, ports, waterways, and coastal security, and the interdiction of illicit drugs and undocumented migrants. In 2002, as part of the Coast Guard's initial plan to replace or modernize existing aircraft, vessels, and information management capabilities—also known as the Deepwater Program—the Coast Guard intended to convert all 49 of its aging and deteriorating 110-foot patrol boats into 123-foot patrol boats with increased capabilities. This conversion was to serve as a bridging strategy until a replacement vessel, the Fast Response Cutter (FRC), became operational. Conversion of the first eight 110-foot patrol boats began in February 2003; however, hull buckling and other structural problems among the eight converted patrol boats led the Coast Guard to first impose operating restrictions and then, ultimately, halt all future patrol boat conversions in June 2005. As the 123-foot patrol boats continued to experience structural and mechanical problems leading to operational and safety concerns, the Coast Guard decided to remove all eight of the 123-foot patrol boats from service in November 2006. Then, in April 2007, the Coast Guard announced its decision to permanently decommission these patrol boats.

Because all of the converted patrol boats that were removed from service came from one district—District 7, based in Miami, Florida, and generally covering the coasts and adjacent waters of South Carolina, Georgia, Florida, and Puerto Rico—the Coast Guard was faced with a loss of operational hours in that district, leading it to develop strategies for mitigating the loss of these patrol boats' operational hours until the

replacement vessel, the FRC, is delivered and becomes operational.¹ According to the Coast Guard, the first FRC is currently anticipated to be delivered in late fiscal year 2010.

This report, prepared at your request, examines Coast Guard patrol boat operations and the actions taken to mitigate the loss of patrol boat operational hours brought about by the removal from service of the eight 123-foot patrol boats. Specifically, this report addresses:




- the operational challenges created by the removal from service of the 123-foot patrol boats, and strategies the Coast Guard has implemented to mitigate these challenges;
- effects these mitigation strategies have had on overall Coast Guard operational hours, as well as operating and maintenance costs, patrol boat crews, and mission performance; and
- issues that could affect the sustainability of these mitigation strategies.

In conducting our work, we analyzed reports, memoranda, operational hour data, relevant asset condition measures, and other documentation on Coast Guard patrol boat operations and mitigation strategies. Part of our analyses included a review of the types of vessels the Coast Guard has in its fleet that have been used to mitigate the loss of 123-foot patrol boat operational hours. Table 1 details some of the operating characteristics of the 110-foot patrol boats, the 87-foot coastal patrol boats, and 179-foot patrol coastals on loan from the Navy, which have all been used to assist District 7 in fulfilling its mission requirements.²

¹To accomplish its responsibilities, the Coast Guard is organized into two major commands that are responsible for overall mission execution—one in the Pacific area and the other in the Atlantic area. These commands are divided into nine districts which, in turn, are organized into 35 sectors that unify command and control of field units and resources, such as multimission stations and patrol boats.

²Since fiscal year 2005, the Coast Guard has had operational command of three to five Navy 179-foot patrol coastal vessels, established via a Memorandum of Agreement with the Navy.

Table 1: Information on the Vessel Classes Used to Provide Operational Hours in District 7 to Offset the Loss of the 123-foot Patrol Boats

Capability	87-foot coastal patrol boat	110-foot patrol boat	179-foot patrol coastal
			
Number in fleet	65	41	5
Crew size	1 officer or officer in charge, 9 enlisted	2 officers, 14 enlisted	2 officers, 24 enlisted
Maximum speed	25 knots	30 knots	35+ knots
Endurance ^a	3 days	5 days	10 days
Fuel capacity	2,800 gallons	10,380 gallons	14,500 gallons, plus 5,632 additional reserve
Missions	<ul style="list-style-type: none"> Search and rescue Marine environmental protection Ports, waterways, and coastal security Migrant interdiction Counter drug Living marine resources 	<ul style="list-style-type: none"> Search and rescue Marine environmental protection Ports, waterways, and coastal security Migrant interdiction Counter drug Living marine resources Defense readiness 	<ul style="list-style-type: none"> Search and rescue Marine environmental protection Ports, waterways, and coastal security Migrant interdiction Counter drug Living marine resources Defense readiness

Source: U.S. Coast Guard.

^aEndurance is the total amount of time a vessel is capable of patrolling with the amount of fuel, food, and water that it carries on board.

Note: Photographs were located on the U.S. Coast Guard Pier System Web site and U.S. Coast Guard Visual Information Server, both of which provide photographs for public use. The 87-foot patrol boat photo was taken by PA2 Tiffany Powell, and the 110-foot patrol boat photo was taken by Petty Officer 3rd Class David R. Marin.

In addition to our data analyses, we also interviewed Coast Guard officials responsible for managing patrol boat operations, developing and implementing mitigation strategies, and gathering and reporting data on patrol boat condition measures. Specifically, we met with officials from the Coast Guard’s headquarters and various field locations who have either developed and implemented mitigation strategies, experienced the loss of the 123-foot patrol boats, or deployed vessels to assist District 7 in achieving its operational missions.

To assess the reliability of the operational hour and vessel condition data obtained from the Coast Guard, we questioned knowledgeable officials about the data and the systems that produced the data and performed electronic testing for obvious errors in accuracy and completeness. On the basis of our assessments, we determined that the data were sufficiently reliable for the purposes of this report. Appendix I describes our scope and methodology in greater detail.

We conducted this performance audit from July 2007 through June 2008 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings based on our audit objectives.

Results in Brief

The removal from service of the Coast Guard's eight 123-foot patrol boats in November 2006 created operational challenges by reducing patrol boat operational hours and exacerbating a gap between the Coast Guard's operational hour target for its patrol boat fleet and what it was achieving, so the Coast Guard implemented six strategies to mitigate the loss of these operational hours. The Coast Guard originally established a target of 99,400 operational hours that would be provided by new vessels as part of the Deepwater program based on the capacity of its 110-foot patrol boat fleet in 1998. However, since fiscal year 2000, the Coast Guard has fallen short of this target, with operational hours declining from approximately 88,000 domestic 110-foot patrol boat operational hours in fiscal year 2003 to 63,000 hours in fiscal year 2006. The 123-foot patrol boats—all of which were stationed in District 7—had provided approximately 10,000 operational hours in fiscal year 2006, and had a total operational hour target of 20,000 hours. In an effort to mitigate the loss of the 123-foot patrol boats and their associated operational hours, the Coast Guard implemented a number of strategies to replace the lost operational hours in District 7, for fiscal year 2007 and future years. These mitigation strategies included (1) using the crews from the eight 123-foot patrol boats that had been removed from service to augment the existing crews of eight 110-foot patrol boats in District 7, thereby providing two crews that can alternate time operating each of the eight patrol boats (i.e., double crewing); (2) periodically deploying vessels from other districts to perform missions in District 7; (3) retaining the use of three Navy patrol boats through September 2011, (4) increasing the operational hours of each of the 87-foot patrol boats in District 7; (5) acquiring four new 87-foot patrol

boats to be stationed in District 7 beginning in September 2008; and (6) shortening the amount of time to conduct a maintenance and upgrade project on 110-foot patrol boats so that fewer are off-line at any one time.

The mitigation strategies implemented by the Coast Guard have had a number of impacts on operational hours, operating and maintenance costs, patrol boat crews, and mission performance, both positive and negative. On the positive side, these mitigation strategies collectively added approximately 21,000 operational hours to District 7 in fiscal year 2007. Its mitigation strategy to double crew eight 110-foot patrol boats, for example, added approximately 5,200 of the 21,000 operational hours. While these mitigation strategies have replaced lost operational hours to District 7 in fiscal year 2007, and are projected to provide additional operational hours in future years, they have also had some negative effects Coast Guard-wide, in terms of operating and maintenance costs, crew training, and mission performance. For instance, double crewing the eight 110-foot patrol boats increased operations, fuel, and maintenance costs by approximately \$2.6 million over a 1-year period. Additional operating and maintenance costs for implementing these mitigation strategies include (1) \$10.5 million annually to extend the use of three Navy 179-foot patrol coastals for 3 years through fiscal year 2011; (2) \$0.5 million in fiscal year 2007 to support efforts to increase the operational hours of the 87-foot patrol boats in District 7; (3) \$30 million in fiscal year 2008 to acquire four new 87-foot patrol boats, plus an additional \$7 million to \$9 million annually to operate; and (4) \$8 million to shorten the duration of the maintenance and upgrade project for the 110-foot patrol boat fleet. While the patrol boat crews in District 7 have generally held a positive view of double crewing in terms of the reduced number of operational hours for each crew and the enhanced maintenance support, officers from two of the four double-crewed patrol boats we spoke with said that this strategy has resulted in less time for certain training that crews can only complete while they have access to a vessel. Finally, given the Coast Guard's limited assets, increasing the operational hours in District 7 has reduced the operational hours in some other districts and has adversely affected the performance of some missions in other districts. For example, officials from districts that periodically deploy some of their vessels to District 7 told us that this has challenged their ability to fully enforce domestic fishing laws and regulations in their own districts.

While the mitigation strategies the Coast Guard has implemented are achieving results in the near-term, the Coast Guard faces a number of issues, such as greater resource and maintenance needs, that could potentially affect its ability to sustain these strategies for the longer-term.

First, according to the Coast Guard, the continued operation of District 7's eight double-crewed patrol boats for a higher number of operational hours will depend largely on the success and funding of its augmented maintenance support program. Second, any unexpected delays or reductions in funding in the maintenance and upgrade project for its 110-foot patrol boats could potentially result in some patrol boats remaining in maintenance longer, thus further reducing the number of available operational hours. Potential delays are a valid concern given that the maintenance and upgrade project for two of the five patrol boats completed to date were extended beyond the originally scheduled dates. The Coast Guard is also challenged to determine the extent to which it can continue to sacrifice or delay the performance of certain missions in some districts to bolster mission performance in District 7. Further, while the Coast Guard is using \$30 million it was appropriated via emergency supplemental appropriations in 2007³ to mitigate its patrol boat operational hour gap to purchase four new 87-foot patrol boats that are to be operational in fiscal year 2009, these boats are not as capable as the 110-foot patrol boats. Thus, longer-term sustainability of the mitigation strategies will be more difficult if the Coast Guard faces any potential delays beyond 2010 in acquiring and deploying the first FRCs. Finally, these mitigation strategies are being implemented at the same time that the Coast Guard is also facing expanding requirements across various Coast Guard missions that will require additional resources. For example, in March 2008, we testified that the Coast Guard is facing a need to hire and train new staff for a variety of maritime security missions.⁴

We provided a draft copy of this report to the Department of Homeland Security (DHS) and the U.S. Coast Guard for review. In an e-mail received June 11, 2008, the DHS liaison stated that DHS concurred with the report. The U.S. Coast Guard provided written technical comments that were incorporated into the report as appropriate.

³U.S. Troop Readiness, Veterans' Care, Katrina Recovery, and Iraq Accountability Appropriations Act, 2007 (Pub. L. No. 110-28, 121 Stat. 112 (2007)).

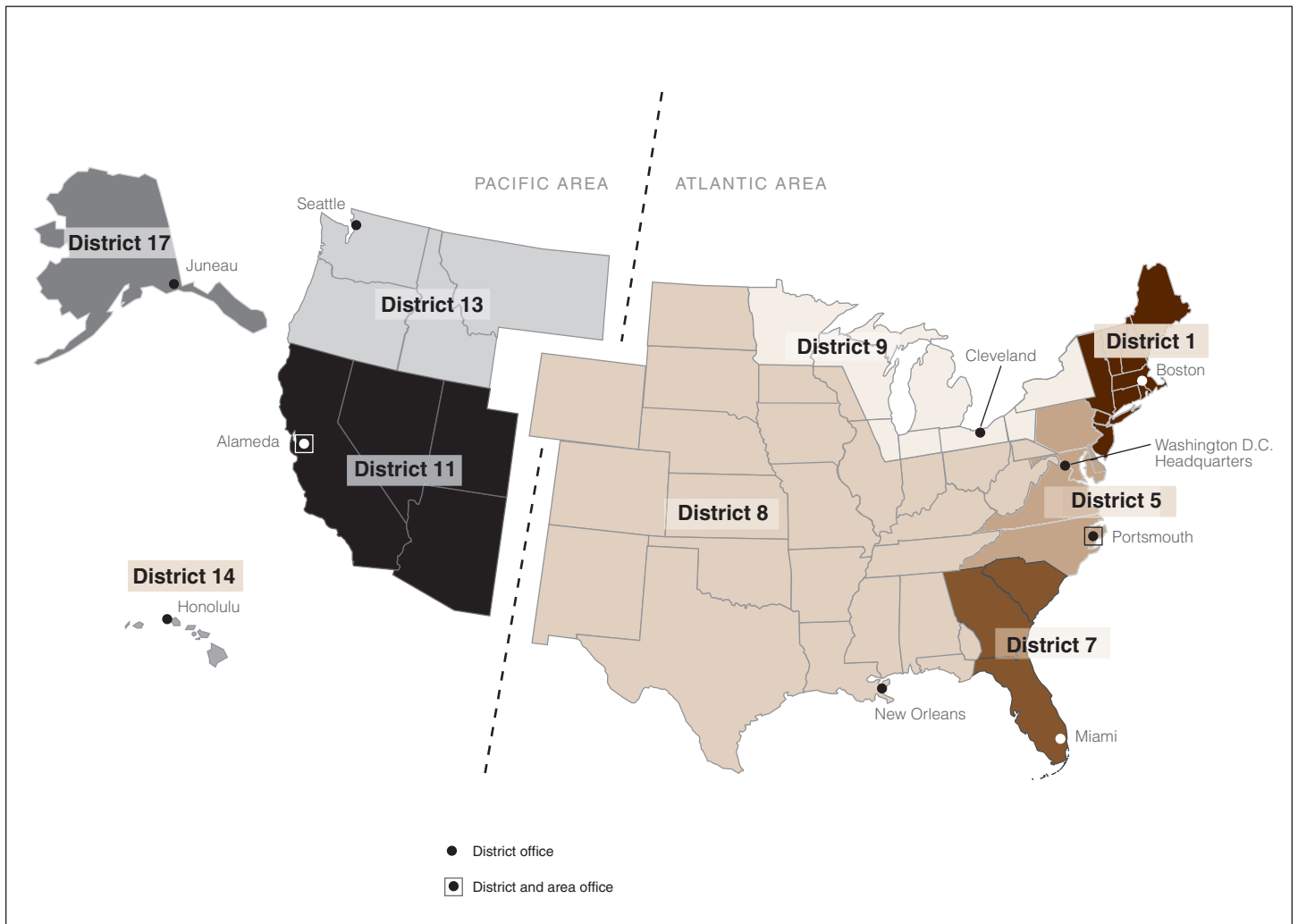
⁴GAO, *Coast Guard: Observations on the Fiscal Year 2009 Budget, Recent Performance, and Related Challenges*, [GAO-08-494T](#) (Washington, D.C.: Mar. 6, 2008).

Background

Missions of the U.S. Coast Guard and Its 110-foot Patrol Boats

The Coast Guard is an Armed Service of the United States and the only military organization within DHS. It is the principle federal agency responsible for maritime safety, security, and environmental stewardship through multimission resources, authorities, and capabilities. In its fiscal year 2009 posture statement, the Coast Guard reported having over 49,100 full-time positions—about 42,000 military and 7,100 civilians. In addition, the agency reported that it has about 8,100 reservists who support the national military strategy or provide additional operational support and surge capacity during times of emergency, such as natural disasters. The Coast Guard also reported that it uses the services of about 29,000 volunteer auxiliary personnel who conduct a wide array of activities, ranging from search and rescue to boating safety education. As discussed earlier, the Coast Guard's two major commands (Pacific Area and Atlantic Area) are organized into nine districts which, in turn, are organized into 35 sectors that are responsible for the command and control of field units and resources. Figure 1 shows the locations of the Coast Guard's Area Commands and districts.

Figure 1: Locations of the Coast Guard's Area Commands and Districts



Source: GAO (map art, analysis); MapResources (map); U.S. Coast Guard (data).

The Coast Guard has responsibilities that fall under two broad missions—homeland security and nonhomeland security. The Coast Guard responsibilities are further divided into 11 programs, as shown in table 2.

Table 2: The Coast Guard’s Homeland Security and Nonhomeland Security Missions

Mission and program	Program activities and functions
Homeland security mission-programs	
Ports, waterways, and coastal security	Conducting harbor patrols, vulnerability assessments, intelligence gathering and analysis, and other activities to prevent terrorist attacks and minimize the damage from attacks that occur.
Migrant interdiction	Deploying cutters and aircraft to reduce the flow of undocumented migrants entering the United States by maritime routes.
Defense readiness	Participating with the Department of Defense (DOD) in global military operations, deploying cutters and other boats in and around harbors to protect DOD force mobilization operations.
Nonhomeland security mission-programs	
Search and rescue	Operating multimission stations and a national distress and response communication system, conducting search and rescue operations for mariners in distress.
Living marine resources	Enforcing domestic fishing laws and regulations through inspections and fishery patrols.
Aids to navigation	Managing U.S. waterways and providing a safe, efficient, and navigable marine transportation system, maintaining the extensive system of navigation aids, monitoring marine traffic through vessel traffic service centers.
Ice operations	Conducting polar operations to facilitate the movement of critical goods and personnel in support of scientific and national security activity, conducting domestic icebreaking operations to facilitate year-round commerce, conducting international ice operations to track icebergs below the 48th north latitude.
Marine environmental protection	Preventing and responding to marine oil and chemical spills, preventing the illegal dumping of plastics and garbage in U.S. waters, preventing biological invasions by aquatic nuisance species.
Marine safety	Setting standards and conducting vessel inspections to better ensure the safety of passengers and crew aboard commercial vessels, partnering with states and boating safety organizations to reduce recreational boating deaths.
Drug interdiction	Deploying cutters and aircraft in high drug-trafficking areas and gathering intelligence to reduce the flow of illegal drugs through maritime transit routes.
Other law enforcement	Protecting U.S. fishing grounds by ensuring that foreign fishermen do not illegally harvest U.S. fish stocks. (Note: Prior to fiscal year 2005, the Other Law Enforcement mission area contained the Enforcement of Laws and Treaties-Other employment category which captured those law enforcement activities that did not fall under drug interdiction, fisheries enforcement, or migration interdiction operations).

Source: U.S. Coast Guard.

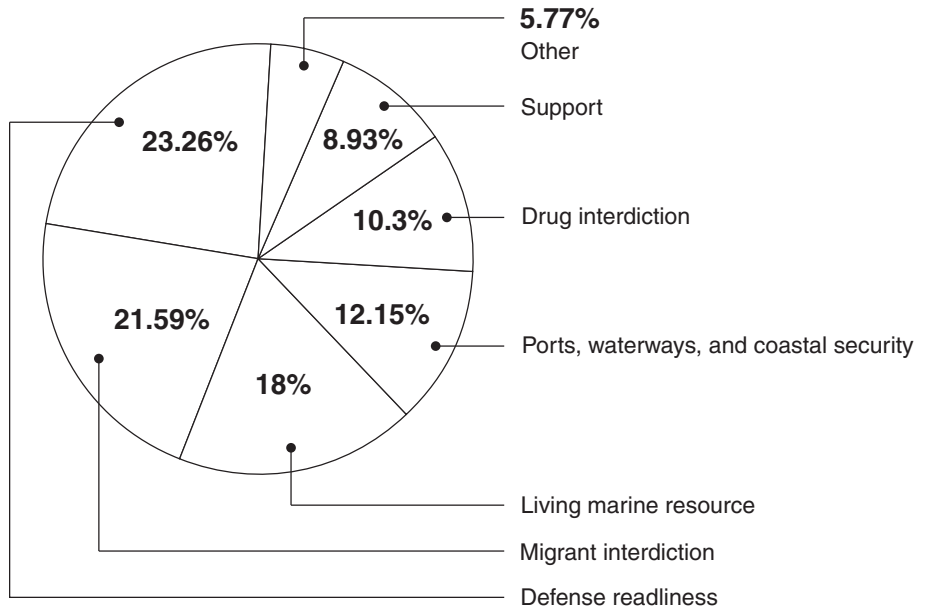
The Coast Guard uses its 110-foot patrol boats to perform a wide variety of missions, most notably interdiction of illicit drugs and undocumented migrants; defense operations (via six selected patrol boats deployed to the Persian Gulf); ports, waterways, and coastal security; and living marine resources (i.e., enforcement of domestic fishing laws and regulations). The 110-foot patrol boats have traditionally each had an annual operational

hour ceiling of 1,800 hours,⁵ except for those stationed (“homeported”) in District 7 (Miami, Florida), which are supported by maintenance augmentation teams to support an operational hour ceiling of up to 2,200 hours per year.⁶ Figures 2 and 3 show the operational hours provided by the 110-foot patrol boat fleet, by mission, for fiscal years 2003 through 2007, both Coast Guard-wide and in District 7 only.

⁵The Coast Guard sets these operational hour ceilings by total annual hours, and does not break down these ceilings by mission. In addition, the Coast Guard can increase operational hour ceilings for its vessels as needed, if it determines that it has the resources in place to operate the vessels at a higher number of hours while sustaining their service lives.

⁶Prior to fiscal year 2004, three 110-foot patrol boats were stationed in San Diego, California and supported by a maintenance augmentation team. While receiving this support, these three 110-foot patrol boats were allocated 2,200 annual operational hours.

Figure 2: Percentage of Operational Hours Logged by Mission for All Coast Guard 110-foot Patrol Boats, Fiscal Years 2003 through 2007



Source: GAO (analysis); U.S. Coast Guard (data).

Notes:

“Other” includes the following missions:

Other law enforcement (foreign fisheries enforcement)	2.52%
Search and rescue	2.37%
Marine safety	0.82%
Aids to navigation	0.03%
Marine environmental protection	0.03%

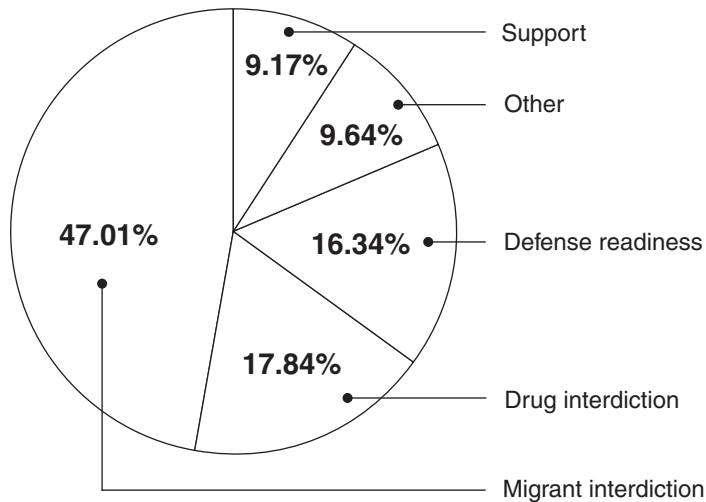
The Support mission includes training; public affairs; and cooperation with federal, state, and local agencies.

The Defense readiness hours include the six patrol boats operating in the Persian Gulf. These vessels account for 96.92 percent of the total 110-foot patrol boat Defense readiness hours for fiscal years 2003-2007.

While this chart shows the percentage of total operational hours logged by the 110-foot patrol boats over a 5-year period, there can be significant year-to-year variation in operational hour totals due to shifting mission priorities, the use of other vessels in filling certain missions, and other factors.

In conducting missions, Coast Guard vessels log the amount of operational hours deployed by mission while on patrol. However, the Coast Guard’s system for tracking operational hours only captures hours logged in support of the primary mission that a vessel conducts while on patrol; thus, any secondary missions that may have been performed on a patrol by these multimission vessels would not necessarily be reflected in operational hour data.

Figure 3: Percentage of Operational Hours Logged by Mission for District 7 110-foot Patrol Boats, Fiscal Years 2003 through 2007



Source: GAO (analysis); U.S. Coast Guard (data).

Notes:

“Other” includes the following missions:

Living marine resources	3.45%
Other law enforcement (foreign fisheries enforcement)	2.70%
Search and rescue	1.86%
Ports, waterways, and coastal security	1.14%
Marine safety	0.46%
Aids to navigation	0.03%

The Support mission includes training; public affairs; and cooperation with federal, state, and local agencies.

The Defense readiness hours include the two District 7 patrol boats operating in the Persian Gulf. These two patrol boats account for 96.7 percent of all District 7 110-foot patrol boat Defense readiness hours.

While this chart shows the percentage of total operational hours logged by the 110-foot patrol boats over a 5-year period, there can be significant year-to-year variation in operational hour totals due to shifting mission priorities, the use of other vessels in filling certain missions, and other factors.

In conducting missions, Coast Guard vessels log the amount of operational hours deployed by mission while on patrol. However, the Coast Guard’s system for tracking operational hours only captures hours logged in support of the primary mission that a vessel conducts while on patrol; thus, any secondary missions that may have been performed on a patrol by these multimission vessels would not necessarily be reflected in operational hour data.

Evolution of the Deepwater Program

The Coast Guard began the Deepwater program in the mid-1990s as the largest acquisition program in the Coast Guard’s history and it has evolved over time in terms of the mix and number of assets to be acquired, and the schedule for delivery. The Deepwater program involves modernizing and acquiring a number of aircraft; vessels; and command, control,

communications, computer, intelligence surveillance, and reconnaissance systems to improve the Coast Guard's ability to achieve its variety of missions. Rather than using a traditional acquisition approach of replacing individual classes of legacy vessels and aircraft through a series of individual acquisitions, the Coast Guard chose a system-of-systems strategy that would replace the legacy assets with a single, integrated package.⁷ To carry out this acquisition, the Coast Guard awarded the competitive contract to a systems integrator, which for the Deepwater program, was a contractor composed of two major companies acting as a joint venture, responsible for designing, constructing, deploying, supporting, and integrating the various assets to meet projected Deepwater operational requirements at the lowest possible costs, either directly or through subcontractors. However, after experiencing a number of management challenges under the systems integrator approach, the Coast Guard has recognized that it needs to increase government oversight and has begun to transfer system integration and program management responsibilities back to the Coast Guard. Our prior reports on the Deepwater program are listed in the Related GAO Products section at the end of this report.

The Coast Guard currently operates 41 110-foot patrol boats that will ultimately be replaced under the Deepwater program. Of the 41 110-foot patrol boats in the Coast Guard's fleet, 28 are homeported in districts within the Atlantic Area Command's area of responsibility (17 of those in District 7), while the remaining 13 are homeported in districts within the Pacific Area Command's area of responsibility. See appendix II for further details on the location of the Coast Guard's 110-foot patrol boat fleet.

Conversion of 110-foot Patrol Boats to 123-foot Patrol Boats

Between January 2001 and November 2006, numerous events contributed to the difficulties the Coast Guard experienced with its strategy to convert its legacy 110-foot patrol boats into more capable 123-foot patrol boats. In January 2001, an independent study found that the 110-foot patrol boats based in south Florida and Puerto Rico were experiencing severe hull corrosion and that their structural integrity was deteriorating rapidly.⁸ To address these structural issues, the Coast Guard's original (2002) Deepwater plan included a strategy to convert all of its fleet of then 49 110-

⁷The Coast Guard's "system of systems" approach integrates vessels, aircraft, sensors, and communication links together as a system to accomplish mission objectives.

⁸CSC Advanced Marine, *Evaluation of the 110' WPB Class Cutter Fleet* (January 2001).

foot patrol boats into 123-foot patrol boats to repair the hulls and provide additional capabilities, such as small boat launch-and-recovery capabilities from a stern ramp; and enhanced and improved command, control, communications, computers, intelligence, surveillance, and reconnaissance. The first patrol boat conversion was completed in March 2004, on the *Matagorda*, with additional post-delivery maintenance taking place from May through September 2004.

Despite the additional maintenance, however, the *Matagorda* and other converted 123-foot patrol boats experienced structural and operational problems that ultimately led to their removal from service in late 2006. On September 10, 2004, while in transit from Key West to Miami, Florida, to evade a hurricane, the *Matagorda* experienced hull and deck buckling. By March 2005, five other converted 123-foot patrol boats also began experiencing similar hull deformations. As a result of structural deformations experienced on these five converted patrol boats, in April 2005, the Coast Guard imposed operational restrictions on all of its 123-foot patrol boats, which it had previously lifted after completing a structural upgrade developed and installed after the September 2004 *Matagorda* hull and deck buckling. These restrictions specified that the converted patrol boats could not operate and were required to return to port in seas with wave heights exceeding 8 feet (they were originally intended to operate in seas up to roughly 13 feet) and that they had to operate at reduced speeds for any seas greater than 3 to 4 feet. In June 2005, due to continued problems with the hulls and their inability to meet post-9/11 mission requirements, the Coast Guard halted the 123-foot patrol boat conversions. Despite the operational restrictions in place, a number of the converted 123-foot patrol boats continued to experience hull and deck buckling and other issues affecting operational capabilities, leading the Coast Guard to ultimately remove all eight boats from service on November 30, 2006, because of continued operational and safety concerns. Then, on April 17, 2007, the Coast Guard announced its decision to permanently decommission the 123-foot patrol boats.

Patrol Boat Sustainment Efforts

Prior to and during the patrol boat conversions, the Coast Guard took measures to strengthen the condition of its patrol boat fleet. Specifically, in 2002, the Coast Guard initiated its Hull Sustainment Project as an extended drydock developed to target the deteriorating hulls of its 110-foot patrol boats. As time went on, the Hull Sustainment Project grew to include other work beyond hull replacement and its name was changed to the Hull Bridging Sustainment Project. From March 2002 to June 2006, 11

of the 110-foot patrol boats went through the Hull Bridging Sustainment Project.

In April 2006, in an effort to mitigate increased maintenance hours and costs, the Coast Guard initiated the Mission Effectiveness Project (MEP) for the 110-foot patrol boats. The MEP was designed to modernize or replace obsolete and unsupportable hull, mechanical, and electrical equipment—such as hull plating and underwater appendages, pumps, motors, piping, generators, and power distribution equipment. The Coast Guard plans to induct a total of 20 110-foot patrol boats into the MEP through February 2013.⁹ As of May 2008, five 110-foot patrol boats have completed the MEP. Through fiscal year 2008, the Coast Guard has been funded a total of \$109.7 million for this initiative and estimates that it will need an additional \$56.3 million through fiscal year 2012, for a total estimated MEP cost of \$166 million.¹⁰

Development and Procurement of the FRC

The ultimate long-term replacement for the 110-foot patrol boat fleet, the FRC, has experienced challenges in its development. The FRC, originally envisioned as a 140-foot cutter built largely of composite materials rather than steel, was initially scheduled to be delivered beginning in 2018.¹¹ In light of the problems encountered with the patrol boat conversions in 2005, the Coast Guard accelerated the design and delivery of the first FRC to 2007. However, in February 2006, design work on a composite-hulled

⁹According to Coast Guard officials, they arrived at a total of 20 110-foot patrol boats for the MEP as follows: 29 of the 41 vessels use an engine type that the Coast Guard considers to be more capable and reliable, and thus worth preserving through the MEP process. Six of these 29 are currently serving in the Persian Gulf, where they are being maintained through supplemental funding; three additional vessels are homeported in District 14 (Guam or Hawaii), and the Coast Guard has determined not to place these vessels in the MEP due to high costs of transit and loss of operational time. Thus, 20 110-foot patrol boats remain for the MEP.

¹⁰Of the \$109.7 million, \$49.2 million was from the Emergency Supplemental Appropriations Act for Defense, the Global War on Terror, and Tsunami Relief, 2005 (Pub. L. No. 109-13, 119 Stat. 231 (2005)) and was used for the first six cutters entering MEP. This supplemental funding was not included in the Deepwater Acquisition Program Baseline cost.

¹¹As used in shipbuilding, composite materials are typically plies of various reinforcing fabrics laminated together.

FRC was suspended due to design risks, including excessive weight and horsepower requirements compared with standard patrol boats.¹²

To address the FRC delays, the Coast Guard elected to move ahead with a dual path approach. First, the Coast Guard plans to acquire a commercial “off-the-shelf” patrol boat design (the FRC-B) that it can modify to meet its requirements. In June 2007, the Coast Guard issued a Request for Proposals for the FRC-B, and expects to award the FRC-B contract in the fourth quarter of fiscal year 2008, with the lead vessel to be delivered by the fourth quarter of fiscal year 2010. Coast Guard officials have stated that the goal is to acquire 12 FRC-Bs by 2012 and have the last of these 12 FRC-Bs operational by the second quarter of fiscal year 2013.

The second part of the Coast Guard’s dual path approach is to acquire a redesigned FRC (the FRC-A) that would meet all of its requirements. In March 2008, we reported that Coast Guard officials recommended that the Coast Guard not pursue acquisition of an FRC-A design that includes unproven composite hull technology.¹³ This recommendation was based largely on a third-party analysis that found the composite technology unlikely to meet the desired 35-year service life under the Coast Guard’s operational conditions. Further, officials believe that the use of the proposed composite materials would not offset high initial acquisition costs, as initially proposed.

We have reported on the Coast Guard’s Deepwater Program, as well as related maintenance and operational issues, since 1998. A complete list of related GAO products can be found at the end of this report.

¹²GAO, *Coast Guard: Status of Deepwater Fast Response Cutter Design Efforts*, [GAO-06-764](#) (Washington, D.C.: June 23, 2006).

¹³GAO, *Status of Selected Aspects of the Coast Guard’s Deepwater Program*, [GAO-08-270R](#) (Washington, D.C.: Mar. 11, 2008).

Loss of Patrol Boats Has Exacerbated the Coast Guard's Operational Hour Shortage, and the Coast Guard Has Implemented a Number of Strategies to Mitigate This Loss

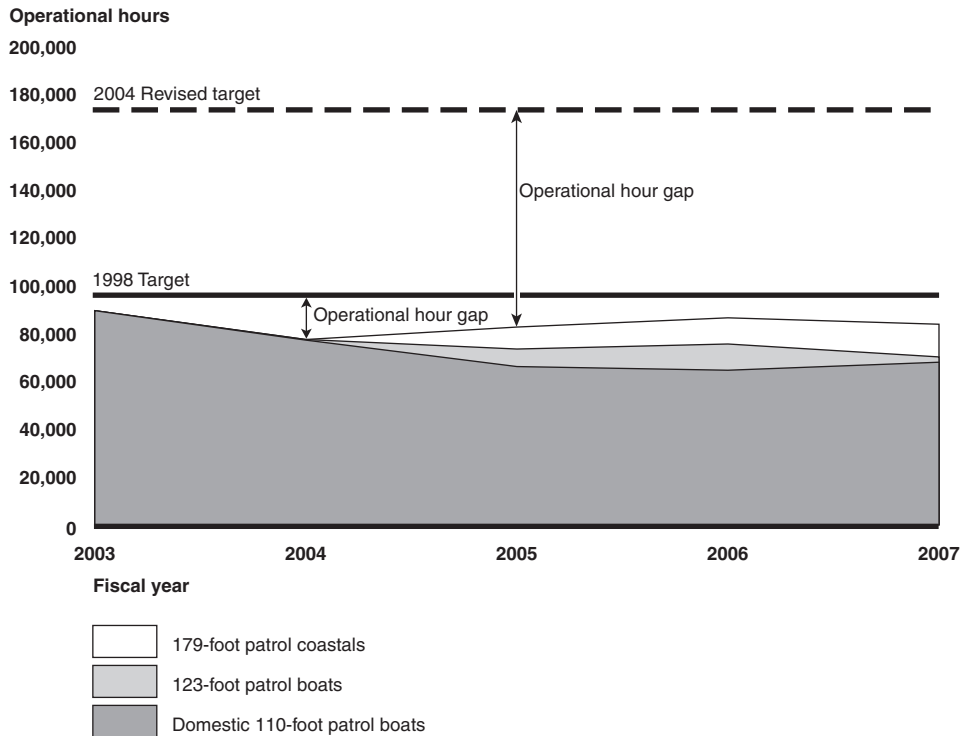
For years, the Coast Guard has faced a gap between the expected and actual operational hours provided by its fleet of 110-foot and 123-foot patrol boats. The loss of the 123-foot patrol boats has only served to worsen this gap. As a result of this loss, the Coast Guard implemented a number of strategies in fiscal year 2007 designed to mitigate the loss of the 123-foot patrol boats and help fill the patrol boat operational hour gap.

Loss of the 123-foot Patrol Boats Has Heightened the Coast Guard's Patrol Boat Operational Hour Gap

The loss of the 123-foot patrol boats has exacerbated the existing gap between the Coast Guard's operational hour targets for its fleet of patrol boats and what it was achieving. In particular, in 1998, the Coast Guard established an annual target of 99,400 operational hours to achieve from its then fleet of 49 110-foot patrol boats. Then, in 2004, the Coast Guard updated its annual patrol boat operational hour target to 174,000 hours based on its plan to achieve 3,000 operational hours from each of the 58 new Fast Response Cutters to be deployed as part of the Deepwater Program.¹⁴ Data provided by the Coast Guard show that since fiscal year 2000, the Coast Guard has fallen short of both target levels, with domestic 110-foot patrol boat operational hours declining from approximately 87,719 hours in fiscal year 2003 to 63,318 hours in fiscal year 2006, before increasing slightly in fiscal year 2007, as shown in figure 4.

¹⁴This 174,000 operational hour target represents what the Coast Guard calculated it needed from its patrol boat fleet as part of the post-9/11 2004 Deepwater Mission Needs Statement. The post-9/11 Mission Needs Statement was approved by the Commandant and DHS in January 2005, but has always been referred to as the 2004 Mission Needs Statement because the document was prepared and routed within the Coast Guard during 2004.

Figure 4: Contributions of 110-foot and 123-foot Patrol Boats and 179-foot Patrol Coastals Toward Meeting the Coast Guard’s Patrol Boat Operational Hour Targets during Fiscal Years 2003 through 2007



Source: GAO (analysis); U.S. Coast Guard (data).

Notes

This figure excludes the operational hours of 110-foot patrol boats currently deployed to the Persian Gulf.

The 1998 target (99,400 hours) refers to the patrol boat operational hour target, as defined by the Coast Guard, that was used as the original basis for patrol boat capacity replacement under the original Deepwater system approach.

The 2004 revised target is based on the Coast Guard’s post-9/11 reassessment of its patrol boat mission needs. This reassessment established a new annual patrol boat target of 174,000 operational hours, which the Coast Guard planned to achieve by acquiring 58 FRCs to operate 3,000 hours each annually.

In addition to this overall decrease in operational hours by the 110-foot patrol boat fleet, the 123-foot patrol boats, when they operated, also faced a gap between expected and actual operational hours. Specifically, the eight 123-foot patrol boats were expected to collectively provide 20,000 annual operational hours. However, due to structural and mechanical problems, the 123-foot patrol boats provided only about half that target—approximately 10,000 operational hours—in fiscal year 2006, the last full

fiscal year in which they operated, before being removed from service in early fiscal year 2007.

Two additional factors have affected the patrol boat operational gap since fiscal year 2003. First, beginning in March 2003, up to six 110-foot patrol boats have contributed to the joint U.S. Navy and Coast Guard National Fleet Policy and the Coast Guard's general defense mission by operating in the Persian Gulf. Two of these six vessels were previously stationed and operating in District 7, while the other four were previously based in other Atlantic Area Districts. While these vessels have provided operational hours in support of this mission, these vessels have not been available to the Coast Guard for planned domestic missions. As a result, their loss also contributes to the gap in patrol boat operational hours. Second, as many as four 110-foot patrol boats have been unavailable at any one time because they were undergoing planned maintenance and upgrades as part of the 110-foot patrol boat MEP. As discussed earlier, the MEP was implemented in April 2006 to modernize or replace obsolete and unsupportable hull, mechanical, and electrical equipment for select 110-foot patrol boats. Going forward, three rather than four 110-foot patrol boats are projected to undergo the MEP at any given time through fiscal year 2013. During this period, at least one vessel in the program is expected to be from District 7.

The loss of the 123-foot patrol boats, when combined with the two factors mentioned above, left the Coast Guard—and District 7 in particular—about 20,000 operational hours short of the 1998 operational hour baseline each year from fiscal years 2003 through 2007. Further, in addition to the loss of operational hours—which the Coast Guard has taken steps to mitigate, as discussed later—having eight fewer vessels available to perform operations has negative effects that are difficult to quantify. For example, having eight fewer vessels means that the deterrence factor of having more vessels visible on the water is lost, and there are fewer vessels available to surge to areas of high demand, if needed. Officials from one District noted that the Coast Guard can surge resources well when needed, but having eight fewer vessels leaves the Coast Guard “thin to barren” in other areas should additional threats emerge. In addition, a Coast Guard official has noted that in the event of a major failure (e.g., major hole in the hull or the vessel running aground) on one of the double-crewed 110-foot patrol boats, the impact would be even greater, as District 7 would then temporarily lose the services of two patrol boat crews rather than just one.

The Coast Guard Has Implemented a Number of Strategies to Mitigate the Loss of the 123-foot Patrol Boats

Upon the removal of the 123-foot patrol boats from service in November 2006, the Coast Guard took action to implement a number of strategies to mitigate the loss of the patrol boats and their operational hours. These strategies include the following:

- **Double crewing eight 110-foot patrol boats stationed in District 7:** The double crewing concept began in February 2007 and has become one of the most significant strategies in terms of increasing patrol boat operational hours in District 7. Under this strategy, the eight crews that previously operated each of the 123-foot patrol boats are being used to alternate operational time with the crews already operating eight 110-foot patrol boats. For example, a St. Petersburg crew will operate a 110-foot patrol boat—stationed in St. Petersburg—on a 21-day patrol and then bring the vessel into port at Key West, Florida. For 7 days, the St. Petersburg crew and maintenance staff will perform maintenance on the vessel and prepare it to change command over to the Key West-based crew. The Key West-based crew will then operate the vessel for 21 days and bring it into port at St. Petersburg, beginning the crew rotation cycle again. The Coast Guard implemented this strategy expecting to gain additional operational hours from these 110-foot patrol boats. During fiscal year 2008, this strategy has evolved into what the Coast Guard calls a “high tempo, high maintenance” organization for its double-crewed 110-foot patrol boats in District 7. The Coast Guard is also using a new approach to contract for major maintenance and providing additional staff to conduct patrol boat maintenance in support of District 7, to provide a greater level of maintenance support to the double-crewed 110-foot patrol boats. Specifically, the Coast Guard plans to accelerate the maintenance cycle of the double-crewed 110-foot patrol boats by hiring 45 new maintenance and engineering support staff.¹⁵ The explanatory statement¹⁶ accompanying the Consolidated Appropriations Act of 2008 directed additional funding in fiscal year 2008 to pilot this more

¹⁵ A standard patrol boat maintenance cycle consists of one drydock availability (major maintenance work that can only be completed when a vessel is out of the water, typically lasting 6 weeks) every 3 years, with one dockside availability (major maintenance work that can be completed while a vessel is in the water, typically lasting 3 weeks) every 2 years. The high tempo, high maintenance approach will shorten this to one drydock availability every 18 months, with one dockside availability every 9 months between drydock availabilities.

¹⁶ House Committee on Appropriations, 110th Cong., Legislative Text and Explanatory Statement 1057 (Committee Print 2008).

intensive maintenance regime.¹⁷ The Coast Guard expects that this “high tempo, high maintenance” approach will provide an even greater number of operational hours than the double-crewing model implemented during fiscal year 2007.¹⁸

- **Periodic deployment of vessels from other districts:** The Coast Guard’s Atlantic Area Command coordinated the deployment of a number of vessels under its operational command to District 7 in an effort to increase operational hours and help meet mission requirements for District 7 during fiscal year 2007. Specifically, medium endurance cutters and the 179-foot patrol coastals were periodically deployed from Districts 1, 5, and 8, and the Joint Interagency Task Force–South to District 7’s areas of responsibility to increase the available operational hours and help perform certain important missions, such as interdiction of undocumented migrants.¹⁹ In addition, each of these districts periodically deployed vessels under its own control—such as seagoing buoy tenders and 87-foot patrol boats—to District 7 to assist in missions, such as undocumented migrant interdiction and search and rescue.²⁰ The Coast Guard is continuing to implement some of these deployments during fiscal year 2008.

¹⁷ Pub. L. No. 110-161, 121 Stat. 1844 (2007).

¹⁸In addition, under the high tempo, high maintenance approach, crews will be located in the same homeport as the cutters they work on, thus eliminating the need to switch command between homeports.

¹⁹District 1 (Boston, Massachusetts), District 5 (Portsmouth, Virginia), and District 8 (New Orleans, Louisiana) are part of the Coast Guard’s Atlantic Area Command along with District 7. The Joint Interagency Task Force–South in Key West, Florida, under the U.S. Southern Command, has primary responsibility for U.S. detection and monitoring of drug trafficking activities in the transit zone, which encompasses Central America, Mexico, the Caribbean Sea, the Gulf of Mexico, and the eastern Pacific Ocean. The Coast Guard has primary operational control for most interdiction operations. The Department of Defense provides maritime patrol aircraft, helicopters, and ships; the Department of Homeland Security—primarily, the Coast Guard and the U.S. Customs and Border Protection—provides maritime patrol aircraft, ships, and law enforcement assistance; and the Department of Justice provides prosecutorial and law enforcement assistance. Joint Interagency Task Force–South also receives some operational support from various countries within the transit zone, and France, the Netherlands, and the United Kingdom also provide air and maritime assistance in the eastern Caribbean Sea.

²⁰A buoy tender is a vessel used by the Coast Guard in its aids to navigation mission, which involves establishing and maintaining a large number of navigational aids, such as buoys or beacons, to assist mariners and prevent disasters, collisions, or wrecks.

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- **Retaining three Navy vessels through fiscal year 2011:** The Coast Guard renewed an existing Memorandum of Agreement with the U.S. Navy to retain three of the five 179-foot patrol coastal class cutters on loan from the Navy through September 2011.²¹
 - **Increasing the operational hours of some 87-foot patrol boats:** As another strategy to increase the availability of operational hours, in fiscal year 2007, the Coast Guard increased the total number of hours each of the 11 87-foot patrol boats homeported in District 7 could operate annually from 1,800 to 2,000 hours.
 - **Procuring four new 87-foot patrol boats:** The Coast Guard has procured four new 87-foot patrol boats that are to be homeported in District 7. The Coast Guard estimates that these new patrol boats will be delivered beginning in September 2008, and anticipates operating each of these vessels at 1,800 hours per year, for a total of 7,200 hours.
 - **Amending the 110-foot patrol boat MEP schedule:** The Coast Guard is also amending the 110-foot patrol boat MEP schedule to reduce the number of patrol boats inducted each year into the MEP from four to three hulls and decrease the time of the MEP from 12 to 9 months.

²¹The Maritime Transportation Security Act of 2002 (Pub. L. No. 107-295, 116 Stat. 2064, 2106 (2002)) provided that the Secretary of the department in which the Coast Guard is operating may accept, by direct transfer without cost, for use by the Coast Guard primarily for expanded drug interdiction activities required to meet national supply reduction performance goals, up to 7 PC-170 patrol craft from the Department of Defense if it offers to transfer such craft. These vessels, originally 170 feet in length, were later fitted with a stern ramp modification that extended their length to 179 feet; thus, we refer to these vessels as the 179-foot patrol coastals. Per the amendment to the original Navy-Coast Guard Patrol Coastal Inter-Service Transfer Memorandum of Agreement signed in 2004, the Coast Guard will return operational control of the *Tempest*, homeported in Pascagoula, Mississippi; and the *Monsoon*, homeported in San Diego, California to the Navy in September 2008. The *Zephyr*, homeported in San Diego, and the *Shamal* and *Tornado*, homeported in Pascagoula, will remain under the operational control of the Coast Guard until September 2011. The Coast Guard plans to relocate the *Zephyr* to Pascagoula in October 2008.

The Coast Guard's Mitigation Strategies Have Replaced Some Lost Operational Hours, but Have Adversely Affected Coast Guard Resources and the Performance of Some Missions

The mitigation strategies discussed have yielded some positive and negative impacts for the Coast Guard to date. On the positive side, these strategies have allowed the Coast Guard to recoup approximately 21,000 operational hours towards replacing lost 123-foot patrol boat hours and filling its patrol boat operational hour gap. However, these strategies were not without adverse impacts. Particularly, some of these strategies have adversely affected operations and maintenance costs, time available for crew training, and mission performance in districts donating assets to District 7.

The Coast Guard's Mitigation Strategies Have Provided Operational Hours towards the Patrol Boat Operational Hour Gap

As detailed in table 3, the mitigation strategies that the Coast Guard began to employ in fiscal year 2007 provided approximately 21,000 additional operational hours toward District 7 operations.

Table 3: Operational Hour Increases Resulting from the Strategies to Mitigate the Loss of the 123-Foot Patrol Boats in District 7

Strategy	Estimated operational hour increases in District 7 in fiscal year 2007 ^a	Estimated annual operational hour increases in District 7 beyond fiscal year 2007
Double crewing eight 110-foot patrol boats in District 7 (using crews originally on 123-foot patrol boats)	5,220 hours (Using February–September 2007 data on total operational hours minus District 7 operational hour ceiling)	11,200 hours annually (Based on operational hour ceiling increase of 1,400 hours per cutter) under original double-crew initiative for fiscal year 2008. However, under the new high tempo, high maintenance model that has been adopted, the Coast Guard estimates this operational hour gain to be 14,400 hours annually, beginning in fiscal year 2009.
Periodic deployment of Area/District assets to District 7, as follows: ^{b,c}	6,521 hours Note: these hours were provided at the expense of the donor districts, as shown below)	N/A for Area assets The impact of Area asset deployments cannot be estimated, as hours were apportioned before fiscal year 2008 based on district need, whereas for fiscal year 2007, some hours had been allotted to districts but were deployed by Atlantic Area in support of District 7. District assets: 2,150 hours in fiscal year 2008
District 1:		
Seagoing buoy tender (District asset)	500 hours	500 hours in fiscal year 2008
Medium endurance cutter (Area asset)	264 hours	
District 5:		
Seagoing buoy tender (District asset)	419 hours	500 hours in fiscal year 2008
Medium endurance cutter (Area asset)	540 hours	

Strategy	Estimated operational hour increases in District 7 in fiscal year 2007 ^a	Estimated annual operational hour increases in District 7 beyond fiscal year 2007
District 8:		
Seagoing buoy tender (District asset)	548 hours	350 hours in fiscal year 2008
Six Coastal patrol boats (District asset)	1,130 hours	800 hours in fiscal year 2008
Medium endurance cutters (Area asset)	2,420 hours	
Three U.S. Navy patrol coastals (Area asset)	1,608 hours	
	(Note: These hours are not included in the Area/District periodic deployment total, as they are included in the "Renewal of Navy MOA" strategy above. These hours in this context simply reflect a loss of programmed hours to District 8).	
Joint Interagency Task Force – South:		
Medium endurance cutter (Area asset)	700 hours	No deployment in fiscal year 2008.
Renewal of Memorandum of Agreement with U.S. Navy, to extend the use of three 179-foot patrol coastals from September 2008 until Sept 2011. ^d	6,743 hours (Based on operational hour data. These three 179s are homeported in a District 8 homeport, but provided all fiscal year 2007 hours in support of District 7.)	7,500 hours annually (Based on operational hour ceilings of 2,500 hours for three vessels) from fiscal year 2008 through fiscal year 2011. (Note: These are Atlantic Area hours, and thus will likely be divided between District 7 and District 8.)
Increasing operational hour ceilings for 11 District 7 87-foot patrol boats (from 1,800 to 2,00 hours).	2,783 hours (Using June-September 2007 operational hour data versus normal operational hour ceilings, as this strategy was formally approved on May 30, 2007.)	2,200 hours (Increase of 200 hours per vessel for 11 vessels, assuming this option is carried forward for fiscal year 2008, which is still under discussion.)
Purchasing of four additional 87-foot patrol boats	N/A The first of these patrol boats is not projected to be delivered until September 2008.	7,200 hours (Likely not fully until fiscal year 2009, as they are being delivered in late fiscal year 2008)
MEP schedule alteration—reducing number of 110-foot patrol boats at any time from 4 to 3, and reducing their duration from 12 months to 9 months.	N/A for fiscal year 2007 (Shortened MEP cycle not fully in effect until fiscal year 2008.)	3,000 hours (The impact of this operational hour gain will be spread throughout the Coast Guard, as many other Districts will have 110-foot patrol boats in the MEP.)
Total District 7 gain	21,267	33,250 to 36,450^e
Net overall gain (excludes periodic deployment hours)	14,746	31,100 to 34,300^e

Source: GAO (analysis); U.S. Coast Guard (data).

^aThe Coast Guard allocates resource hours on an annual basis. Some figures in this table (estimated increases from double crewing and increasing District 7 87-foot patrol boat operational hour ceilings) were calculated by dividing annual resource hour allocations evenly across all months. It should be noted that actual resource hour usage is affected by seasonal factors and therefore, the operational hour gains shown would likely be different if seasonal trends (e.g., increase in summer recreational boating activity, fishing season) were taken into account.

^bCertain vessels are under the command of the Area (e.g., high and medium endurance cutters, the patrol coastals from the Navy), while other vessels (e.g., buoy tenders, patrol boats) are under the command of districts. As such, deployment of area assets is dictated by the area command, while districts control the deployment and use of their own assets.

^cOperational hours do not include transit time from the donor districts to District 7 for fiscal year 2007. When transit time is added, District 1 estimated an additional 96 operational hours lost, District 5 estimated an additional 130 operational hours lost, and District 8 estimated an additional 599 operational hours lost in fiscal year 2007.

^dWhile the extension of the Memorandum of Agreement is considered one of the mitigation strategies, the use of the Navy 179-foot patrol coastals actually began in fiscal year 2005, with two 179-foot patrol coastals in District 8, and two in District 11. One additional 179-foot patrol coastal was added in District 8 for fiscal year 2006. While the hours received by the 179-foot patrol coastals in fiscal year 2007 were not technically a “new” result of the mitigation strategy, they do represent additional hours available to the Coast Guard to mitigate the loss of patrol boats. Any hours received from fiscal year 2009 forward (when the Memorandum of Agreement extension takes effect), could technically be considered part of the mitigation strategies.

^eThe estimated operational hour gains for future years are presented as a range, depending on whether the original double-crewing model or high tempo, high maintenance model is in effect.

More details on the realized and projected operational hour gains of these mitigation strategies are as follows:

- **Double crewing of 110-foot patrol boats added 5,220 operational hours in District 7 in fiscal year 2007:** From February 2007, when the Coast Guard formally implemented the double-crewing model on eight 110-foot patrol boats, through September 2007, double crewing provided the Coast Guard with approximately 5,220 operational hours above the standard number of operational hours targeted for District 7 patrol boats for 8 months. When adopting the double-crewing approach, the Coast Guard expected that this strategy would allow it to increase the number of annual operational hours from 2,200 to 3,600 per vessel, for a total projected increase of 11,200 hours. Conversely, the personnel tempo for the crews is reduced, as each crew now operates at 1,800 hours per year.²² The 5,220 hour gain fell short of the Coast Guard’s anticipated gain over an 8-month period, which a Coast Guard official attributed to the fact that several of the vessels did not begin double crewing until late February or March 2007, and that one

²²Personnel tempo, in this context, refers to the amount of time that each crew actually serves underway on the vessel annually.

of the double-crewed vessels was in an extended maintenance period.²³ However, the high tempo, high maintenance model discussed earlier—which the Coast Guard expects to be fully implemented by the start of fiscal year 2009—has increased this operational hour target even further. Specifically, the Coast Guard expects that this initiative will allow it to operate the eight double-crewed 110-foot patrol boats at 4,000 operational hours per year (with each crew providing 2,000 hours). This projects to a total increase of 3,200 operational hours over the original double-crewing approach (400 additional hours for eight vessels). Overall, the high tempo, high maintenance model is projected to result in a total operational hour gain of 14,400 operational hours over normal District 7 110-foot patrol boat operational hour standards.²⁴ The Coast Guard anticipates that this strategy will remain in place until all 12 of the FRC-Bs are obtained—which is currently estimated in fiscal year 2012—as long as funding remains available in the out years.²⁵

- **Periodic deployment of vessels from other districts added 6,521 operational hours in District 7 in fiscal year 2007:** As shown in table 3, the periodic deployment of Area and District assets contributed 6,521 hours to District 7 operations in fiscal year 2007. Periodic deployments of vessels into District 7 from other districts are expected to continue in fiscal year 2008. While table 3 provides current estimates of these transfers for fiscal year 2007, the contributions of Atlantic Area Command assets to District 7 at the expense of other Atlantic Area districts in fiscal year 2008 cannot be estimated. The Atlantic Area Command already took programmed operational hours into account when planning its asset allocation for fiscal year 2008. For a graphical representation of the fiscal year 2007 vessel deployments to District 7, see appendix III.
- **Three Navy vessels added 6,743 operational hours in District 7 in fiscal year 2007:** The three 179-foot Navy patrol coastals under

²³Though the Coast Guard considers February 2007 as the start of double-crewing, not all eight 110-foot patrol boats began double-crewing that month, but were phased in throughout February and March 2007.

²⁴Specifically, the new 4,000 hour ceiling provides an increase of 1,800 hours per vessel, given that the District 7 110-foot patrol boat ceiling was previously 2,200 hours. For eight vessels, that leads to a gain of 14,400 operational hours.

²⁵According to the Coast Guard, the high tempo, high maintenance approach will be phased out of operation on individual 110-foot patrol boats as FRCs become operational in District 7.

Atlantic Area control provided 6,743 operational hours, all for District 7 operations, in fiscal year 2007. The Coast Guard estimates that these vessels will annually provide an additional 7,500 operational hours to the Area Command during fiscal years 2008 through 2011. In addition to the operational hour gains, Coast Guard analysis of the 179-foot patrol coastals indicates that these vessels have superior range, speed, and endurance compared to the 110-foot and 123-foot patrol boats and are considered outstanding assets to combat illegal “go-fast” smuggling vessels that typically run 40+ knots. According to one District official, the 179-foot patrol coastals could also be used for ports, waterways, and coastal security; living marine resources; and other law enforcement missions. The 179-foot patrol coastals were used primarily in support of the migrant interdiction mission in District 7 in fiscal year 2007.

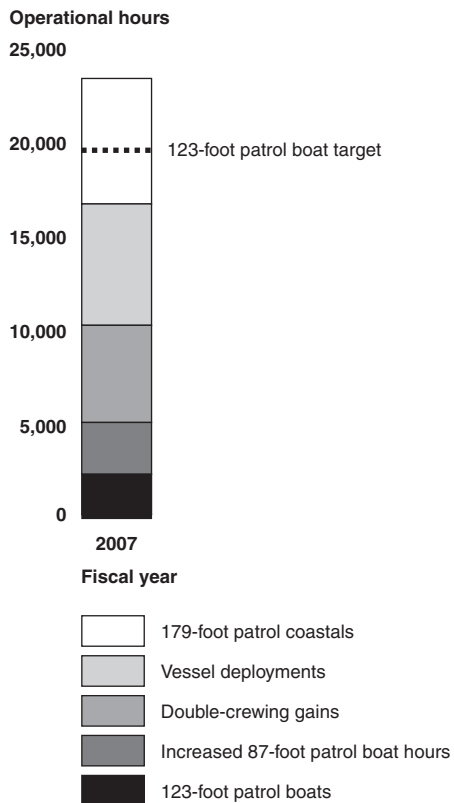
- **Increasing the operational hour ceiling of some 87-foot patrol boats added 2,783 operational hours in District 7 in fiscal year 2007:** Adding 200 hours to the operational hour ceiling of each of the 11 District 7 87-foot patrol boats would annually add 2,200 operational hours. As shown in table 3, the District 7 87-foot patrol boats provided 2,783 hours above normal operational hour ceilings for the time frame in which this strategy was formally approved (i.e., June–September 2007) in fiscal year 2007.²⁶ District 7 intends to keep the 2,000 operational hour ceiling for its 87-foot patrol boats in fiscal year 2008, but is awaiting approval from the Atlantic Area Command.
- **Procuring four new 87-foot patrol boats may add 7,200 operational hours annually in District 7:** These four patrol boats, all of which will be stationed in District 7, could collectively provide an additional 7,200 operational hours annually (i.e., four patrol boats operating at 1,800 hours each) to help offset the lost 123-foot patrol boat operational hours.
- **Amending the 110-foot patrol boat MEP schedule may add 3,000 operational hours annually Coast Guard-wide:** Amending the MEP schedule will reduce both the number of patrol boats in the MEP at any one time, as well as the amount of time that the patrol boats spend in the MEP. The Coast Guard estimates that this will recoup approximately 3,000 operational hours per year, but not limited to

²⁶Coast Guard officials attribute the gain, which was greater than the projected operational hour increase, to the fact that the June-September time frame represents a period of greater migrant activity—and thus higher operating tempos—for District 7 assets.

District 7. Since the first vessel to go through the amended MEP was in the program from June 2007 through February 2008, the amended MEP schedule will not provide significant additional operational hours to the Coast Guard until later in fiscal year 2008.

These strategies have provided a number of operational hours to replace lost 123-foot patrol boat hours, and in turn, help to fill the Coast Guard’s patrol boat operational hour gap. Figure 5 shows how the mitigation strategies have helped District 7 replace the 123-foot patrol boat operational hour target of 20,000 hours in fiscal year 2007.

Figure 5: Impact of the Mitigation Strategies on Replacing 123-foot Patrol Boat Operational Hours for Fiscal Year 2007



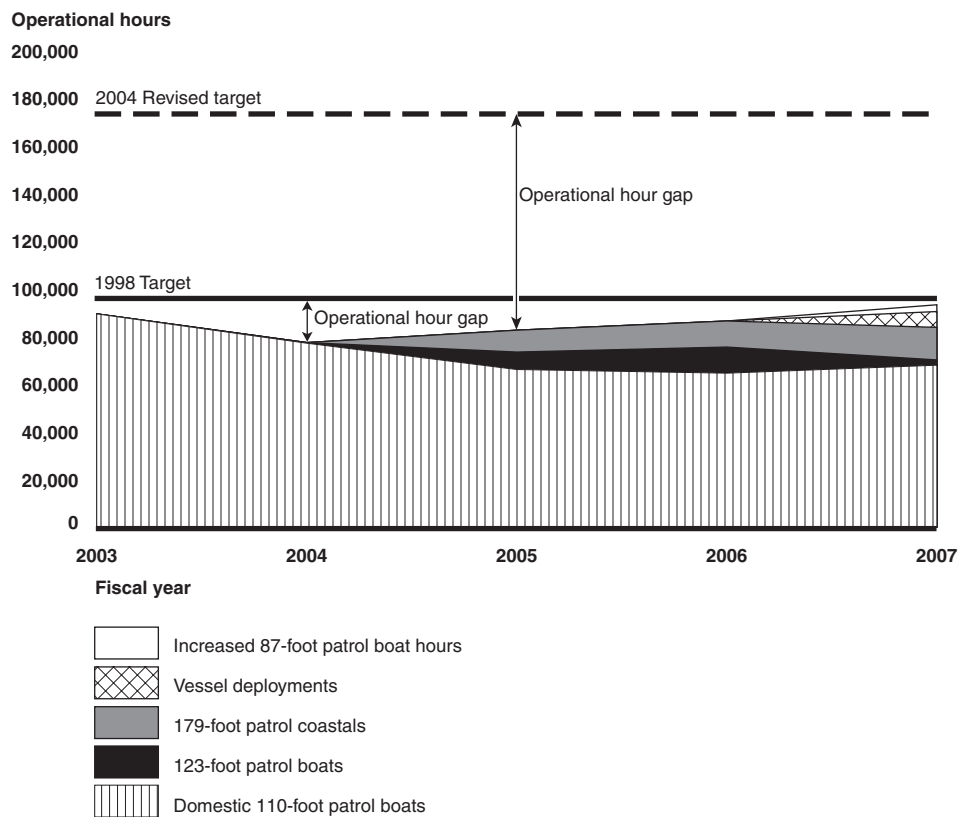
Source: GAO (analysis); U.S. Coast Guard (data).

According to a Coast Guard official, the three 179-foot patrol coastals homeported in Pascagoula, Mississippi (District 8) provided all fiscal year 2007 operational hours in support of District 7.

The vessel deployments refer to Area (medium endurance cutters, patrol coastals) and District (buoy tenders, patrol boats) vessel deployments that were shifted to District 7, primarily in support of the migrant interdiction mission, and were done at the expense of the “donor” districts.

These mitigation strategies helped District 7 to recover operational hours from the loss of the 123-foot patrol boats, and also helped the Coast Guard fill some of its overall patrol boat operational hour gap in fiscal year 2007, as illustrated in figure 6. However, any hours gained from periodic vessel deployments came at the expense of other districts in the Coast Guard, and hours gained from additional 87-foot patrol boat operations, while important, do not provide as many capabilities (e.g., endurance, fuel capacity, crew size) as 110-foot patrol boats.

Figure 6: Domestic Patrol Boat Operational Hours Coast Guard-wide, Including Mitigation Strategy Contributions, Fiscal Years 2003 through 2007



Source: GAO (analysis); U.S. Coast Guard (data).

Notes:

Any gains from 110-foot patrol boat double crewing are reflected in the operational hour totals.

The vessel deployments refer to Area (medium endurance cutters, patrol coastals) and District (buoy tenders, and patrol boats) vessel deployments that were shifted to District 7, primarily in support of the migrant interdiction mission, and were done at the expense of the “donor” districts.

Though the Coast Guard considers the increase in 87-foot patrol boat operational hours part of the mitigation strategies, it must be noted that these vessels do not possess the capabilities (e.g., on-scene endurance, fuel capacity, crew size) of the 110-foot patrol boats, and thus are not a full replacement of those lost capabilities. As such, the Coast Guard does not include 87-foot patrol boat hours when presenting information to Congress regarding its patrol boat operational hour gap.

The Mitigation Strategies Have Adversely Affected Operating and Maintenance Costs, Crew Training, and Mission Performance

In contrast with the operational hour gains discussed, the mitigation strategies have had Coast Guard-wide effects, including increased operating and maintenance costs; limited onboard, in port training for patrol boat crews; and a reduced capacity to perform some missions, such as living marine resources, in other districts.

Mitigation Strategies Have Increased Operating and Maintenance Costs

Although the Coast Guard has broadened its use of existing assets and made plans to acquire new patrol boats to recover lost operational hours and vessels, these mitigation strategies have increased operating and maintenance costs. These operating and maintenance costs include the following:

- **Double crewing eight 110-foot patrol boats has increased operating and maintenance costs:** To support the increase in operational hours by double crewing eight 110-foot patrol boats in District 7, the Coast Guard reported spending \$2.6 million more for operations, fuel, and maintenance from February 2007 through February 2008 compared to what it spent during a comparable period to support these eight patrol boats before double crewing. These costs were funded from existing 110-foot and 123-foot patrol boat accounts. In addition to increasing the number of maintenance personnel, other costs associated with double crewing the eight 110-foot patrol boats included increasing the amount of scheduled maintenance to improve patrol boat reliability and enhance the probability of reaching a targeted 3,600 operational hours per hull in fiscal year 2007. For fiscal year 2008, \$11.5 million was congressionally directed to provide the Coast Guard additional maintenance support, which the Coast Guard stated it is using to support funding for 6 months of additional personnel and 9 months of operation and maintenance costs. This is intended to further increase the number of operational hours gained by double crewing 110-foot patrol boats in District 7 to 4,000 hours annually per hull.
- **Extended use of three Navy vessels will increase operating and personnel costs:** The Coast Guard extended its memorandum of agreement with the U.S. Navy to use three Navy 179-foot patrol

coastals through 2011. The operating and personnel expenses to be paid by the Coast Guard are approximately \$10.5 million annually for these three vessels.²⁷

- **Increasing operational hour ceilings for 87-foot patrol boats in District 7 increased operational, fuel, and maintenance costs:** In fiscal year 2007, the Coast Guard spent approximately \$500,000 for operational, fuel, and maintenance costs to increase the annual operational hours of the 87-foot patrol boats homeported in District 7 from 1,800 to 2,000. According to the Coast Guard, if this practice were to continue, it does not know exactly what the effects of the increased operational tempo will be on the condition and service lives of the 87-foot patrol boats. The Coast Guard added, though, that it anticipates that an increase in maintenance funding, as well as days to complete the maintenance, would be needed to combat the accelerated wear on the 87-foot patrol boats.
- **Purchasing four additional 87-foot patrol boats will increase operations and maintenance costs:** The Coast Guard was provided \$30 million in supplemental funding to mitigate the patrol boat operational gap.²⁸ The Coast Guard used the funding to acquire four new 87-foot patrol boats in fiscal year 2008 for use in District 7. According to the Coast Guard, these four vessels cumulatively will cost an additional \$7 million to \$9 million annually to operate. While these new patrol boats should be of use in helping to close the operational gap by freeing up other, larger assets for missions, the 87-foot patrol boats have fewer capabilities and endurance than the 110-foot or 123-foot patrol boats. For example, 87-foot patrol boats are typically used closer to shore and cannot operate away from their homeports for as long as 110-foot patrol boats. While District 7 will benefit from having these vessels, the Coast Guard does not consider the 87-foot patrol boats to be adequate replacements for the larger, more capable 110-foot patrol boats and, therefore, does not include their hours in calculating its patrol boat operational hour gap.
- **Amending the MEP schedule will increase maintenance costs:** The Coast Guard anticipates a cost increase of approximately \$500,000 per vessel, for a total of \$8 million (16 vessels out of the total of 20 110-

²⁷The Navy has provided additional funds of \$2 million per vessel for major maintenance work.

²⁸Pub. L. No. 110-28, 121 Stat. 112 (2007).

Mitigation Strategies Limit Onboard Crew Training

foot patrol boats that have been or are to be inducted in the MEP program are currently slated to go through the amended cycle).²⁹ This cost increase was necessary to hire additional shift workers to shorten the MEP cycle. The Coast Guard states that this cost will be offset by not including the three 110-foot patrol boats homeported in District 14 (Hawaii or Guam) as part of the MEP.

Coast Guard officers we interviewed who were assigned to the double-crewed 110-foot patrol boats in District 7 generally held a positive view of double crewing in terms of the reduced number of operational hours for each crew and the enhanced maintenance support; however, officers from two of the four double-crewed 110-foot patrol boats that we spoke with noted that this strategy has resulted in less time for certain onboard training that can only be completed while they have access to a vessel in port or underway. According to these officials, 110-foot patrol boat crews in District 7 previously logged 2,200 operational hours at sea away from port; however, crews on double-crewed patrol boats will each have about 1,800 hours at sea away from port, which is 400 fewer hours in which to train at sea onboard a vessel. For example, Coast Guard patrol boat crew members told us that double crewing has adversely affected training for some crew members, such as deck watch officers.³⁰ To qualify as a deck watch officer, a crew member must generally work for a qualification period of 3 to 6 months, provided the crew member is underway on a vessel for 8 to 12 days per month. Double crewing may extend this qualification period to about 6 to 9 months. However, potential delays may occur in the deck watch officer qualification process for a crew member because their vessel has been scheduled for a major maintenance overhaul. If a person has a 2 to 3 month delay because of maintenance, they may not be able to qualify prior to the transfer season, which may leave their crew short of deck watch officers. While some crew members may be assigned temporary duty to another patrol boat to log training hours, the Coast Guard acknowledges that this option is not always

²⁹The other four 110-foot patrol boats have already been through the longer (12 month) cycle.

³⁰A deck watch officer is the commissioned, warrant, or petty officer on watch in charge of the vessel and is responsible for the safety of the vessel and for the performance of the duties prescribed by the commanding officer and Coast Guard regulations. Every person onboard who is subject to the orders of the commanding officer, except the executive officer, is subordinate to the deck watch officer.

Mitigation Strategies Adversely Affect Mission Performance in Districts Periodically Deploying Assets to District 7

possible. Despite this concern though, officials from the Coast Guard's Office of Cutter Forces state that 1,800 operational hours is consistent with the same amount of time that all other non-District 7 110-foot patrol boats in the Coast Guard have to train members.

Coast Guard officials indicated that the Coast Guard's strategy to periodically deploy Atlantic Area and district assets to District 7 adversely affected the donating districts' ability to perform some missions. Coast Guard officials have also indicated that the living marine resources (i.e., fisheries enforcement) mission has seen the largest adverse impact from deployments of vessels from other districts to District 7. Additionally, in some instances, aids-to-navigation mission work was delayed. Table 4 provides more detailed information on the effects on mission performance for Districts 1, 5, and 8 as a result of periodically deploying vessels to District 7 in fiscal year 2007.

Table 4: Information on Periodic Vessel Deployments to District 7 and the Estimated Impacts on the Donating Districts' Missions During Fiscal Year 2007

Vessel deployments	Estimated mission impacts
District 1	
225-foot Seagoing buoy tender (District asset)	Loss of approximately three law enforcement boardings in support of living marine resources mission.
Medium endurance cutter (Area asset):	Loss of approximately seven law enforcement boardings in support of living marine resources mission.
District 5	
225-foot Seagoing buoy tender (District asset):	Deferment of preventative maintenance for approximately 32 navigational aids and repair of 7 aid discrepancies (malfunctions or "broken" aids) in support of aids to navigation mission.
Medium endurance cutter (Area asset):	Loss of approximately 24 boardings and 17 violation notices in support of living marine resources mission.
District 8	
225-foot Seagoing buoy tender (District asset):	Deferments of preventative maintenance for approximately 13 navigational aids and repair of 1 navigational aid in support of the Aids-to-Navigation mission.
Six coastal patrol boats (District asset):	Loss of approximately 125 boardings in support of the following missions: Recreational Boating Safety, Living Marine Resources, and Ports, Waterways, and Coastal Security.
Medium endurance cutters (Area asset)	Loss of approximately 40 to 50 boardings in support of living marine resources mission.
Three U.S. Navy patrol coastals (Area asset)	Loss of approximately 70 boardings in support of the following missions: Recreational Boating Safety, Living Marine Resources, and Ports, Waterways, and Coastal Security.
Joint Interagency Task Force – South	
Medium endurance cutters (Area asset):	Loss of approximately 2,145 kilograms of cocaine seized (based on their average amount of cocaine seized per ship day in fiscal year 2007) in the counter drug mission.

Source: U.S. Coast Guard.

^aNavigational aids refer to buoys and beacons used for navigation purposes.

In fiscal year 2007, Districts 1, 5, and 8 provided over 6,000 operational hours and a variety of vessels to District 7 to help recoup lost operational capacity. Districts 1, 5, and 8 each donated a seagoing buoy tender and also collectively contributed almost 5,000 operational hours from Atlantic Area vessels (i.e., medium endurance cutters and Navy 179-foot patrol coastals) to District 7; however, the impact of these periodic deployments varies in each of these three districts. For example, District 1 redeployed *Willow*, a 225-foot buoy tender, to District 7 where it was used as a holding station for interdicted migrants. A Coast Guard official in District 1 estimated that dispatching the *Willow* to District 7 resulted in not being able to perform three law enforcement boardings in support of the living

marine resources mission in District 1. According to this official, District 1 also lost medium endurance cutter operational hours to District 7 in fiscal year 2007 for approximately 13 days, likely preventing the district from attempting seven additional law enforcement boardings. Law enforcement boardings are not only used to enforce fisheries law, but they also serve as a deterrent for illegal living marine resources activity. District 5 officials told us that deploying the *Elm*, their 225-foot buoy tender, to District 7 not only limited their ability to perform tasks related to their aids to navigation mission, such as immediately repairing the seven navigational aids that were either out-of-position or malfunctioning during this period, but also resulted in deferring preventive maintenance for the *Elm* for 20 days. Additionally, Coast Guard officials told us that the Atlantic Area medium endurance cutters that were deployed from District 5 to District 7 would have primarily conducted living marine resources operations in District 5, and estimated that losing 540 medium endurance cutter operational hours to District 7 in fiscal year 2007 likely caused District 5 to miss approximately 17 living marine resources mission violations.

District 8 contributed the greatest number of assets and operational hours to District 7 in fiscal year 2007. In addition to dispatching the *Cypress*, a 225-foot buoy tender to District 7 in fiscal year 2007, District 8 also deployed six 87-foot patrol boats to District 7 for a combined 1,130 operational hours. In addition, District 8 lost access to roughly 1,600 operational hours from the 179-foot patrol coastals on loan from the U. S. Navy when these vessels were reprogrammed from performing missions in District 8 to District 7. Further, District 8 lost approximately 2,400 medium endurance cutter operational hours to District 7 in fiscal year 2007. District 8 officials estimate that the loss of the medium endurance cutter operational hours probably resulted in about 40 to 50 lost boardings for the living marine resources mission. According to District 8 officials, losing a portion of its medium endurance cutter operational hours was a significant loss because these vessels are the primary vessels used for this mission. With the exception of its buoy tender, District 8 does not currently have any vessels in its fleet larger than its 87-foot patrol boats, which limits the district's ability to conduct off-shore missions in District 8 because, according to the Coast Guard, the 87-foot patrol boats do not have the range nor the endurance to operate in distant fisheries, and also have a harder time sustaining a high boarding rate during living marine resources missions.

Additionally, one Coast Guard official cited that another effect that could not be quantified or measured was the loss of a deterrence effect by having fewer vessels patrolling the waters in their area of responsibility.

According to an official in District 8, while it is virtually impossible to quantify the effect of having vessels on patrol, it is very important not to underestimate the importance of patrolling the coast because he believes that Coast Guard patrols do lead to more safety compliance and, therefore, safer waters.

According to the Coast Guard, periodic vessel deployments are expected to continue in fiscal year 2008 and future fiscal years until the FRCs—the replacement for the patrol boats—are delivered. The Coast Guard, in its Fiscal Year 2009 Congressional Budget Justification, stated that its mission performance in the living marine resources and other law enforcement (foreign fisheries) missions will be “temporarily affected” by the reduction in available patrol boats. Thus, the Coast Guard is mindful of its need to find a proper balance between homeland security and nonhomeland security missions, as well as the extent to which it can continue to delay or forego the performance of certain missions in some districts to provide additional vessels and operational hours in District 7.

Several Issues, Including Greater Resource and Maintenance Needs, Could Affect Longer Term Sustainability of Mitigation Strategies

The Coast Guard faces several issues that could potentially affect its ability to sustain these mitigation strategies for the longer term. While the double-crewed patrol boats performed well in fiscal year 2007, Coast Guard officials have stated that it will be critical to continue to receive sufficient funding to support this initiative in future years. Other issues, such as continued periodic deployment of assets to District 7 and related mission effects, delivery of the FRCs, and the Coast Guard’s expanding mission demands, could challenge the Coast Guard’s ability to successfully sustain these mitigation strategies.

Condition of Vessels Being Double Crewed, Maintenance Costs, and Availability of Maintenance Funds Will Affect Mitigation Strategies’ Sustainability

Residual funding available through the 123-foot patrol boat operating and maintenance accounts has allowed the Coast Guard to sustain the double-crewed 110-foot patrol boats to date, but sustainment is contingent on sufficient funding to pay for the augmented maintenance and personnel. Coast Guard officials have indicated that through fiscal year 2007, double crewing had not adversely affected the condition of the double-crewed patrol boats, and its measures support this contention. In particular, our analysis of the measures the Coast Guard uses to monitor the condition of its vessels shows that all four measures (capacity, unscheduled maintenance days, percent of time fully mission capable, and average

number of casualties per operational day) improved for the double-crewed patrol boats in fiscal years 2007 over fiscal year 2006.³¹ See appendix IV for further details on the trend in these condition measures for the eight double-crewed patrol boats from fiscal years 2004 through 2007. Coast Guard officials attribute the improvement reflected by these measures to increased focus and planning of maintenance activities for these patrol boats, as well as greater parts availability. However, Coast Guard officials have also stated that they will not be able to thoroughly assess the effects of double crewing on the condition of its eight 110-foot patrol boats until they have gone through a complete maintenance cycle, which is now taking 18 months under the new “high tempo, high maintenance” model.

While the effects of double crewing on the condition of the eight 110-foot patrol boats are not fully known, Coast Guard officials have cautioned that maintaining the condition of the double-crewed patrol boats would be contingent on receiving sufficient resources for maintenance support. Under the high tempo, high maintenance model, the Coast Guard expects to retain the double-crewing concept and achieve an even greater level of operational hours through additional maintenance support. In this regard, for fiscal year 2008, \$11.5 million was congressionally-directed to pilot an intensive maintenance regime that the Coast Guard expects will support funding for 6 months of additional personnel and 9 months of operation and maintenance costs, and estimates that it will need greater levels of funding—approximately \$14.9 and \$15.2 million—in the next 2 fiscal years. However, the Coast Guard may likely not know whether this level of funding will be adequate until maintenance contracts are signed and the higher operational hour levels are pursued.

Scheduling and Funding of the Mission Effectiveness Project Affect Strategies’ Sustainability

Sustainment of the Coast Guard’s revised and shortened MEP schedule is contingent on completion of the maintenance and upgrades on schedule and sufficient funding. Any delays in the Coast Guard’s new shortened MEP schedule, or reductions in anticipated funding, could extend the MEP and reduce any gains realized by the shortened schedule. The Coast Guard

³¹Capacity refers to the percentage of time that a vessel is not in maintenance status. Unscheduled maintenance days refer to the percentage of time that a vessel class spends in unscheduled maintenance status over the time period being measured. Percent of time fully mission capable refers to the percentage of operational time that a vessel has no open major casualties (i.e., deficiencies in mission-essential equipment that cause the major degradation of a primary mission or loss of at least one primary mission). Average number of casualties per operational day refers to the number of major casualties that remain open each operational day.

plans to regain some 110-foot patrol boat operational hours by having fewer vessels going through the MEP at one time and shortening the length of the MEP from 12 months to 9 months. To realize these gains, it will be important that the Coast Guard is able to keep the vessels on track with this amended schedule. This is a legitimate concern, as the Coast Guard has already seen two of the five 110-foot patrol boat boats that completed the MEP have their time in MEP extended by approximately 1 to 2 months due to the need to complete unexpected work required outside of the scope of the MEP. While the Coast Guard has stated that the patrol boats have come out of MEP on time and on budget for all standard MEP work items, if unexpected work of this sort were to occur again, this could lengthen the MEP process beyond 9 months and negate some of the advantages of the shortened schedule. In addition, if the Coast Guard does not receive the anticipated level of funding, this could also affect the Coast Guard's ability to get vessels through the MEP as scheduled.

Deployment of Assets from Other Districts Will Continue to Affect the Coast Guard's Ability to Meet Certain Missions

As stated earlier, the Coast Guard is mindful of its need to balance missions across districts and is aware that continued periodic deployment of assets to District 7 may continue to adversely affect mission performance in the donor districts. We have already discussed how deployment of Area and District assets to District 7 from other districts has adversely affected Coast Guard mission performance in those districts, particularly in the living marine resources mission. Some periodic asset deployments are expected to continue in fiscal year 2008 and perhaps in future fiscal years until replacement patrol boats are delivered. The Coast Guard acknowledges this and, in its Fiscal Year 2009 Congressional Budget Justification, has stated that its mission performance in the living marine resources and other missions (e.g., foreign fisheries enforcement) will be temporarily affected by the reduction in available patrol boats.

Longer Term Sustainability of the Mitigation Strategies Could Become an Even Larger Issue Depending on FRC Delivery

One of the biggest factors that affects the sustainability of the mitigation strategies is the timely delivery of the FRCs that will replace the 110-foot patrol boats. While the Coast Guard has purchased four new 87-foot patrol boats that are to be delivered by the first quarter of fiscal year 2009 using \$30 million it was appropriated via emergency supplemental appropriations in 2007, the Coast Guard notes that these can not substitute for either 110-foot or 123-foot patrol boats since they do not have the same

capacity or capabilities.³² Coast Guard officials have emphasized that the mitigation strategies represent their best efforts to make the best use of the assets they have available until the FRC is delivered—the first of which is anticipated by the end of fiscal year 2010, with all 12 to be delivered by the end of fiscal year 2012. Any potential delays in the construction and delivery of the FRC will likely force the agency to continue these mitigation strategies for an even longer period of time, which could result in additional costs for operations and maintenance support to sustain its 110-foot patrol boats.

Increasing Mission Demands across the Coast Guard Could Also Affect Sustainability of Mitigation Strategies

Longer-term sustainability could also be affected by increased demands the Coast Guard is facing across various homeland security and nonhomeland security missions, as we reported in March 2008.³³ For example, with respect to the Coast Guard's missions to protect America's ports, waterways, and waterside facilities, we cited a need to hire and train new staff to address increases in the pace of foreign port inspections and in the demand to provide security for vessels arriving at domestic liquefied natural gas import facilities. In nonhomeland security missions, the Coast Guard has recently been given responsibility for providing assistance for surveillance and monitoring of the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve, called Papahānaumokuākea.³⁴ According to the Coast Guard, surveillance of this monument—which includes monitoring fishing activities and law enforcement, marine species protection, debris recovery, and oil spill clean-up and prevention—has added an additional enforcement responsibility onto an existing mission workload without the benefit of increased funding, personnel, or vessels and aircraft. These additional resource needs could affect the Coast Guard's ability to continue to fund the current mitigation strategies in the years to come.

³²U.S. Troop Readiness, Veterans' Care, Katrina Recovery, and Iraq Accountability Appropriations Act, 2007 (Pub. L. No. 110-28, 121 Stat. 112 (2007)).

³³GAO, *Coast Guard: Observations on the Fiscal Year 2009 Budget, Recent Performance, and Related Challenges*, [GAO-08-494T](#) (Washington, D.C.: Mar. 6, 2008).

³⁴In December 2000, Executive Order 13178 authorized the creation of Papahānaumokuākea, which is about 140,000 square miles. In 2006, the President declared this region a national monument to be monitored by the U.S. Fish and Wildlife Service and National Oceanic and Atmospheric Administration, with support from the State of Hawaii and the Coast Guard. To ensure that commercial fishing limitations are observed until its prohibition in 2011, several Coast Guard vessels patrol the region and conduct search and rescue missions, protect threatened species, and respond to potential hazards, such as debris or damaged vessels.

Agency Comments

We requested comments on a draft of this report from DHS and the Coast Guard. DHS declined to provide official written comments to include in our report. However, in an e-mail received June 11, 2008, the DHS liaison stated that DHS concurred with the report. The Coast Guard provided written technical comments that were incorporated into the report as appropriate.

We are providing copies of this report to the Secretary of DHS, the Commandant of the U.S. Coast Guard, and interested congressional committees. This report will also be made available to others upon request. In addition, the report will also be made available at no charge on GAO's Web site at <http://www.gao.gov>. If you or your staff have any questions about this report, please contact me at (202) 512-9610, or caldwells@gao.gov. Contact points for our Office of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made major contributions to this report are listed in appendix V.



Stephen L. Caldwell
Director, Homeland Security and Justice Issues

Appendix I: Objectives, Scope, and Methodology

This report examines Coast Guard patrol boat operations and the actions taken to mitigate the loss of patrol boat operational hours brought about by the removal from service of eight 123-foot patrol boats. Our work focused on three key questions: (1) What operational challenges were created by the removal from service of the 123-foot patrol boats, and what strategies has the Coast Guard implemented to mitigate these challenges? (2) What effects have these mitigation strategies had on overall Coast Guard operational hours, as well as operating and maintenance costs, patrol boat crews, and mission performance? (3) What are some issues that could affect the sustainability of these mitigation strategies?

In responding to the first question, we reviewed data and documentation such as patrol boat operational hour data, memoranda, other internal reports, and communications with Congress, and spoke with knowledgeable Coast Guard officials. Specifically, we obtained data on Coast Guard-wide operational hours provided by 110-foot, 123-foot, and 179-foot patrol boats from fiscal years 2003 through 2007. We also obtained data from the Coast Guard on the operational hour target of its 1998 patrol boat fleet—which the Coast Guard viewed as the baseline needed for new vessel replacement under the original Deepwater implementation plan—as well the revised 2004 patrol boat operational hour target established in the Coast Guard’s Revised Mission Needs Statement, which took into account the Coast Guard’s greater mission responsibilities post-9/11.¹ We reviewed operational hour data specific to the Coast Guard’s six 110-foot patrol boats deployed to the Persian Gulf in support of defense operations to determine how their operations contributed to the domestic patrol boat operational hour gap. We also reviewed the schedule of 110-foot patrol boats going through the Mission Effectiveness Project.² We also discussed these operational data with officials from the Coast Guard’s Office of Cutter Forces to gain clarification and further details as needed. To assess the reliability of the operational hour data, we consulted with knowledgeable Coast Guard officials on the system responsible for gathering and reporting this data. We also performed electronic testing of the data for obvious errors in

¹The Deepwater Program is the Coast Guard’s plan to replace or modernize existing aircraft, vessels, and information management capabilities.

²The Mission Effectiveness Project is designed to modernize or replace obsolete and unsupportable hull, mechanical, and electrical equipment—such as hull plating and underwater appendages, pumps, motors, piping, generators, and power distribution equipment—for selected 110-foot patrol boats.

accuracy or completeness. On the basis of this assessment, we determined that the data were sufficiently reliable for the purposes of this report. Additionally, to gain an understanding of how the mitigation strategies were developed and implemented across various levels of the Coast Guard, we spoke with officials from the following entities: Office of Cutter Forces, Office of Naval Engineering, Office of Performance Management and Assessment (all at Coast Guard headquarters in Washington, D.C.); Coast Guard Yard (Baltimore, Maryland); Atlantic Area Command (Portsmouth, Virginia) and Atlantic Area Maintenance and Logistics Command (Norfolk, Virginia); District 7 Command (Miami, Florida); Naval Engineering Support Unit (Miami, Florida); Sector St. Petersburg, Florida; Sector Miami, Florida; District 1 Command (Boston, Massachusetts); District 5 Command (Portsmouth, Virginia); District 8 Command (New Orleans, Louisiana); and Joint Interagency Task Force – South (Key West, Florida). We corroborated the information gathered from these officials with Coast Guard memoranda, internal reports, and communications with Congress that detailed the development and status of implementation of these strategies.

In responding to our second objective, we spoke with officials from these many entities to discuss how the various mitigation strategies were affecting Coast Guard operational hours, operations, maintenance, costs, and mission performance. Specifically, in assessing the operational hour effects of the mitigation strategies, we spoke with officials from these entities and also analyzed the operational hour data discussed. To estimate the operational hour gains of the double-crewing strategy, we compared operational hour data for the eight double-crewed 110-foot patrol boats with prorated operational hour targets for February 2007 (when double crewing began) through September 2007. To determine the effects on operations and maintenance of assets, we spoke with officials from these many entities, as well as crew members from four of the double-crewed 110-foot patrol boats in St. Petersburg and Miami, Florida, to gain their views of how double crewing has affected their operations, work tempo, and training opportunities.

To assess the costs of the Coast Guard's mitigation strategies, we relied on data reported to us by the Coast Guard on the costs of: double crewing the eight 110-foot patrol boats, as well as increased funding for fiscal year 2008 to expand the operational hour targets of this approach; acquisition and operations of new 87-foot patrol boats; acceleration of the Mission Effectiveness Project schedule; extending the operations of three Navy 179-foot patrol coastals for 3 additional fiscal years; and supporting additional operational hours for 87-foot patrol boats in District 7 during

fiscal year 2007. We corroborated these data with other sources—such as the congressional direction for the use of funds to support double crewing and supplemental appropriations to mitigate the patrol boat operational gap relating to the 87-foot patrol boat acquisitions—to the extent possible.

Regarding the costs incurred during the first 13 months of double crewing (February 2007–February 2008), we spoke with and gathered information from Coast Guard officials responsible for gathering this data and determined that these data are sufficiently reliable for the purposes of this report. We also spoke with officials from all the districts listed, and Joint Interagency Task Force-South, to gain their estimates of how deploying both area- and district-controlled assets have affected their abilities to fully perform their missions. We obtained some district-level mission performance data on some of the missions that may have been affected by the mitigation strategies (e.g., living marine resources, drug interdiction operations); however, through speaking with officials from the Coast Guard’s Office of Performance Management and Assessment, we determined that it would be very difficult to link any changes in these data with the effects of any of the mitigation strategies, since these data values may be affected by a large number of factors. Thus, we relied on estimates from district officials, as well as interviews with the Coast Guard’s Office of Performance Management and Assessment, to assess the effects of the mitigation strategies.

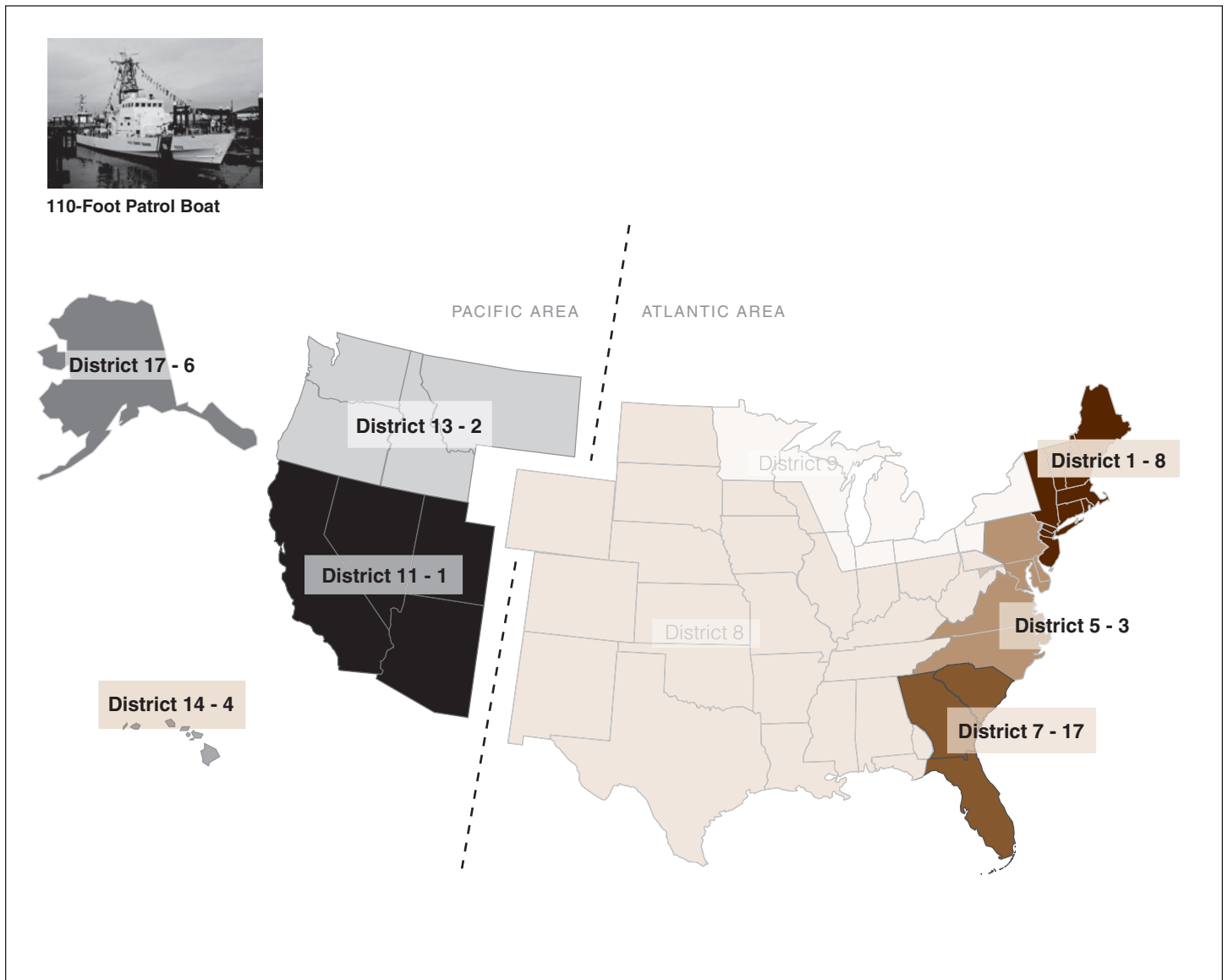
In responding to our third objective, we relied largely on the information collected from our data gathering and interviews, in conjunction with our prior work on larger Coast Guard-wide challenges. In assessing issues that may affect the sustainability of the double-crewing effort, we explored how double crewing may have affected the condition of the eight 110-foot patrol boats by interviewing officials with the Office of Naval Engineering, Sectors St. Petersburg and Miami, and Naval Engineering Support Unit, Miami, as well as by reviewing measures (capacity, unscheduled maintenance days, percent of time fully mission capable, and average number of casualties per operational day) used by the Coast Guard to track the condition of its vessels. We assessed the reliability of these condition measures, and the data and the systems that produced the data, through communications with knowledgeable officials in the Coast Guard’s Office of Naval Engineering. On the basis of this assessment, we determined that these data were sufficiently reliable for the purposes of this report.

Appendix II: Number of 110-foot Patrol Boats Stationed in Each U.S. Coast Guard District

This appendix provides details on the areas and districts that host the Coast Guard's fleet of 41 110-foot patrol boats. District 7, including Florida, Georgia, and South Carolina, hosts almost half of the Coast Guard's fleet of 110-foot patrol boats. District 8, including much of the Gulf of Mexico, does not host any 110-foot patrol boats.

Appendix II: Number of 110-foot Patrol Boats Stationed in Each U.S. Coast Guard District

Figure 7: Number of 110-Foot Patrol Boats Stationed in Each U.S. Coast Guard District



Source: GAO (map art, analysis); MapResources (map); U.S. Coast Guard (photo images, data).

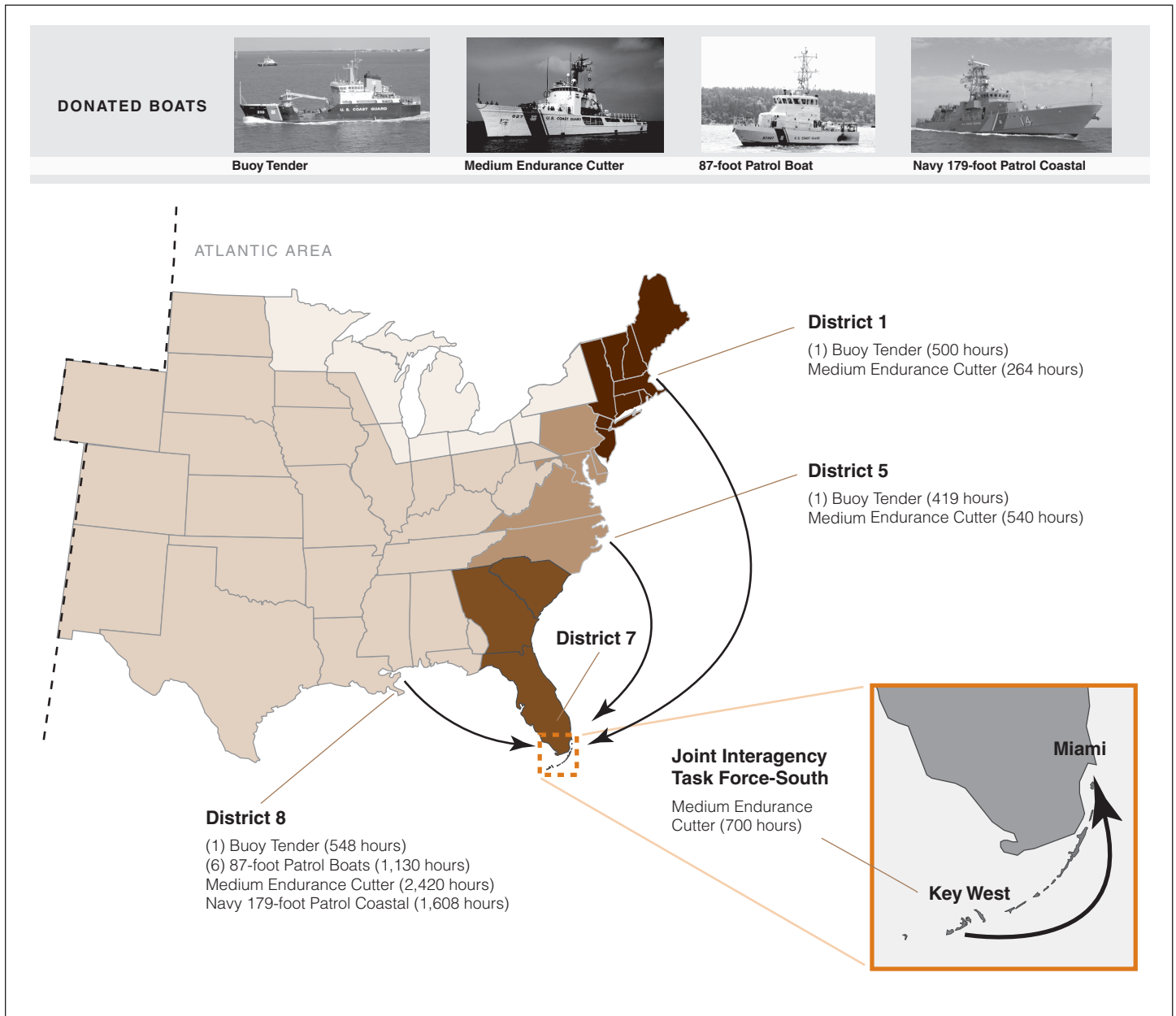
Note: Six 110-foot patrol boats are currently operating away from their home districts in support of defense operations in the Persian Gulf as follows: three from District 1, one from District 5, and two from District 7.

Appendix III: Periodic Deployment of Vessels from Other Districts to District 7, Fiscal Year 2007

This appendix provides information on the periodic deployment of certain Area- and District-controlled vessels to support District 7 operations in fiscal year 2007. Figure 8 illustrates the vessels and their operational hours that deployed from certain Atlantic Area districts and Joint Interagency Task Force-South to support District 7 operations in fiscal year 2007.

Appendix III: Periodic Deployment of Vessels from Other Districts to District 7, Fiscal Year 2007

Figure 8: Periodic Deployment of Area and District Vessels from Other Districts and Joint Interagency Task Force-South to District 7 in Fiscal Year 2007



Source: GAO (map art, analysis); MapResources (map); U.S. Coast Guard (photo images, data).

**Appendix III: Periodic Deployment of Vessels
from Other Districts to District 7, Fiscal Year
2007**

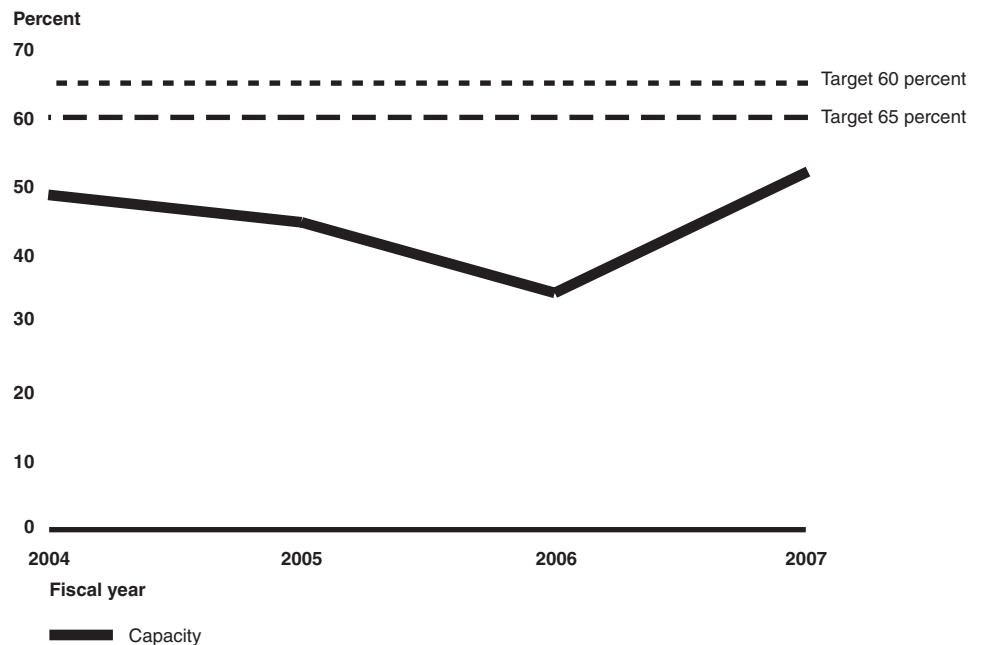
Notes: Photographs were located on the U.S. Coast Guard Pier System Web site and U.S. Coast Guard Visual Information Server, both of which provide photographs for public use. The buoy tender photo was taken by PA3 John Edwards, the medium endurance cutter photo was taken by Petty Officer First Class NyxoLyno Cangemi, and the 87-foot patrol boat photo was taken by PA2 Tiffany Powell.

This figure illustrates a change in tactical control for these deployed vessels from the donating entity to District 7, not necessarily the geographic area of operation of the vessels (i.e., the vessels did not necessarily operate in Miami, but under the control of the District 7 Command, which extends from the coast of South Carolina south to Puerto Rico).

Appendix IV: Condition Measures for the Coast Guard's Eight Double-Crewed 110-foot Patrol Boats, Fiscal Years 2004 through 2007

This appendix provides more details on the condition of the Coast Guard's 110-foot double-crewed patrol boats. Specifically, the figures illustrate the values, for the eight double-crewed 110-foot patrol boats, of four specific measures used by the Coast Guard to monitor the condition of its vessels. Note that double crewing of these eight patrol boats began in February 2007. In general, they show that the condition and availability of these vessels improved during the year of double crewing (fiscal year 2007) over prior years for nearly all of these measures.

Figure 9: Capacity for Double-Crewed 110-foot Patrol Boats, Fiscal Years 2004 through 2007

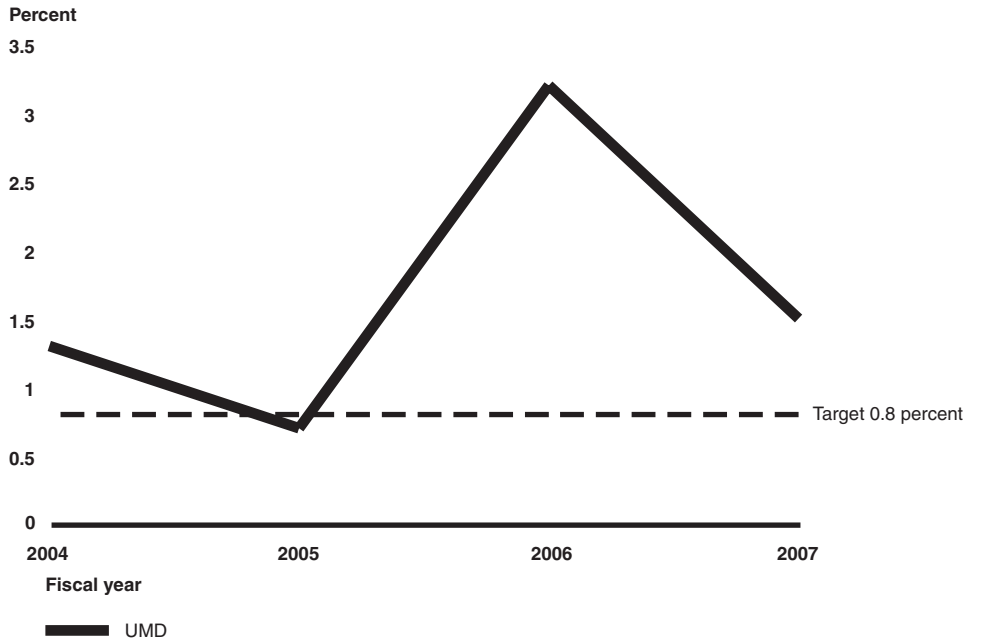


Source: GAO (analysis); U.S. Coast Guard (data).

Note: Capacity refers to the percentage of time that a vessel is not in maintenance status.

Appendix IV: Condition Measures for the Coast Guard's Eight Double-Crewed 110-foot Patrol Boats, Fiscal Years 2004 through 2007

Figure 10: Unscheduled Maintenance Days (UMD) for Double-Crewed 110-foot Patrol Boats, Fiscal Years 2004 through 2007

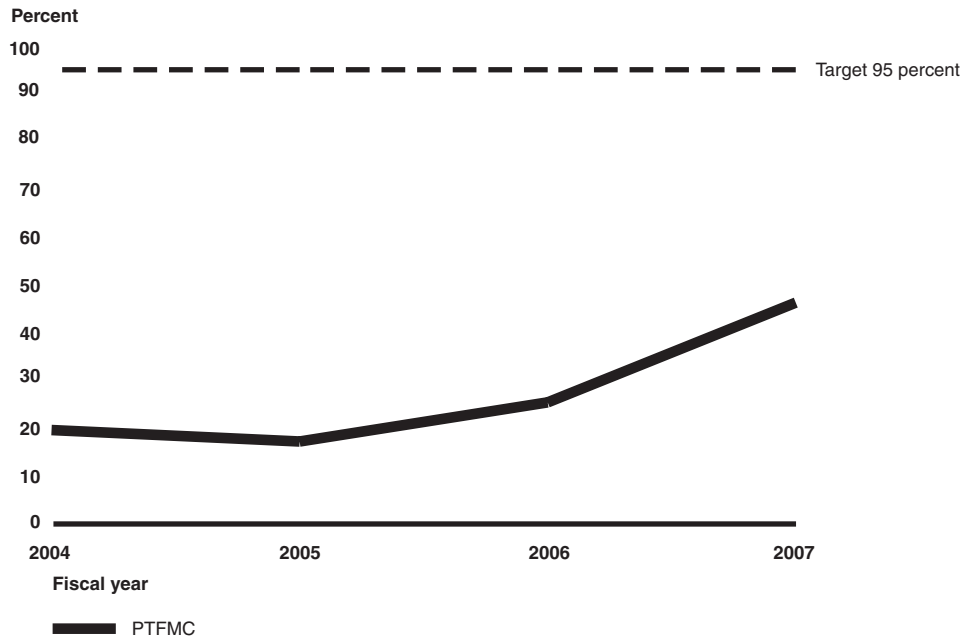


Source: GAO (analysis); U.S. Coast Guard (data).

Note: Unscheduled Maintenance Days refers to the percentage of time that a vessel class spends in unscheduled maintenance status over the time period being measured.

Appendix IV: Condition Measures for the Coast Guard's Eight Double-Crewed 110-foot Patrol Boats, Fiscal Years 2004 through 2007

Figure 11: Percent of Time Fully Mission Capable (PTFMC) for Double-Crewed 110-foot Patrol Boats, Fiscal Years 2004 through 2007

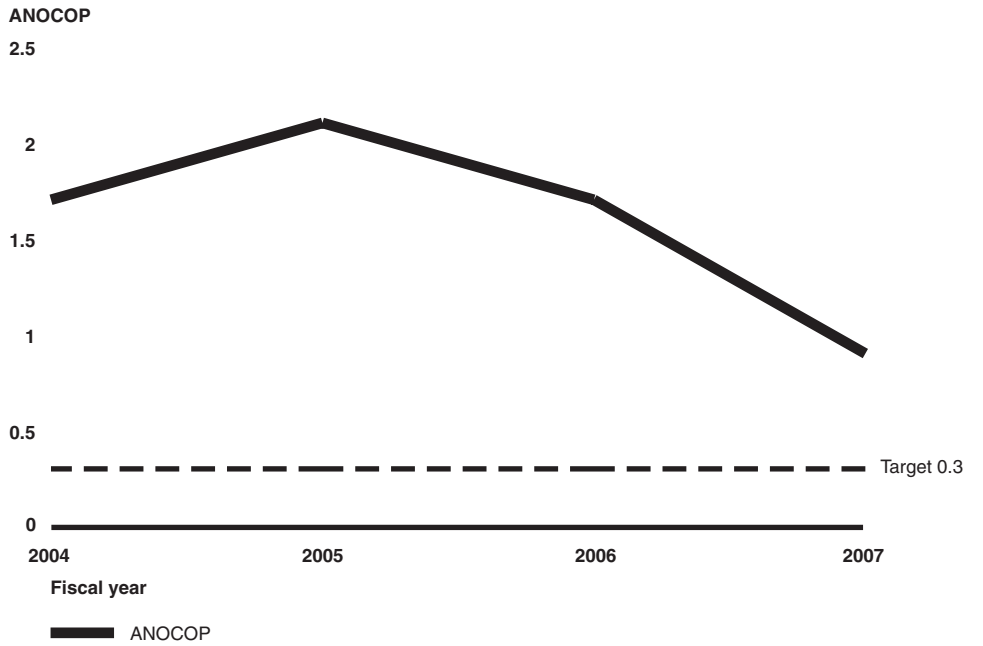


Source: GAO (analysis); U.S. Coast Guard (data).

Note: Percent of Time Fully Mission Capable refers to the percentage of operational time that a vessel has no open major casualties (i.e., deficiencies in mission-essential equipment that cause the major degradation of a primary mission or loss of at least one primary mission).

Appendix IV: Condition Measures for the Coast Guard's Eight Double-Crewed 110-foot Patrol Boats, Fiscal Years 2004 through 2007

Figure 12: Average Number of Casualties per Operational Day (ANOCOP) for Double-Crewed 110-foot Patrol Boats, Fiscal Years 2004 through 2007



Source: GAO (analysis); U.S. Coast Guard (data).

Note: Average Number of Casualties per Operational Day refers to the number of major casualties that remain open each operational day.

Appendix V: GAO Contacts and Acknowledgments

GAO Contact

Stephen L. Caldwell (202) 512-9610, or caldwells@gao.gov

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