

March 2007

# PORT RISK MANAGEMENT

## Additional Federal Guidance Would Aid Ports in Disaster Planning and Recovery





Highlights of [GAO-07-412](#), a report to congressional committees

## Why GAO Did This Study

U.S. ports are significant to the U.S. economy, handling more than 2 billion tons of domestic and import/export cargo annually. Since Sept. 11, 2001, much of the national focus on ports' preparedness has been on preventing potential acts of terror, the 2005 hurricane season renewed focus on how to protect ports from a diversity of threats, including natural disasters. This report was prepared under the authority of the Comptroller General to examine (1) challenges port authorities have experienced as a result of recent natural disasters, (2) efforts under way to address these challenges, and (3) the manner in which port authorities plan for natural disasters. GAO reviewed documents and interviewed various port stakeholders from 17 major U.S. ports.

## What GAO Recommends

To ensure that ports achieve adequate planning for natural disasters, GAO recommends that the Secretary of Homeland Security encourage port stakeholders to use existing forums for discussing all-hazards planning.

DHS, DOT and DOD generally agreed with the facts presented in the report. However, DHS expressed concern about using existing forums for planning. Our work showed that these forums are already being used for planning in several cases which should be further encouraged.

[www.gao.gov/cgi-bin/getrpt?GAO-07-412](http://www.gao.gov/cgi-bin/getrpt?GAO-07-412).

To view the full product, including the scope and methodology, click on the link above. For more information, contact Katherine Siggerud at (202) 512-6570 or [siggerudk@gao.gov](mailto:siggerudk@gao.gov).

# PORT RISK MANAGEMENT

## Additional Federal Guidance Would Aid Ports in Disaster Planning and Recovery

### What GAO Found

Ports, particularly those impacted by the 2005 hurricane season, experienced many different kinds of challenges during recent natural disasters. Of the 17 U.S. ports that GAO reviewed, port officials identified communications, personnel, and interagency coordination as their biggest challenges.

Many port authorities have taken steps to address these challenges. Individually, ports have created redundancy in communications systems and other backup equipment and updated their emergency plans. Collectively, the American Association of Port Authorities developed a best practices manual focused on port planning and recovery efforts, as well as lessons learned from recent natural disasters. Even ports that have not experienced problems as a result of recent disasters, but are nonetheless susceptible to disaster threats, have responded to lessons learned by other ports. Additionally, federal maritime agencies, such as the U.S. Coast Guard, the Maritime Administration, and the U.S. Army Corps of Engineers have increased their coordination and communication with ports to strengthen ports' ability to recover from future natural disasters and to build stakeholders' knowledge about federal resources for port recovery efforts.

Most port authorities GAO reviewed conduct planning for natural disasters separately from planning for homeland security threats. Unlike security efforts, natural disaster planning is not subject to the same type of specific federal requirements and, therefore, varies from port to port. As a result of this divided approach, GAO found a wide variance in ports' natural disaster planning efforts including:

- the level of participation in disaster forums, and
- the level of information sharing among port stakeholders

In the absence of appropriate forums and information sharing opportunities among ports, some ports GAO contacted were limited in their understanding of federal resources available for predisaster mitigation and postdisaster recovery. Other ports have begun using existing forums, such as their federally mandated Area Maritime Security Committee, to coordinate disaster planning efforts. Port and industry experts, as well as recent federal actions, are now encouraging an all-hazards approach to disaster planning and recovery. That is, disaster preparedness planning requires that all of the threats faced by the port, both natural (such as hurricanes) and man-made (such as terror events), be considered together. The Department of Homeland Security, which through the Coast Guard oversees the Area Maritime Security Committees, provides an example of how to incorporate a wider scope of activity for ports across the country. Additionally, the Maritime Administration should develop a communication strategy to inform ports of the maritime resources available for recovery efforts.

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## Abbreviations

AAPA	American Association of Port Authorities
AMSC	Area Maritime Security Committee
COTP	Captain of the Port
DHS	Department of Homeland Security
DOD	Department of Defense
DOT	Department of Transportation
FEMA	Federal Emergency Management Agency
GICA	Gulf Intracoastal Canal Association
LEA	Local Emergency Management Agency
MIRP	Maritime Infrastructure Recovery Plan
MSRAM	Maritime Security Risk Assessment Model
MTSA	Maritime Transportation Security Act of 2002
NIMS	National Incident Management System
NRP	National Response Plan
SAFE Port Act	Security and Accountability for Every Port Act of 2006

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Congressional Committees:

U.S. ports and waterways handle more than 2 billion tons of domestic and import/export cargo annually, and more than 95 percent of U.S. international trade moves by water. As such, ports are a global gateway to world markets and significant engines in the U.S. economy. As important as they are, virtually every major U.S. port faces one or more types of natural disasters with potentially devastating consequences. Ports throughout the eastern seaboard and the Gulf Coast face the possibility of hurricanes, and ports on the West Coast are in areas that are highly susceptible to earthquakes. Losing a major port, even for a few weeks or months, could have a national economic impact, making effective recovery a concern not only for the local area but for the federal government as well.

Ports' complexities exacerbate the difficulty of taking adequate steps to deal with possible natural disasters. Ports are often sprawling enterprises, and each port is unique. Further, a "port" is seldom a single entity. Rather, a port is usually a collection of varied maritime stakeholders. Ports usually include a public entity, such as a port authority. The role of port authorities varies from port to port. For example, the Port of Mobile operates a coal plant in the port, but it also has tenants that lease and operate their own facilities in the port area. Other ports, such as the Port of Miami, are owned and managed by county government,<sup>1</sup> but terminal operators are responsible for the day-to-day maintenance and repair of the terminal area. Besides port authorities, port stakeholders include shipping companies and other tenants that may be leasing port authority facilities, factories and other industries located in the area, and local and state law enforcement and emergency management agencies. Terminals or facilities may also be privately owned. Federal agencies also have a role at ports including the U.S. Coast Guard (Coast Guard), U.S. Army Corps of

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<sup>1</sup>The Dante B. Fascell Port of Miami-Dade is owned and managed by the local government, Miami-Dade County.

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Engineers, and the Maritime Administration.<sup>2</sup> Despite these complexities, ports have various forums in which these maritime stakeholders can coordinate on issues that affect the port as a whole. For terrorism concerns, for example, major U.S. ports have a Area Maritime Security Committee (AMSC)<sup>3</sup> that provides a venue for discussing security concerns. For disaster relief concerns, U.S. ports would work with the Federal Emergency Management Agency (FEMA) regarding disaster assistance.

Since the terrorist attacks of September 11, 2001, much of the focus on emergency preparedness has been on preparedness for preventing, mitigating the effects of, and responding to terrorist attacks. Through legislation and presidential directives, the Department of Homeland Security (DHS) is the primary federal organization responsible for preparing the nation both for terrorist attacks and for major disasters. Homeland Security Presidential Directives 5 and 8 require that DHS establish a single, comprehensive approach to and plans for the management of emergency events whether the result of terrorist attacks or large-scale natural or accidental disasters.<sup>4</sup> As we have previously reported, the capabilities needed to respond to major disasters, whether the result of a terrorist attack or nature, are similar in many ways. The devastating hurricane season of 2005, which included Hurricanes Katrina, Rita, and Wilma, focused renewed attention on the potential effects that natural disasters could pose to port operations. The numerous vulnerabilities port operations face, together with the limited resources available to deal with them, have also initiated a renewed look at how to protect ports from a variety of threats.

In light of the continued attention both to port security and to federal natural disaster response, we are providing a comprehensive view of steps ports have taken to prepare and mitigate the impacts of natural disasters. Consequently, we conducted this review, initiated under the Comptroller General's authority, to examine port disaster preparedness measures and

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<sup>2</sup>In this report, "port" usually refers to one of two things: (1) the port authority or (2) the collective group of stakeholders. We have taken care to ensure that the reference intended is clear. Where necessary, we have inserted clarifying language (such as "port authority") to help ensure clarity.

<sup>3</sup>Maritime Transportation Security Act of 2002, Pub. L. No. 107-295, 116 Stat. 2064.

<sup>4</sup>GAO, *Homeland Security: DHS' Efforts to Enhance First Responders' All-Hazards Capabilities Continue to Evolve*, [GAO-05-652](#) (Washington, D.C.: July, 11, 2005).

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to examine the federal role in helping ports plan and recover from natural disaster impacts. More specifically, this report examines (1) the challenges port authorities have experienced as a result of recent natural disasters, (2) the efforts under way to address challenges from these disasters, and (3) the manner in which port authorities plan for natural disasters and the effect of this approach on their ability to share information with port stakeholders and access federal resources.

To address the challenges port authorities experience as a result of recent disasters and the efforts to address these challenges, we selected 17 U.S. ports for review (see fig. 1). We focused primarily on commercial ports and various commercial aspects of these ports. The criteria we used included selecting ports that (1) varied in size (based on cargo value) and (2) varied in the degree to which they had experienced some type of natural disaster since 1998.<sup>5</sup> Based on guidance from DHS regarding the most significant natural disaster threats to ports, we limited the natural disasters we considered to earthquakes and hurricanes. In particular, we focused on ports impacted by the 2005 hurricane season; in all, 11 of the 17 ports we selected were affected by hurricanes that year. We conducted site visits at 7 of the 17 ports, where we interviewed various maritime stakeholders, including officials from the port authorities, emergency management agencies, and federal agencies such as the Coast Guard, U.S. Army Corps of Engineers, Maritime Administration, and FEMA. We contacted the remaining 10 ports by telephone and conducted a more limited range of interviews. For all 17 ports, we reviewed numerous planning documents, including emergency operations plans, business continuity plans, and hurricane plans.

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<sup>5</sup>We chose 1998 as the cutoff date for recent disasters based on the available data from FEMA.

**Figure 1: Ports Selected for Case Studies and Phone Interviews**



Sources: GAO, Map Resources (map).

To determine the manner in which port authorities prepare for disasters and its effect on information sharing and access to federal resources, we relied primarily on information obtained from our 17 case studies and phone interviews, supplementing it as necessary with other information related to risk management and disaster planning. For perspective on risk management, we used our body of work related to risk management

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throughout the federal government<sup>6</sup> and supplemented it with additional risk management models and tools from a wide range of federal, professional, and academic stakeholders, as well as interviews and documents from the Coast Guard and offices within DHS. We did not include any separate planning efforts conducted by private operators, for two key reasons: their roles and responsibilities vary greatly from port to port and; unlike their planning efforts for homeland security, their efforts for natural disasters are not subject to the same type of federal requirements or guidelines. We performed our work from December 2005 through March 2007, in accordance with generally accepted government auditing standards. See appendix I for more detail regarding our objectives, scope, and methodology.

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## Results in Brief

Port authorities reported experiencing many different kinds of challenges during recent natural disasters, with communication, personnel, and interagency coordination reported as the most problematic challenges. This was particularly true for ports that were impacted by the 2005 hurricane season. Twelve of the 17 ports we reviewed had experienced at least one hurricane or earthquake since 1998, and of these, 8 reported one or more types of challenges in responding (see fig. 2). The most visibly apparent challenge port authorities experienced was dealing with damaged infrastructure, including structural damage to buildings and piers, and silting and debris clogging key waterways. Port authorities also reported difficulties restoring power, water, and other utilities. However, the greatest challenges port officials said they experienced—and in many cases did not anticipate—were in the following other areas:

- *Communications.* Many ports experienced difficulties in communicating both outside the port and with port personnel and other port stakeholders. Phone outages were extensive and cell phone reception was limited. For example, one port was without services for 2 to 4 weeks following Hurricane Katrina.
- *Personnel.* When many port personnel around the Gulf area were evacuated from their homes, the evacuation caused problems both in locating personnel and also in letting them know they should return to work.

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<sup>6</sup>See, for example, GAO, *Risk Management: Further Refinements Needed to Assess Risks and Prioritize Protective Measures at Ports and Other Critical Infrastructure*, GAO-06-91 (Washington, D.C.: Dec. 15, 2005).

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- *Coordination.* Officials reported difficulties coordinating with local, state, and federal stakeholders, especially for planning and recovery efforts. For example, in some cases, port officials had difficulty re-entering the port because they lacked the credentials required by local police and other emergency management officials. Some ports also reported difficulty accessing federal resources for recovery efforts. For example, officials at some ports said they had problems understanding the process in filing for disaster assistance and coordinating damage assessments with FEMA or were unaware of resources available through the Maritime Administration, such as ships that could be used for housing or for conveying supplies.

**Figure 2: Port Experiences with Natural Disasters Since 1998**

Ports	Threats	Events	Challenges							
Freeport, TX		Frances/Rita								
Gulfport, MS		Katrina								
Houston, TX		Rita								
Jacksonville, FL		Ernesto								
Los Angeles, CA										
Miami, FL		Katrina								
		Rita								
Mobile, AL		Katrina								
Morgan City, LA		Katrina								
		Rita								
New Orleans, LA		Katrina								
		Rita								
		Wilma								
Oakland, CA										
Pascagoula, MS		Katrina								
Port Arthur, TX		Rita								
Richmond, VA										
San Diego, CA										
Savannah, GA										
Tacoma, WA		Nisqually								
Wilmington, NC		Ophelia, Katrina								
		Ernesto, Floyd								

Threat of hurricane	No recent events	Personnel	Utilities (power)	Coordination	Gray icons indicate negligible or no challenge
Threat of earthquake	Infrastructure	Communication	Utilities (water)	Clearing debris/aids to navigation	

Source: GAO.

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Port authorities and other stakeholders reported taking a variety of steps to address these challenges. Port authorities have replaced, repaired, and created redundancies for a variety of communications systems and physical infrastructure—for example, purchasing backup phone systems and power generators, creating alternative administrative sites, and developing alternative storage for computer information. Though the 2005 hurricane season primarily affected Gulf ports, port authority officials elsewhere said the results of that season prompted them to improve their preparation as well. One key effort was undertaken by the American Association of Port Authorities (AAPA), an industry group. It convened work groups to discuss lessons learned and, based on the input, issued a manual with guidance for ports on such issues as developing alternative communications, setting up an emergency operations center, and identifying federal resources for recovery efforts. Port authorities reported their changes often extended to improving coordination with other stakeholders. Some ports adapted forums intended for security planning, such as their AMSC, while others with existing natural disaster forums took steps to strengthen them. Some port authorities also established plans for coordinating with neighboring ports. Actions have also been taken at the federal level. For example, the Maritime Administration, contributed to a one-time plan developed by FEMA—the Federal Support Plan. This plan was specifically cited for the 2006 Hurricane Season and was specific to the federal government’s response to support the State of Louisiana. The Maritime Administration contributed to this plan by identifying government and commercial maritime capabilities that could be employed in response to a disaster. To date, while the Maritime Administration plans to provide a directive regarding capabilities to all of their regional offices in June 2007, no plan exists for communicating this information to ports.

Port authorities we reviewed generally conducted their natural disaster planning separately from planning for homeland security threats, and this approach has reduced their ability to facilitate sharing natural disaster planning information among key stakeholders and to access federal resources. Planning for homeland security, an activity that is governed by federal law, tends to be consistent from port to port. By contrast, natural disaster planning, which is not subject to the same type of specific federal requirements, varied considerably at the ports we reviewed in its extent and thoroughness. Separate planning for these two threats means that ports are not able to effectively estimate the impact of mitigation alternatives and optimize their investments in these alternatives based on costs and benefits. Industry experts and port stakeholders, such as the Coast Guard, are now encouraging unified consideration of all risks faced

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by ports, but we found few port authorities were taking a unified approach. One consequence of divided planning is that key stakeholders were not necessarily participating in natural disaster planning. Unlike security planning, where the Secretary of Homeland Security can establish an AMSC with broad representation across port stakeholders, natural disaster planning carries no such requirement. During our review, we found substantial variation in the maturity of, and participation in, natural disaster planning forums at ports. In particular, one port had no forum that brought together the port authority and the local disaster planning agency, which had knowledge of available federal resources, such as FEMA grant programs, as well as the expertise to deal with grant requirements. In the absence of such a forum, it is not surprising that some ports were limited in their understanding of federal resources available for predisaster mitigation and postdisaster recovery. To help improve information sharing, some ports have begun using their federally authorized AMSC, or some other similar forum with wide representation, in disaster planning efforts. DHS, which through the Coast Guard coordinates the AMSCs, provides an example of how to incorporate a wider scope of committee activity for ports across the country.

To help ensure that ports achieve adequate planning for natural disasters and effectively manage risk to a variety of threats, we are recommending that the Secretary of the Department of Homeland Security encourage port stakeholders to use existing forums for discussing their all-hazards planning efforts and include appropriate representatives from DHS, the port authority, representatives from the local emergency management office, the Maritime Administration, and vessel and facility owner/operators. To help ensure that ports have adequate understanding of maritime disaster recovery resources, we recommend that the Secretary of the Department of Transportation direct the Administrator of the Maritime Administration to develop a communication strategy to inform ports of the maritime resources available for recovery efforts.

In commenting on a draft of this report, DHS, the Department of Transportation (DOT), and the Department of Defense (DOD) generally agreed with the facts presented. In its letter, DHS did not endorse placing responsibility for disaster contingency planning on existing committees in ports and said these responsibilities should remain with state and local emergency management planners. Our recommendation was not to place responsibility for such planning within port committees, but rather to use these existing forums as a way to engage all relevant parties in discussing natural disaster planning for ports. DOT officials provided a number of comments and clarifications, which we incorporated as appropriate to

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ensure the accuracy of our report. The DOT generally concurred with GAO's recommendation. The DOD provided technical comments and clarifications.

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## Background

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### Port Activities Involve Many Different Entities

Ports comprise many different stakeholders, both public and private. Port authorities also may have jurisdiction over some or all of the geographical area of a port. The port authority can be an agency of the state, county, or city in which the port is located. In most ports in North America, the actual task of loading and unloading goods is carried out by private operators who lease space or equipment from the port authority. (In some ports, the port authority also manages some of these stevedoring activities.) The percentage of the port area over which the port authority has jurisdiction, and the level of involvement of the port authority in the port's operations, is different from port to port. This variability in port authority jurisdiction and operational involvement has direct consequences for portwide disaster preparedness. Even though a port authority may have a thorough disaster plan in place, that plan may not be binding on any of the private operators in the port.

The stakeholders involved at any given port can vary but, in general, they include port authorities, private-sector operators doing business within the port, government agencies, and information-sharing forums. Table 1 summarizes these basic participants and their roles.<sup>7</sup>

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<sup>7</sup>See table 2 for federal agencies involved.

**Table 1: Port Stakeholder Roles**

<b>Port stakeholder</b>	<b>Stakeholder role</b>
<b>Quasi-governmental</b>	
Port authority	<ul style="list-style-type: none"> <li>• Provides a limited governance structure for the port.</li> <li>• Sometimes owns port assets such as cranes and pier space.</li> <li>• The role of the port authority varies from port to port. Some ports own and operate cargo terminals, while others lease their equipment and pier space to private operators. Others engage in a combination of both activities.</li> </ul>
<b>Private sector</b>	
Facility/service operators	<ul style="list-style-type: none"> <li>• Ship owners and operators</li> <li>• Stevedoring companies</li> <li>• Rail carriers/operators</li> <li>• Trucking and shipping companies</li> <li>• Other operators to support the day-to-day activities of the port</li> </ul>
<b>State and local governments</b>	
State or local emergency management agency	<ul style="list-style-type: none"> <li>• May assist port in planning for natural disasters and security threats. May also help to coordinate disaster response services such as police, fire, and medical teams for the port.</li> </ul>
<b>Information sharing forums</b>	
Area Maritime Security Committee	<ul style="list-style-type: none"> <li>• Federally established forum at all ports for all stakeholders to share information on security issues through regularly scheduled meetings, electronic bulletins on suspicious activities around seaport facilities, and sharing of key documents.<sup>a</sup></li> <li>• The U.S. Coast Guard Captain of the Port (COTP)<sup>b</sup> is authorized to establish and coordinate the AMSC and appoint members along with other duties as prescribed by regulation.</li> </ul>
Harbor Safety Committee	<ul style="list-style-type: none"> <li>• Forum at many ports for all stakeholders to advise on regulatory and nonregulatory safety-related issues, including disaster preparedness. Only two Harbor Safety Committees, at the Ports of Houston, Texas, and New Orleans, Louisiana, are federally mandated.<sup>c</sup></li> </ul>
Gulf Intracoastal Canal Association	<ul style="list-style-type: none"> <li>• The Gulf Intracoastal Canal Association (GICA) is maritime trade association that is an advocate for issues regarding the Gulf Intracoastal Waterway, which is an inland navigable waterway located along the Gulf Coast. One of GICA's missions is to work with its members, as well as the Coast Guard and Corps, to identify opportunities to improve the safety and efficiency of the Gulf Intracoastal Waterway.</li> </ul>
American Association of Port Authorities	<ul style="list-style-type: none"> <li>• A trade association that represents more than 150 public port authorities in the United States, Canada, the Caribbean, and Latin America.</li> <li>• Coordinated a series of working groups to develop best practices for disaster preparation and recovery.</li> </ul>

Source: GAO.

<sup>a</sup>Maritime Transportation Security Act of 2002 (MTSA), Pub. L. No. 107-295, 116 Stat. 2064, contains many of the homeland security requirements related specifically to port security. The Area Maritime Security Committees are authorized by section 102 of MTSA, as codified at 46 U.S.C. § 70112(a)(2).

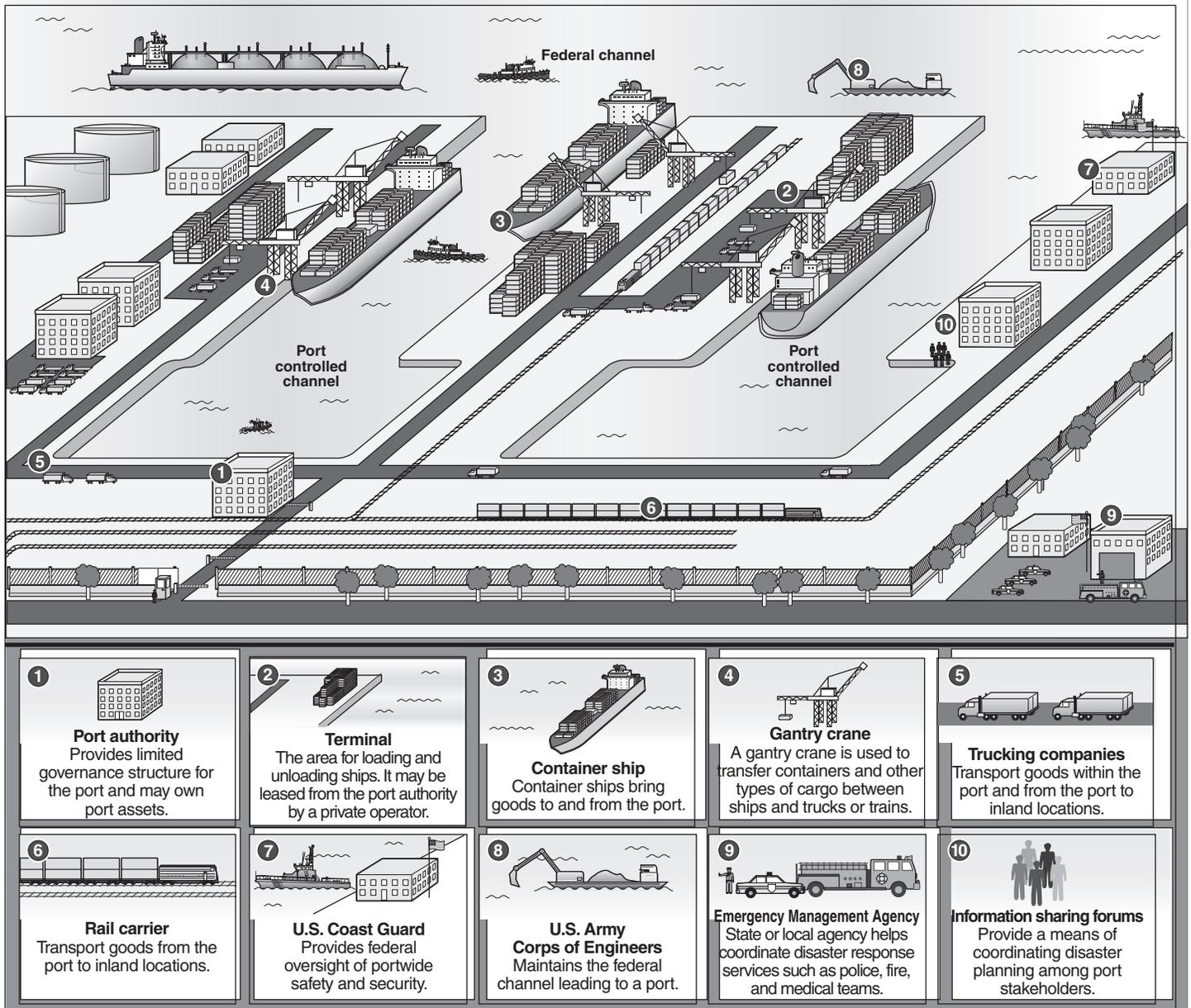
<sup>b</sup>A Coast Guard officer designated as the lead official to facilitate execution of Coast Guard duties in that area. 14 U.S.C. § 634.

<sup>c</sup>Coast Guard Authorization Act of 1991, Pub. L. No. 102-241, § 18 and § 19, 105 Stat. 2208.

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These various stakeholders interact in a variety of ways. The port authority provides a limited governance structure for the port. Many port authorities lease piers, or “terminals,” and equipment to stevedoring companies and shipping lines that are responsible for the actual loading and transport of cargo. Some port authorities also operate cargo terminals alongside the private operators. Figure 3 depicts the main elements of a typical port. Individual ports may not include all of these elements, or may include some not depicted here.

**Figure 3: Port Elements**



**1**   
**Port authority**  
 Provides limited governance structure for the port and may own port assets.

**2**   
**Terminal**  
 The area for loading and unloading ships. It may be leased from the port authority by a private operator.

**3**   
**Container ship**  
 Container ships bring goods to and from the port.

**4**   
**Gantry crane**  
 A gantry crane is used to transfer containers and other types of cargo between ships and trucks or trains.

**5**   
**Trucking companies**  
 Transport goods within the port and from the port to inland locations.

**6**   
**Rail carrier**  
 Transport goods from the port to inland locations.

**7**   
**U.S. Coast Guard**  
 Provides federal oversight of portwide safety and security.

**8**   
**U.S. Army Corps of Engineers**  
 Maintains the federal channel leading to a port.

**9**   
**Emergency Management Agency**  
 State or local agency helps coordinate disaster response services such as police, fire, and medical teams.

**10**   
**Information sharing forums**  
 Provide a means of coordinating disaster planning among port stakeholders.

Source: GAO.

## Federal Role in Port Activities Is Extensive

Several federal agencies provide support to ports in natural disaster planning, response, and recovery (see table 2). These agencies have different missions that relate to port operations, including natural disaster planning and response. For example, the Coast Guard is the agency responsible for most federal oversight related to portwide safety and security. It plays the primary role in coordinating efforts for homeland security efforts. FEMA plays a role in homeland security planning and also administers several assistance programs for disaster preparation and recovery. The Maritime Administration plays a general role in coordinating efforts to strengthen the maritime system and also has the ability to provide maritime assets that could be used to support homeland security interests. These vessels are part of the country's National Defense Ready Reserve Fleet, including ships and barges, which could be used for housing, power generation, or the movement of water and other supplies.

**Table 2: Federal Agency Role at Ports**

Stakeholders	Selected mission-related activities
<b>Department of Homeland Security</b>	
U.S. Coast Guard	<p>Promotes and carries out five operating goals at every U.S. port: Maritime Safety, Protection of Natural Resources, Mobility (i.e., facilitation of the movement of people and goods), Maritime Security, and National Defense.</p> <p>Coordinates the AMSC where they have been created.</p> <p>Responsible for closing the port to vessel traffic before or during a disaster and reopening the port to traffic following the incident.</p> <p>Reviews facility security plans and oversees compliance with these plans.</p>
FEMA	<p>Administers the Public Assistance Grant Program that provides funds for the repair, replacement, or restoration of disaster-damaged, publicly owned facilities. Few ports have received funding for post-disaster recovery under this program.</p> <p>Administers the Hazard Mitigation Grant Program that provides funds to state and local governments to implement long-term hazard mitigation measures after a major disaster declaration. Ports may be included as sub-applicants on a state or local government application. Very few ports have applied for and received hazard mitigation grants.</p> <p>Administers the Predisaster Mitigation Program that provides technical and financial assistance for hazard mitigation planning and the implementation of mitigation projects prior to a disaster event.</p>
Preparedness Directorate—Office of Grants and Training	<p>Administers the Port Security Grant Program that provides funds each year to mitigate security threats to ports. Both port authorities and private operators may apply. The program has distributed \$876,394,146 since its inception, and \$168,052,500 in the fiscal year 2006 program.</p>

Stakeholders	Selected mission-related activities
<b>Department of Transportation</b>	
Maritime Administration	<ul style="list-style-type: none"> <li>• Seeks to improve and strengthen the U.S. marine transportation system—including infrastructure, industry and labor—to meet the economic and security needs of the nation.</li> <li>• Provides ready reserve vessels that could be used to support vital homeland and national security interests.<sup>b</sup></li> <li>• Publishes a Port Risk Management and Insurance Guidebook that is currently being revised to include disaster preparedness guidance for ports.</li> </ul>
<b>Department of Defense</b>	
U.S. Army Corps of Engineers	<ul style="list-style-type: none"> <li>• Maintains any federal channels leading to a port. Following disasters, surveys the channel, removes debris, and oversees any necessary dredging.</li> </ul>

Source: GAO.

<sup>a</sup>The U.S. Army Corps of Engineers maintains more than 12,000 miles (19,200 km) of inland waterways and operates 235 locks.

<sup>b</sup>The Maritime Administration manages this inactive inventory for the Department of Defense.

## Federal Disaster Planning Guidance

The terrorist attacks of September 11, 2001, prompted additional federal efforts to address a broad spectrum of emergencies. The Homeland Security Act of 2002<sup>8</sup> required DHS to develop a comprehensive National Incident Management System (NIMS). NIMS is intended to provide a consistent framework for incident management at all jurisdictional levels regardless of the cause, size, or complexity of the situation and to define the roles and responsibilities of federal, state, and local governments, and various first responder disciplines at each level during an emergency event. To manage all major incidents, NIMS has a standard incident management system, called the Incident Command System, with five functional areas—command, operations, planning, logistics, and finance and administration. NIMS also prescribes interoperable communications systems and preparedness before an incident happens, including planning, training, and exercises.

In December 2004, DHS issued the National Response Plan (NRP), intended to be an all-discipline, all-hazards plan establishing a single, comprehensive framework for the management of domestic incidents where federal involvement is necessary. The NRP includes planning assumptions, roles and responsibilities, concept of operations, and

<sup>8</sup>Pub. L. No. 107-296, 116 Stat. 2135 (2002).

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incident management actions. The NRP also includes a Catastrophic Incident Annex, which provides an accelerated, proactive national response to a “catastrophic incident,” defined as any natural or man-made incident, including terrorism, resulting in extraordinary levels of mass casualties, damage, or disruption severely affecting the population, infrastructure, environment, economy, national morale, or government functions.

Developing the capabilities needed to deal with large-scale disasters is part of an overall national preparedness effort that should integrate and define what needs to be done, where, based on what standards, how it should be done, and how well it should be done. Along with the NRP and NIMS, DHS has developed the National Preparedness Goal. Considered as a group, these three documents are intended to guide investments in emergency preparedness and response capabilities. The NRP describes what needs to be done in response to an emergency incident, either natural or man-made, the NIMS describes how to manage what needs to be done, and the National Preparedness Goal describes how well it should be done. The National Preparedness Goal is particularly useful for determining what capabilities are needed, especially for a catastrophic disaster. The interim goal addresses both natural disasters and terrorist attacks. It defines both the 37 major capabilities that first responders should possess to prevent, protect from, respond to, and recover from disaster incidents and the most critical tasks associated with these capabilities.<sup>9</sup> An inability to effectively perform these critical tasks would, by definition, have a detrimental impact on effective protection, prevention, response, and recovery capabilities.

The Maritime Infrastructure Recovery Plan (MIRP), released by DHS in April 2006, applies these disaster preparedness documents to the maritime sector. The MIRP is intended to facilitate the restoration of maritime commerce after a terrorist attack or natural disaster and reflects the disaster management framework outlined in the National Response Plan. The MIRP addresses issues that should be considered by ports when planning for natural disasters. However, it does not set forth particular actions that should be taken at the port level, leaving those determinations to be made by the port operators themselves.

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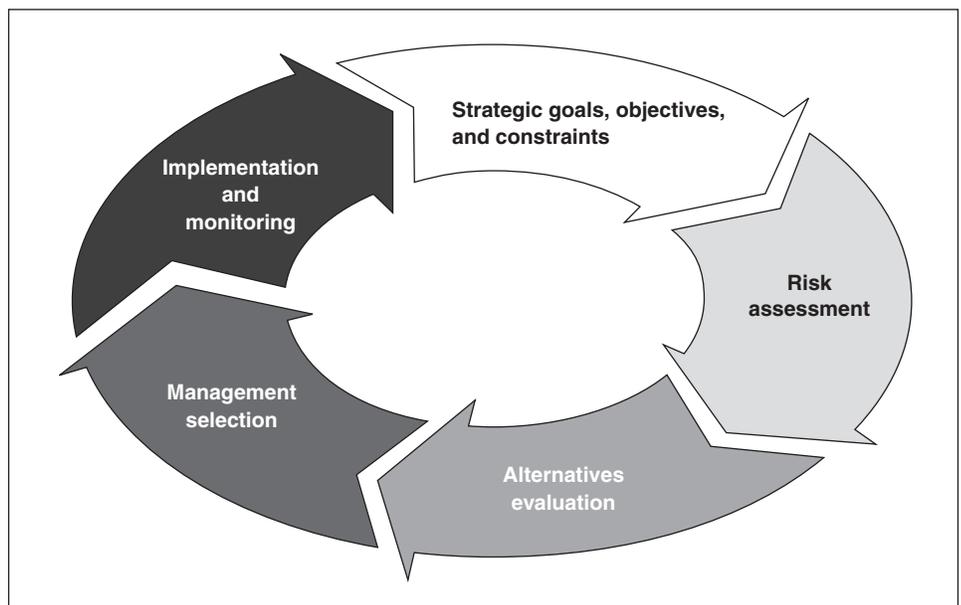
<sup>9</sup>Homeland Security Presidential Directive 8 (HSPD-8).

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The 9/11 Commission pointed out that no amount of money or effort can fully protect against every type of threat. As a result, what is needed is an approach that considers the relative risks these various threats pose and determines how best to use limited resources to prevent threats, where possible, and to respond effectively if they occur. While the Homeland Security Act of 2002 and Homeland Security Presidential Directive 7 call for the use of risk management in homeland security, little specific federal guidance or direction exists as to how risk management should be implemented. In previous work examining risk management efforts for homeland security and other functions, we developed a framework summarizing the findings of industry experts and best practices.<sup>10</sup> This framework, shown in figure 4, divides risk management into five major phases: (1) setting strategic goals and objectives, and determining constraints; (2) assessing the risks; (3) evaluating alternatives for addressing these risks; (4) selecting the appropriate alternatives; and (5) implementing the alternatives and monitoring the progress made and results achieved.

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**Figure 4: GAO Risk Management Framework**



Source: GAO.

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<sup>10</sup> [GAO-06-91](#).

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## Recent Natural Disasters Created a Variety of Challenges; Some Recovery Efforts Were More Difficult Than Expected

Recent natural disasters—particularly Hurricanes Katrina, Wilma, and Rita in 2005—challenged affected ports on several fronts, according to port authority officials. Since 1998, hurricanes have damaged buildings, cranes, and other equipment owned by seven of the port authorities we interviewed. Ports also reported damage to utility systems and experienced delays in water, sewer, and power restoration. Port authorities cited clearing waterways and debris removal as another difficulty. In the case of Hurricane Katrina, some ports, such as Gulfport and New Orleans, have not yet returned or took about 6 months to return to predisaster operational levels, respectively. Separate from the physical impact of the disasters, challenges occurred with personnel, communications and coordination issues and, according to port authority officials, these challenges proved more difficult than anticipated. In some cases, personnel had evacuated the area, and port officials were unsure when staff would be able to return to work. Given that many phone lines were down, there were delays in restoring phone service and, in most cases, ports did not have communications alternatives in place. Some port authorities also reported difficulties in working with local, state, and federal entities during the recovery process, including coordinating re-entry to the port of port personnel and filing for FEMA disaster recovery assistance.

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## Damage to Infrastructure Affected Operations at Most Ports Experiencing Recent Natural Disasters

Even though most ports anticipated and had plans in place to mitigate infrastructure damage from natural disasters, over half of the port authorities we contacted reported that the disasters created infrastructure challenges. Twelve of the 17 ports we reviewed had experienced a hurricane or earthquake since 1998, and among those 12 port authorities, 7 reported challenges in restoring infrastructure (see fig.2). While we were unable to review a complete list of disaster assistance estimates, some port authorities were able to provide specific dollar amounts for repair damage to buildings, cranes, or other equipment. For instance, the Port of Miami reported spending more than \$6 million on repairs as a result of Hurricanes Katrina, Wilma, and Rita, including damage to facilities, signage, sea wall and storm drainage system. Likewise, The Port of Houston reported spending \$200,000 for facility repairs following Hurricane Rita. Ports were still faced with these repair costs even though a majority of the port plans we reviewed included infrastructure damage mitigation. As a way to work around the damaged structures, ports also utilized temporary trailers for administrative and operational functions. For example, this occurred at the Port of Port Arthur, where the strategy

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of reserving backup equipment with appropriate vendors was included in that port's Hurricane Readiness Plan.

Besides the repair costs involved, another indication of the significance of damage to infrastructure was the effect on port operations. In several cases, tenants left the port and moved elsewhere. For example, Port of New Orleans officials said that because they are unsure if departed tenants at the port will return, they have been reluctant to replace three severely damaged container cranes. Operations have been even more curtailed at the Port of Gulfport, also because of Hurricane Katrina. Port authority officials report that they have been able to repair only 3 of their 12 warehouses, which limited their ability to accommodate storage for some of their major operators. These operators have since moved their operations to other nearby ports, such as Pascagoula, Mississippi, or Mobile, Alabama.

Besides damage to buildings, cranes, and other equipment involved specifically in moving cargoes, port authorities also reported damages to their utility systems, including water, sewer, and power. For example, following Hurricane Katrina, the Port of Port Arthur was without power for approximately 2 weeks. Because of a lack of on-site generators, port officials limited port operations to daylight hours only. The power outage also limited operation of certain hangar doors that required electrical power to be opened. Ports with damage to water and sewer included Gulfport, where 2 months were needed to restore its sewer and water capacity. Similarly, the Port of Pascagoula had three damaged water wells as a result of Hurricane Katrina. Port officials told us one of those wells was still not operational almost a year later. While some ports included backup water and power resources in their contingency utility plans, officials at one port said their backup resources may not be adequate to address long-term or extensive outages. In fact, 10 of the 17 ports we reviewed did not have plans for utility system restoration. The lack of anticipation of these vulnerabilities was particularly apparent for ports affected by Hurricanes Katrina, Wilma, and Rita; only 4 of the 10 ports impacted by those storms had planned for utility challenges. For example, Port of New Orleans officials said their supply of 5 to 10 days of water and 3 to 5 days of power through generators was not enough to sustain them through the outages caused by Hurricane Katrina.

While many ports indicated that several federal agencies were eventually able to effectively aid in clearing the waterways and restoring aids to navigation, ports' experiences varied. Their experiences also demonstrated that rapid clearing of waterways is key to reestablishing

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port operations and emphasizes the need for ports to coordinate and arrange for debris removal and restoring aids to navigation ahead of time. Following are some examples:

- Following Hurricane Katrina, the Port of Gulfport had to remove large amounts of debris, such as tree limbs that were hanging and leaning over roads, as well as containers, cargo, and other equipment that winds had scattered into the roadways. Port officials said that clearing these obstructions was essential to re-establishing port operations. Immediately after the hurricane, the local Navy construction battalion (called Seabees) volunteered to assist the port by clearing roads with their large bulldozers, which enabled supplies and cargo to move in and out of the port. The Seabees also cleared boat ramps so that Coast Guard search and rescue vessels could safely enter the waterway. Port officials estimated that, over a period of 3 weeks, the Seabees cleared about 30 percent of the debris in the port area. After the Seabees were called to other duties, Port of Gulfport officials hired a contractor to remove the remaining debris at a cost of about \$5 million. Port of Gulfport officials said that they applied for FEMA reimbursement of these costs. Further, they explained that the use of and planning for existing federal resources for debris removal, such as the Navy Seabees, could have saved even more time and possibly federal dollars that would later be paid to the port in the FEMA reimbursement process.
- Inside the port area, the Port of Mobile experienced challenges with debris removal that federal agencies such as the Corps or the Coast Guard were not responsible for removing. These challenges may have caused additional delays in restoring port operations. For instance, port officials explained that storm surge waters from Katrina loosened several oil rigs in the Gulf, one of which made its way into the port's pier area and damaged several piers. They said the port is currently in litigation to resolve who will pay for the damages. Port of Mobile officials also estimated that dredging expenses, including the removal of branches, sand, and silt from pier areas will be more than \$7.5 million. Because the rig obstruction and other pier damages were not in the federal waterway or jurisdiction, Port of Mobile officials said they were only able to receive limited assistance from federal agencies in resolving their internal damage issues.

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## Difficulties with Personnel, Communication, and Coordination Issues Were Greater Than Expected during Recovery Efforts

Officials of eight port authorities we contacted reported challenges related to personnel, communications, or coordination with port stakeholders as a result of hurricanes since 1998 and, in conversations with us, they indicated that these challenges were more difficult than anticipated. Port plans we reviewed addressed some of these types of vulnerabilities to natural disasters. However, ports still identified such vulnerabilities as a significant obstacle to their ability to return to predisaster operational levels. Several ports cited examples about how their personnel had evacuated and, for numerous reasons, were unable to return to work. For example, several Port of Gulfport employees lost their homes during Hurricane Katrina and had no local living arrangements for themselves or their families. Likewise, the Port of New Orleans said its operations were stifled by the lack of personnel and labor in both Hurricane Katrina and Hurricane Rita. At the Port of Port Arthur, lack of power for area homes kept employees from returning immediately, causing temporary delays in port operations.

Port authorities also did not anticipate the extent to which their communications systems would be impacted. High winds and flooding from the hurricanes rendered phone lines out of service. With phone lines down, port authorities were unable to get in touch with their staff or other port stakeholders to share information. For instance, we learned that approximately 50 percent of phones at the Port of Mobile were out of service for about 2 to 4 weeks. Other ports, including New Orleans, Pascagoula, and Port Arthur, also experienced phone outages and reported limitations in cell phone reception.

Ports also identified coordination challenges with local, state, and federal stakeholders while planning for and recovering from natural disasters. At the local level, one coordination problem port officials experienced was in re-entering the port after the storm. For example, in Gulfport, port officials were denied entry to port property for the first 2 weeks following Hurricane Katrina. Similarly in Houston, law enforcement agencies blocked roads for access back into Houston after the Hurricane Rita evacuation. In some cases, port officials did not have the proper credentials required by local police and other emergency management officials to be allowed roadway access through the city to their port.

In other instances, we found that ports experienced varied levels of coordination with local emergency management agencies, especially regarding planning efforts. For example, Mobile County Emergency Management officials affirmed that they have a close working relationship with the Port of Mobile, where they have helped the port conduct risk

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assessments and emergency planning activities, and where they coordinate with port officials on other plans involving safety, security, and the environment. Conversely, Port of Gulfport and Harrison County Emergency Management officials in Mississippi said they had limited contact and coordination regarding emergency recovery. One county emergency management official said that although the agency has made efforts to share planning documents with the port, the agency is required to work through the Mississippi Emergency Management Agency and follow any guidance in the state emergency plan to request resources from or provide assistance to the port.

At the federal level, one coordination issue reported by port stakeholders involved difficulties in coordinating with FEMA for recovery resources. Some local emergency management officials and port officials that we interviewed expressed concerns about the level of interaction with FEMA officials before an incident occurs. For example, Port of Jacksonville officials said they would like to see FEMA take a more active role in the disaster planning process, such as participation on the AMSC at the local level or coordinating with the Florida State Department of Community Affairs at the state level.<sup>11</sup> Similarly, Port of Los Angeles officials said effective communication with FEMA is essential and that they would like to communicate more clearly with FEMA about reimbursement policies before a disaster takes place. In fact, in November 2006, port officials from Los Angeles and Oakland held a joint meeting with FEMA and the California Office of Emergency Services to discuss the current federal and state regulations and practices regarding disaster relief fund and reimbursement policy.

Port stakeholders also expressed concerns about coordinating with FEMA after an incident occurred, including inconsistencies in information and difficulty in appropriately completing FEMA forms and other documents required for reimbursement. At the county emergency management level, one agency official cited an inconsistency of the interpretation of FEMA policies and changing personnel as some of the challenges in working with FEMA. This official suggested that interacting with FEMA officials more frequently before a disaster would help the port authority better understand which personnel to contact in an emergency situation. The official said this coordination problem became obvious during the

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<sup>11</sup>The Florida State Department of Community Affairs is the department that houses the state emergency management agency.

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Hurricane Katrina recovery effort when, after the port had made several requests, FEMA did not send a representative to the area. Port officials in Gulfport also found it difficult to reconcile their damages using FEMA's cost estimate process. To resolve the paperwork confusion, the Port of Gulfport hired an outside company to deal with FEMA directly and to handle all reimbursement-related issues on their behalf. While Port of Gulfport officials recognized that FEMA's attention to detail was an effort to prevent fraud and abuse, they also said FEMA staff could have done a better job in providing guidance about the reimbursement process.

Besides having coordination challenges with FEMA, we learned that several ports were unclear about resources that were available for recovery from the Maritime Administration. Immediately following Hurricane Katrina, the Gulf area was in need of critical resources such as power, water, and personnel. However, due to infrastructure damages around the area, it was difficult to get these resources into ports. As such, The Maritime Administration provided, with the concurrence of the Department of Defense, ready reserve vessels for FEMA's use. These ready reserve vessels are strategic sealift assets usually used for defense purposes that could be used for command and control, housing, power generation, or the movement of water and other supplies. We found that ports' knowledge about these assets and how to request them was limited. For example, port authority officials at one port turned down the Maritime Administration's offer for a housing vessel. The port determined that the deep draft and large size of the vessel might impede commercial traffic and block other vessels from entering their port. Port officials reached this determination without the knowledge that smaller vessels for the same purpose could have been provided by the Maritime Administration. The vessel offered by the Maritime Administration, however, was instead deployed to the Port of New Orleans area to house first responders.

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## Port Authorities Have Various Efforts Under Way to Mitigate Challenges

Many port authorities have taken steps to address the challenges resulting from recent natural disasters. Individually, they have taken such steps as upgrading communications equipment, adding backup communications approaches and power equipment, and creating alternative sites for administrative operations and storage of computer data. Collectively, they have shared best practices for disaster planning and response, most notably through an industry-wide publication with detailed planning steps and guidelines. Port authorities that were not directly impacted by recent disaster events have also taken steps to revise their planning efforts, including greater coordination with other port stakeholders. Many port authorities have adapted or improved existing stakeholder forums to assist

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in facilitating port planning for natural disasters. At the federal level, agencies such as the Maritime Administration have taken steps to assist ports in identifying federal resources available for disaster response and recovery.

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### Steps Taken Include Port-Specific and Industry-Wide Actions

As a result of the lessons learned from recent natural disasters, port authorities report taking many steps to mitigate vulnerabilities. One mitigation tactic reported by many port authorities is to add equipment and develop redundant systems to help during any recovery efforts. The most frequent redundancy added was in creating communications alternatives. Various port authorities reported purchasing communications equipment that does not necessarily rely on traditional land lines for calling, such as analog pagers, wireless handheld devices, CB radios, and satellite phones. They also integrated more sophisticated communications hardware and software programs. Some ports, such as Houston and San Diego, implemented 1-800 phone numbers to receive calls from port personnel. As an additional precaution, the Port of Houston utilizes call centers located out of state in areas that are less likely to have been impacted by the same storm. In another effort to route calls out of the impacted area, the Port of New Orleans has also been assigned phone numbers with alternative area codes.

Besides making improvements to communications systems, many port authorities took steps related to power and administrative operations. Seven port authorities reported purchasing or arranging for alternative power supplies that could be used during an outage. For example, the Port of New Orleans purchased generators after the 2005 hurricane season. Ports also recognized the need for administrative and information technology location alternatives. Four port authorities reported changing their alternative administrative sites since recent storms. Port authorities also told us that they have changed the way they back up and store their electronic data and equipment. For example, the Port of New Orleans previously had its alternative work site only 3 miles away from its regular operations location. Since both operations sites could be susceptible to the same disaster event, Port of New Orleans officials have partnered with the Port of Shreveport, Louisiana, almost 200 miles away, to use Shreveport's facilities as an alternate operations site if the Port of New Orleans is out of business for more than 5 days. Further, the two ports have prepared a mutual agreement, which includes cost sharing efforts for information technology infrastructure upgrades at the Port of Shreveport, to better accommodate New Orleans' needs in a disaster.

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Another mitigation tactic by ports has been the sharing of best practices and lessons learned from recent natural disasters. Through efforts by the AAPA, a nationwide industry group, ports from across the U.S. and Canada participated in the development of an industry best practices document.<sup>12</sup> In developing this document, AAPA organized various working groups, which included port officials from ports that had been affected by recent natural disasters, as well as ports that had not been affected. Acting as a forum for port officials to share their experiences with natural disasters, these working groups were able to develop a manual focused on port planning and recovery efforts. Vetted by AAPA members, the manual includes planning for emergency operations, communications, damage assessments, insurance and FEMA claims processes, coordinating with federal agencies, and overall emergency planning objectives.

Another industry group, the GICA,<sup>13</sup> has worked closely with the Corps, Coast Guard and other maritime agencies to implement new practices for a more efficient response to maritime related incidents. Many of these efforts have been implemented as result of recent hurricanes. For example, a special Logistics Support Center is set up during response times for the sole purpose of assisting the Corps and Coast Guard with contracting special equipment, including water, fuel and crane barges, towing vessels, pumps, and generators. Regarding clearing the waterways, GICA barge members have provided knowledgeable waterway operators and state-of-the-art boats to assist Coast Guard personnel in conducting channel assessments immediately following a storm. In an effort to restore aids to navigation, GICA contacts also towed 50 temporary buoys and supplied aircraft for aerial surveillance of the waterways. Moreover, the Corps, Coast Guard, and GICA formed the Gulf Coast Inland Waterways Joint Hurricane Team to develop a protocol for storm response. Finalized in July 2006, the Joint Hurricane Response Protocol<sup>14</sup> is an effort to more fully develop lessons learned from previous hurricane seasons and

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<sup>12</sup>Emergency Preparedness and Continuity of Operations Planning: *Manual for Best Practices*, American Association of Port Authorities, Prepared by: Phyllis Saathoff, Managing Director, Port Freeport. September 2006.

<sup>13</sup>GICA is maritime trade association that is an advocate for issues regarding the Gulf Intracoastal Waterway, which is an inland navigable waterway located along the Gulf Coast. One of GICA's missions is to work with its members, as well as the Coast Guard and Corps, to identify opportunities to improve the safety and efficiency of the Gulf Intracoastal Waterway.

<sup>14</sup>Gulf Coast Inland Waterways Joint Hurricane Response Protocol: Prepared by the Gulf Coast Joint Hurricane Team. July 2006.

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waterways management practices, with the goal of implementing an effective restoration of Gulf Coast maritime commerce following future storms.

Ports that have not experienced problems as a result of recent disasters but that are nonetheless susceptible to disaster threats have also responded to these lessons learned by other ports. For example, the Port of Tacoma hired a consultant to assist in developing a business continuity plan. The Port of Jacksonville has also undertaken a comprehensive enhancement to its continuity of operations plan. Likewise, as a result of lessons learned from the Loma Prieta Earthquake in Oakland, the Port of Los Angeles developed more stringent seismic building codes. Additionally, Port of Savannah officials told us that they, too, have changed their prehurricane crane operations based on lessons learned from hurricanes in the Gulf region.

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## Ports Have Taken Steps to Improve Stakeholder Coordination

We found several examples of port efforts to improve stakeholder coordination, including utilizing existing forums to coordinate disaster planning, as well as realigning and enhancing their current plans. Regarding the use of existing forums, port authorities in both New Orleans and Mobile said they were using their AMSC to coordinate response and recovery efforts. Moreover, GAO has previously reported that in the wake of Hurricane Katrina, information was shared collaboratively through AMSCs to determine when it was appropriate to close and then reopen the port.<sup>15</sup> Port-specific coordination teams, such as those at the Port of Houston, have also used their lessons learned to improve coordination for natural disaster planning. Houston's port coordination teams are an outgrowth of the port's relationships with other maritime stakeholders in the Houston-Galveston Navigation Safety Committee,<sup>16</sup> which includes a wide variety of waterway users and operators. In another example, the Port of Oakland works closely with the City Disaster Council on emergency planning and participates in various exercises with city, county, and state officials.

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<sup>15</sup>GAO, *Maritime Security: Information Sharing Efforts are Improving*, [GAO-06-993T](#) (Washington, D.C.: July 10, 2006).

<sup>16</sup>Also known as HOGANSAC, this committee's 19 members include pilots associations, operators, and environmental and academic interests. The committee addresses a wide range of topics affecting navigation in the area. Other individuals with experience and interest in navigation safety issues serve on working groups established by the committee to examine other issues of local interest.

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We also found several examples of how ports have aligned their local planning with the national planning structure and have identified various ways to enhance their current coordination plans. The national structure, which includes NIMS and NRP, is designed to provide a consistent framework and approach for emergency management. Port plans that we reviewed, in particular those from ports in hurricane impacted areas, have identified the importance of adapting to this national structure and emergency response system. For example, the Port of Mobile's emergency operations plan explains that the complexity of incident management and the growing need for stakeholder coordination has increased its need for a standard incident management system. Therefore, the Port of Mobile's emergency operations plan outlines the use of an incident management framework from which all agencies can work together in an efficient and effective manner. Some port authorities making changes have not experienced any significant impact from recent disasters. For instance, Port of Jacksonville officials reported that Hurricane Katrina impacts in the Gulf region prompted them to revise their disaster preparedness plans, including reorganizing the plans to reflect NIMS language and alignment with NRP guidelines. Similarly, Port of San Diego officials said they hired a consultant to assist them with drafting their emergency response and business continuity plan. San Diego's plan prioritized risks, clarified roles and responsibilities of key departments, and laid out directions on how to better coordinate with local emergency management officials during a disaster event.

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### Federal Agencies Have Attempted to Help Ports Strengthen Recovery Efforts

Since the 2005 hurricane season, federal agencies have also taken steps to help port authorities strengthen ports' ability to recover from future natural disasters. These efforts have focused on increased coordination and communication with stakeholders and also on building stakeholders' knowledge about federal resources for port recovery efforts. The efforts primarily involve four federal agencies that in some fashion work directly with ports—the Maritime Administration, the Coast Guard, FEMA and the U.S. Army Corps of Engineers. Efforts for those four agencies are as follows:

*Maritime Administration Efforts:* The Maritime Administration has taken two main steps: developing an approach for activating maritime assets in disaster recovery, and updating a risk management guidebook. During the 2005 hurricane season, the Maritime Administration emerged as a critical resource for the Gulf area by providing vessels from the nation's National Defense Ready Reserve Fleet to enable recovery operations and provide shelter for displaced citizens. Since that time, FEMA developed a one-time

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plan—the Federal Support Plan, which was cited specifically for the 2006 Hurricane Season and specific to the federal government’s response efforts in the State of Louisiana. The Maritime Administration contributed to this plan by identifying government and commercial maritime capabilities that could be employed in response to a disaster.<sup>17</sup> According to Maritime Administration officials, while the information is focused on the Gulf area, it could be easily adapted to other areas in the United States if a disaster occurred. To date, the Maritime Administration is completing the process of identifying needs and capabilities and plans to provide a directive regarding capabilities to its regional offices in June 2007. However, no strategy exists for communicating this information to ports.

The Maritime Administration is also currently updating its publication titled *Port Risk Management and Insurance Guidebook* (2001). This publication is the Maritime Administration’s “best practices” guide for port risk management. Developed primarily to assist smaller ports in conducting risk management, it includes information on how ports can obtain insurance coverage, facilitate emergency management and port security, and apply risk management. The Maritime Administration began updating the guidebook after the 2005 hurricane season. According to officials from the Maritime Administration, ports are actively using this guidebook, especially since many of the contributors are port directors and risk managers at the ports.

While these efforts demonstrate the Maritime Administration’s increased involvement in assisting ports in planning for future disasters, we also observed that Maritime Administration regions vary in their level of communication and coordination with ports. According to a Maritime Administration official, the Gulf and East Coast regions have been working with FEMA regional offices to quickly activate needed assets in case of a disaster. However, while the Gulf and East Coast regions have been strengthening these relationships, other regions may not have the same level of coordination. We found, in general, port authorities’ interaction with the Maritime Administration was limited for natural disaster planning, and the ports we spoke to said they usually did not work directly with the

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<sup>17</sup>The primary planning instrument for DOT remains the Emergency Support Function #1 Annex to the National Response Plan; however, the annex does not detail site specific information as was done for this plan.

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agency in disaster planning.<sup>18</sup> This view was echoed by Maritime Administration officials who said that the relationship between the agency's regional offices and the ports in their respective areas varied across the country.

*Coast Guard efforts:* Coast Guard efforts in natural disaster planning varied considerably from port to port and were most extensive in the Gulf. While in general, the Coast Guard was considered successful in its missions during the 2005 hurricane season, its officials said they were taking additional steps in improving planning for recovery efforts with port stakeholders based on their experiences with recent natural disasters. For example, at the Port of Mobile, Coast Guard officials said that participating in an actual Incident Command System<sup>19</sup> emergency centers has been as helpful as exercises and, since the 2005 hurricane season, they have utilized such a unified command at least 10 times in preparation for potential hurricane landfalls in the region. At other ports, the Coast Guard had a more limited role in assisting ports in planning for natural disasters.

Even at ports that had not experienced substantial damage from a recent natural disaster, however, Coast Guard units were applying lessons learned from other ports' experiences and increasing their level of involvement. For example, the Port of Houston sustained minimal damage from Hurricane Rita; however, Coast Guard officials said that they identified areas where they could make improvements. The Coast Guard at the Port of Houston leads a recovery planning effort through port coordination teams, which include stakeholders such as the port authority, Coast Guard, and private operators, working together during disaster recovery efforts. These teams are all-hazards focused and are activated differently for terrorist incidents or natural disasters. Coast Guard officials said that although the teams were successful in planning for Hurricane Rita, there were areas for improvement, including outreach and training with port stakeholders and communication. Further, Coast Guard officials at the Port of Tacoma said that other ports' experiences with recent

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<sup>18</sup>According to officials from MARAD, the DOT Regional Emergency Transportation Coordinator and Representatives may play a supporting role with regards to communicating and coordinating department response processes and building relationships with local authorities.

<sup>19</sup>The Incident Command System, established under NIMS, is a system for managing all types of major incidents. It defines the operating characteristics, interactive management components and structure of incident management and emergency response organizations engaged throughout the life cycle of an incident.

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natural disasters has generated interest in them becoming more involved in the planning and coordination of natural disasters. They also indicated they were interested in adapting, in some form, a planning forum similar to the Port of Houston's port coordination teams.

*FEMA efforts:* While state and local emergency management agencies assist in facilitating FEMA disaster planning at the port level, FEMA has several efforts under way to improve its assistance to ports for disaster recovery. For instance, FEMA officials said that through the Public Assistance Program, FEMA is able to provide assistance to ports that are eligible applicants after a major disaster or emergency. Based on lessons learned from Hurricane Katrina, FEMA is also reviewing and updating its policies and guidance documents associated with this program. To administer the program, FEMA will coordinate closely with federal, state, and local authorities (including emergency management agencies) through its regional offices. Officials also said that through planning, training, and exercise activities sponsored by DHS, they hope to have greater opportunities to interact and coordinate with port authorities and other local agencies before disasters occur. Further, officials agree that coordination with their local counterparts is an important part of emergency management and disaster recovery efforts.

*U.S. Army Corps of Engineers efforts:* Although the U.S. Army Corps of Engineers generally does not conduct natural disaster planning with ports, staff at the district level have made some efforts to increase their level of involvement in this process, particularly in the Gulf region. For example, district U.S. Army Corps of Engineers staff have (1) organized and chaired yearly hurricane planning forums to which all ports in the region are invited; (2) organized prestorm teleconferences for port stakeholders, National Oceanic and Atmospheric Administration, U.S. Navy, and in some instances, the media; (3) participated in the Coast Guard's Partner Emergency Action Team, which specifically address disaster preparedness; (4) geographically aligned with the Coast Guard to better facilitate coordination during an emergency; and (5) implemented informational training on planning for hurricanes to ports and other maritime stakeholders. Many of these improvements were implemented as a result of Hurricane Ivan (2001) and the hurricanes from the 2005 season. However, the extent of the U.S. Army Corps of Engineers participation in natural disaster planning with ports varies. For instance, U.S. Army Corps of Engineers representatives in Savannah said they do not play a significant role in the port's natural disaster planning for recovery efforts. Similarly in Jacksonville, U.S. Army Corps of Engineers officials explained that their primary natural disaster recovery duty at the Port of Miami is to

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repair the federal channel and they do not participate in the port authority's disaster planning efforts. However, the Jacksonville U.S. Army Corps of Engineers does cooperate with the Coast Guard's Marine Safety Office in Jacksonville in the development of their hurricane preparedness plan. For this effort, it assisted in determining what vessels could remain in port during a hurricane and what vessels would be required to leave.

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## Current Planning Approach Lessens Effective Coordination among All Port Stakeholders

Most port authorities we reviewed conduct planning for natural disasters separately from planning for homeland security threats. Federal law established security planning requirements that apply to ports. Similar requirements do not exist with regard to natural disaster planning. The ports we contacted used markedly different approaches to natural disaster planning, and the extent and thoroughness of their plans varied widely. A few ports have integrated homeland security and natural disaster planning in what is called an all-hazards approach, and this approach appeared to be generating benefits and is in keeping with experts' recommendations and with the newest developments in federal risk management policy. A consequence of the divided approach was a wide variance in the degree to which port stakeholders were involved in natural disaster planning and the degree to which port authorities were aware of federal resources available for disaster recovery. For homeland security planning, federal law provides for the establishment of AMSCs with wide stakeholder representation, and some ports are using these committees or another similar forum with wide representation in their disaster planning efforts. DHS, which through the Coast Guard oversees the AMSCs, provides an example of how to incorporate a wider of scope of committee activity.

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## Port-Level Natural Disaster Planning Is Primarily Conducted Separately from Other Threats

Of the ports we visited, more than half developed plans for natural disasters separately from plans that address security threats. This is likely due to the requirement that port authorities carry out their planning for homeland security under the federal framework created by the Congress in the Maritime Transportation Security Act (MTSA),<sup>20</sup> under which all port operators are required to draft individual security plans identifying security vulnerabilities and approaches to mitigate them. Under the Coast Guard's implementing regulations, these plans are to include such items as

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<sup>20</sup>The Maritime Transportation Security Act of 2002 (MTSA), Pub. L. No. 107-295, 116 Stat. 2064 contains many of the homeland security requirements related specifically to port security. The Area Maritime Security Committees are authorized by section 102 of MTSA, (46 U.S.C. § 70112(a)(2)).

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measures for access control, responses to security threats, and drills and exercises to train staff and test the plan.<sup>21</sup> The plans are “performance-based”; that is, the security outcomes are specified, but the stakeholders are free to identify and implement appropriate solutions as long as these solutions achieve the specified outcomes. Because of the similarities in security and natural hazard planning these plans can be useful for guiding natural disaster response.

MTSA also provided the Secretary of Homeland Security with the authority to create AMSCs at the port level. These committees—with representatives from the federal, state, local, and private sectors—offer a venue to identify and deal with vulnerabilities in and around ports, as well as a forum for sharing information on issues related to port security. The committee assists the Coast Guard’s COTP in developing an area maritime security plan, which complements the facility security plans developed by individual port operators. The plan provides a framework for communication and coordination among port stakeholders and law enforcement officials and identifies and reduces vulnerabilities to security threats throughout the port area.

In contrast, port authority and operator natural disaster planning documents are generally not required by law and vary widely. According to one member from the AAPA, ports will have various interrelated plans, such as hurricane readiness plans, emergency operations plans, engineering plans, and community awareness and emergency response plans. Taken as a whole, the distinct plans for a particular port may represent the port’s risk management approach to disaster planning.

In addition, port natural disaster plans are not reviewed by the Coast Guard. Representatives of the Coast Guard at locations we visited confirmed they do not review port authority or port operator planning documents pertaining to natural disaster planning. For example, officials at the Port of Oakland and the Port of Tacoma said they do not review the port or port stakeholders planning documents for natural disaster planning. Coast Guard officials at the Port of Savannah also noted that they do not review the hurricane plans for port operators. They contended that they do not have the expertise to advise the operators on how to protect or restart their particular operations. Moreover, natural disaster

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<sup>21</sup>The requirements for security plans are found in 33 C.F.R. Part 104, Subpart D for vessels, and 33 C.F.R. Part 105, Subpart D for facilities.

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plans developed by port authorities generally do not apply to the port's private operators. Only in one case did a port authority state that it required its private operators to draft a natural disaster plan.

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### Under the Separate Approach, Disaster Plans Show Wide Variation

We found that the thoroughness of natural disaster plans varied considerably from port to port. For instance, the Port of Mobile had a relatively thorough plan. The Port of Mobile was affected by three major hurricanes in 2005-2006. Roughly a year after Hurricane Katrina, the Alabama State Port Authority completed an extensive emergency operations plan, based on an analysis that considered natural, man-made, and security-related hazards. The operations plan describes preparedness, response, recovery, and mitigation procedures for each identified threat, establishes requirements for conducting exercises, and establishes a schedule for regular plan reviews and updates.<sup>22</sup> In contrast, the Port of Morgan City does not have a written plan for preparing for natural disaster threats but instead relies on port personnel to assess disaster risk and prepare appropriately. Following a disaster, the port authority relies on senior personnel to direct recovery efforts as needed.

In the absence of uniform federal guidance for port disaster planning, some local governments have instituted local planning requirements. The differences in these local guidelines account for some of the variation in the content and thoroughness of port disaster plans. For example, the Miami-Dade County Emergency Management Office helps to coordinate disaster preparedness for all county agencies, including the Port of Miami. As such, the port submits its hurricane plans and continuity of operations plan to the office each year for review, which provides a certain level of quality assurance. By comparison, the Port of Los Angeles found local seismic building codes were insufficient to reach the desired level of preparedness, so the port developed its own seismic codes to guide infrastructure construction and repair.

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<sup>22</sup>Mobile's plan, while relatively thorough, still has gaps in coordination with port stakeholders. Port authority officials noted that they do not share their emergency plans with tenants or outside partners. While many tenants develop their own emergency plans, the port authority does not require them.

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## Combined All-Hazards Approach Shows Promise for Improved Planning

In contrast to the disjunctional planning for both natural disasters and security at ports, industry experts encourage the unified consideration of all risks faced by the port. Unified disaster preparedness planning requires that all of the threats faced by the port, both natural and man-made, be considered together. This is referred to as an all-hazards approach. Experts consider it to offer several advantages:

- *Application of planning resources to both security and natural disaster preparedness.* Because of the similarities between the effects of terrorist attacks and natural or accidental disasters, much of the planning, personnel, training, and equipment that form the basis of protection, response, and recovery capabilities are similar across all emergency events. As we have previously reported, the capabilities needed to respond to major disasters, whether the result of terrorist attack or nature, are similar in many ways.<sup>23</sup> Unified risk management can enhance the efficiency of port planning efforts because of the similarity in recovery plans for both natural and security-related disasters. One expert noted that responding to a disaster would likely be the same for a security incident and a natural disaster incident from an operational standpoint.
- *Efficient allocation of disaster-preparation resources.* An all-hazards approach allows the port to estimate the relative impact of mitigation alternatives and identify the optimal mix of investments in these alternatives based on the costs and benefits of each. The exclusion of certain risks from consideration, or the separate consideration of a particular type of risk, gives rise to the possibility that risks will not be accurately assessed or compared, and that too many or too few resources will be allocated toward mitigation of a particular risk. Port risk management experts noted that, in the absence of an all-hazards risk management process, it is difficult to accurately assess and address the full spectrum of threats faced by a port.

## Federal Actions Reflect Movement Toward All-Hazards Approach

At the federal level, the Congress has introduced various elements of an all-hazards approach to risk management and assistance to ports. Examples are as follows:

- *Single response approach to all types of emergency events.* NIMS and NRP, which were implemented by DHS, provide a unified framework for responding to security and natural disaster events. NIMS is a policy document that defines roles and responsibilities of federal, state, and local

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<sup>23</sup> [GAO-05-652](#).

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first responders during all types of emergency events. The NRP is designed to integrate federal government domestic prevention, protection, response, and recovery plans into a single operational plan for all-hazards and all-emergency response disciplines. Using the framework provided by NIMS, the NRP describes operational procedures for federal support to emergency managers and organizes capabilities, staffing, and equipment resources in terms of functions that are most likely to be needed during emergency events. In addition, along with the NRP and NIMS, DHS has developed the National Preparedness Goal, as required by Homeland Security Presidential Directive 8. Considered as a group, these three documents are intended to guide investments in emergency preparedness and response capabilities for all hazards. An inability to effectively perform these critical tasks would, by definition, have a detrimental impact on effective protection, prevention, response, and recovery capabilities.

- *Broadened focus for risk mitigation efforts.* Security and Accountability for Every Port Act, passed in October 2006, contains language mandating that the Coast Guard institute Port Security Training and Exercise Programs to evaluate response capabilities of port facilities to respond to acts of terrorism, natural disasters, and other emergencies.<sup>24</sup> Officials from the DHS Preparedness Directorate's Grants and Training Office also noted that the criteria for the Port Security Grant Program is beginning to reflect the movement toward all-hazards planning in the future. DHS officials stated that the program may evolve to focus more on portwide risk management, rather than on risk mitigation for particular assets. Furthermore, grant applications that demonstrate mitigation of natural hazard risks in addition to security risks may be more competitive. Other officials noted that while the program may focus more on all hazards in the future, it will remain focused on security priorities for now.

Another agency-level movement toward the all-hazards approach is occurring in the Coast Guard's improvement of a computer tool it uses to compare security risks for targets throughout a port, including areas not under the jurisdiction of a local port authority. This tool, called the Maritime Security Risk Assessment Model (MSRAM), provides information for the U.S. Coast Guard COPT to use in deciding the most efficient allocation of resources to reduce security risks at a port. The Coast Guard is developing an all-hazards risk assessment and management system,

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<sup>24</sup>Security and Accountability for Every Port Act of 2006, Pub. L. No. 109-347, §113(a) 114(a) 120 Stat. 1884 (SAFE Port Act).

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partially fed by MSRAM, which will allow comparison of risks and risk-mitigation activities across all goals and hazards. The Coast Guard directs the Area Maritime Security Committee to use MSRAM in the development of the Area Maritime Security Plan. Given that the Coast Guard is enhancing the MSRAM with a tool that will incorporate natural hazards, the risks addressed in the Area Maritime Security Plan could likely include both natural and security threats in the future.

An all-hazards approach is in many ways a logical maturation of port security planning, which saw an aggressive homeland security expansion in the wake of the terrorist attacks of September 11, 2001. One expert in seismic risk management we spoke with said port officials he contacted indicated that they were not focused on natural disaster risk because, in their view, the federal government wanted them to focus on security risks instead. At some ports, hurricanes or earthquakes may be a greater threat than terrorism, and a case can be made that overall risk to a port might be more effectively reduced through greater investment in mitigating these risks. While federal law provides guidance on addressing security risks through MTSA<sup>25</sup> and its implementing regulations, it does not provide similar guidance pertaining to mitigation of natural disaster threats.

Our previous work on risk management has examined the challenges involved in comparing risk across broader threat categories.<sup>26</sup> A risk management framework that analyzes risks based on the likelihood that they will occur and the consequences of their occurrence is a useful tool for ensuring that program expenditures are prioritized and properly focused. In light of the competition for scarce resources available to deal with the threats ports face, a clear understanding of the relative significance of these threats is an important step.

## Port Authorities Using an All-Hazards Approach Indicate Benefits Resulted

Two port authorities we reviewed have begun to take an all-hazards approach to disaster planning by developing planning documents and structures that address both security risks and natural disasters, and officials at both ports said this approach yielded benefits.<sup>27</sup> At the Port of Houston, the Coast Guard used its authority to mandate the creation of

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<sup>25</sup>Pub. L. No. 107-295, 116 Stat. 2064 (2002).

<sup>26</sup>GAO-06-91.

<sup>27</sup>A third port, the Port of Oakland has taken a step toward employing an all-hazards approach. The Area AMSC elected to add natural disaster planning information to their Area Maritime Security Plan as a set of appendixes.

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port coordination teams by creating teams that include all port stakeholders and combine planning and response efforts for both security and natural disaster threats. This unified approach to risk management has allowed the port to respond efficiently to disasters when they occur, according to port officials. In particular, they said, the organization of the team changes to match the nature of the threat. For security threats, the teams are organized geographically and do not require that the entire port close down, thereby appropriately matching resources to the threat being faced. For natural disasters, the teams are organized functionally because of the more dispersed nature of the threat.

Following the 2005 hurricane season, the Port of Mobile convened a task force to reorganize its disaster planning to address both security incidents and natural disasters. The task force, which recently completed its emergency operations plan, included the Port Authority Police Chief; Harbormaster; Environmental, Health and Safety Manager; and representatives of the port's rail, cargo, intermodal and development divisions. A member of the county emergency management agency also served on the task force to provide expert guidance on emergency response planning.

Port stakeholders in other ports that had not moved to an all-hazards approach also said preparedness and response practices for security incidents and natural disasters are sufficiently similar to merit combined planning. Officials in several ports said that although they are required to allocate certain resources to security risk mitigation, overall risk to the port would be more effectively reduced if they had the flexibility to allocate some of those resources to mitigating natural disaster risk.

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### Under the Separate Approach, Gaps Exist in Coordinating Maritime Stakeholders and Obtaining Information about Federal Resources

We have previously reported that, for homeland security planning, the AMSCs established under federal law have been an effective coordination tool.<sup>28</sup> These committees have provided a structure to improve the timeliness, completeness, and usefulness of information sharing between federal and nonfederal stakeholders. Port stakeholders said that the committees were an improvement over previous information-sharing efforts because they established a formal structure for communicating information and new procedures for sharing information. Stakeholders stated that, among other things, the committees have been used as a forum

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<sup>28</sup> [GAO-06-933T](#).

for sharing assessments of vulnerabilities, providing information on illegal or suspicious activities, and providing input on Area Maritime Security Plans. Stakeholders, including private operators, said the information sharing had increased their awareness of security issues around the port and allowed them to identify and address security issues at their facilities. Likewise, Coast Guard officials said the information they received from nonfederal participants had helped in mitigating and reducing risks.

In contrast to the regulatory requirements for the establishment of AMSCs, there are no nationwide federal mandates for all-hazards planning forums that involve a broad spectrum of stakeholders in disaster planning. In the absence of any consistent requirement or approach, we found substantial variation in the maturity of, and participation in, natural disaster planning forums at ports. As table 3 shows, the level of activity and the participants varied considerably. Some ports utilized their AMSC for both types of planning, while others conducted natural disaster planning efforts primarily within the local area’s broader emergency management forums, and still others conducted their planning piecemeal, with various entities meeting separately and not in one coordinated forum.

**Table 3: Natural Disaster Planning Forums at Ports GAO Visited**

Port	Description of forum
Tacoma	The port does not have a central forum for coordinating stakeholder natural disaster planning efforts. Instead, occasional disaster preparedness exercises with the county emergency management agency and the Coast Guard provide stakeholders with opportunities to share lessons learned. However, the Port of Tacoma conducts planning activities with the county emergency management department.
Oakland	The port is an active member of the City’s Emergency Management Board (Disaster Council) which works closely with the Port of Oakland on emergency planning and testing of plans/exercises. The port is also involved in a number of city, county, and statewide exercises.
Houston	The port has an all-hazards forum through the Port Coordination Team and its constituent Port Coordination Centers. These centers and team include representatives from the port authority and the Coast Guard and a range of stakeholders from private entities. The forum plans for natural disasters and security threats and is activated differently depending on the type of event. However, the forum does not include representatives from the local emergency management office. <sup>a</sup>
Mobile	The port’s AMSC is the most significant forum for disaster planning. Following the 2005 hurricane season, the port authority convened a task force to reorganize its disaster planning to address both security incidents and natural disasters. The task force included stakeholders from across the port area. The port also works with the county emergency management agency.
Gulfport	The port authority meets once a year with customers and tenants to discuss hurricane preparedness and review the hurricane plan. The port provides training on transporting cargo during hurricanes and participates in separate response and recovery planning meetings with other maritime stakeholders, such as the U.S. Army Corps of Engineers.
Miami	The primary forum used to discuss natural disaster planning is the Safety First Committee, which discusses a variety of safety issues. The committee is led by the Port of Miami and meets monthly. To address individual private sector stakeholders, a subcommittee meets with individuals as needed.

Port	Description of forum
Savannah	The port authority is involved in several port forums that discuss a variety of issues; emergency issues may be addressed in these forums if they are imminent. Externally, the port authority's primary interactions are with the state for hazard mitigation programming and with the local emergency management office for response and evacuation. Until recently, interaction with the local emergency management office was limited.

Source: GAO.

<sup>a</sup>According to port officials, the Port of Houston does coordinate with the local emergency management agency during a disaster event.

The Port of Savannah provides an example of how separate planning for natural disasters and security can lead to a lack of coordination and information-sharing. While officials from the local emergency management agency said they reviewed and provided comments on the Georgia Port Authority's most recent Hurricane Plan and Draft Emergency Operations Plan, this had not traditionally been the case over the past several years. According to a representative from the emergency management agency, if the port is not sharing its emergency operations plans, it makes it difficult for responders in the local area to understand what is happening within the port in terms of planning for natural disasters. Additionally, while the local EMA is enjoying an ongoing productive dialogue with port representatives in developing the Emergency Operations Plan and working on port safety and security issues, they are not having the same level of success with port representatives responsible for hurricane planning. Even so, officials said that they had seen marked improvement in the area of portwide cooperation and involvement among stakeholders.

Port authorities' lack of familiarity with FEMA's programs is another example of the gaps that exist. We found that port authorities' understanding of FEMA's assistance was dependent on their relationship with the local or state emergency management office—a stakeholder that is not necessarily involved in the forums where the port's natural disaster planning occurs. We discussed three FEMA programs with officials from our seven case study ports: the Public Assistance Program, Hazard Mitigation Grant Program and the Predisaster Mitigation Grant Program (see table 4 for brief descriptions). These programs provide ports with funds for disaster mitigation efforts before and after disaster events and assist ports in avoiding costly damages. Of the three programs, port authorities were most knowledgeable about, and most involved with, the Public Assistance Program, although even with this program, some port authorities reported encountering challenges with the process during the 2005 hurricane season. Their knowledge and participation in the two hazard mitigation grant programs was dependent on their involvement with the emergency planning office. FEMA officials told us that no ports

have applied as an applicant or subapplicant for the Predisaster Mitigation Program,<sup>29</sup> and only a few had received assistance through the Hazard Mitigation Grant Program since 1998. AAPA officials made the same point—that many ports are unaware, unsure how to navigate or do not understand the resources that are available to them for disasters. In its new best practices manual for natural disaster planning, AAPA included a section regarding various federal resources available, including FEMA.

**Table 4: Key FEMA Disaster Assistance Programs**

Public Assistance Program <sup>a</sup>	Provides grants for the repair, replacement, or restoration of disaster-damaged, publicly owned facilities and the facilities of certain private nonprofit organizations. The federal share is not less than 75 percent of the eligible cost for emergency measures and permanent restoration. The state determines who pays the nonfederal share.
Hazard Mitigation Grant Program <sup>b</sup>	Provides grants to states and local governments to implement long-term hazard mitigation measures after a major disaster declaration. The purpose of program is to reduce the loss of life and property due to natural disasters and to enable mitigation measures to be implemented during the immediate recovery from a disaster. Provides up to 75% of the cost of hazard mitigation measures. The State or grantee must provide a 25% match.
Predisaster Hazard Mitigation Program <sup>c</sup>	The program provides funds on a competitive basis to states, territories, Indian tribal governments, and communities for hazard mitigation planning and the implementation of mitigation projects prior to a disaster event. Funding these plans and projects reduces overall risks to the population and structures, while also reducing reliance on funding from actual disaster declarations. The nonfederal share of the grant is at least 25%. Eligibility for a project grant is dependent on the applicant and sub-applicant having a FEMA approved hazard mitigation plan. States are eligible as applicants for grants and ports are eligible as a subgrantee of the state.

Source: GAO.

<sup>a</sup>Established by Robert T. Stafford Disaster Relief and Emergency Assistance Act Pub. L. No. 93-288, 88 Stat.143 (1974), codified in 42 U.S.C. ch. 68.

<sup>b</sup>Authorized in 42 U.S.C. § 5170c.

<sup>c</sup>Authorized in 42 U.S.C. § 5133.

## Conclusions

The 2005 hurricane season emphasized the need for ports to plan for other threats in addition to security. Since the terrorist attacks of September 11, 2001, the country has focused on enhancing its security measures, and ports in particular have been targeted due to their vulnerability and their criticality to the U.S. economy. While ports have long prepared to some degree for hurricanes and earthquakes, the hurricanes of 2005 highlighted key areas in which natural disaster planning was often inadequate. Even

<sup>29</sup>Recently, the Port of Tacoma began participating in the Predisaster Hazard Mitigation Program as a subgrantee of the county.

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ports that were not directly impacted by the hurricanes recognized their own vulnerabilities and took additional actions. As ports continue to revise and improve their planning efforts, available evidence indicates that, if ports take a system-wide approach, thinking strategically about using resources to mitigate and recover from all forms of disaster, they will be able to achieve the most effective results. The federally established framework for ports' homeland security planning appears to provide useful elements for establishing an all-hazards approach and adopting these elements appears to be a logical starting point for an all-hazards approach for port authorities. In particular, greater coordination between stakeholders appears important to ensure that available federal resources can be most effectively applied. A forum for sharing information and developing plans across a wide range of stakeholders, as occurs with a port's AMSC, is critical for ensuring that local stakeholders can use federal resources effectively. This is especially the case for mitigation grants administered by the Federal Emergency Management Agency and the Maritime Administration's communication of information regarding making ships and other maritime resources available for disaster recovery.

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## Recommendations for Executive Action

To help ensure that ports achieve adequate planning for natural disasters and effectively manage risk to a variety of threats, we are recommending that the Secretary of the Department of Homeland Security encourage port stakeholders to use existing forums for discussing all-hazards planning efforts and include appropriate representatives from DHS, the port authority, representatives from the local emergency management office, the Maritime Administration, and vessel and facility owner/operators.

To help ensure that ports have adequate understanding of maritime disaster recovery resources, we recommend that the Secretary of the Department of Transportation direct the Administrator of the Maritime Administration to develop a communication strategy to inform ports of the maritime resources available for recovery efforts.

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## Agency Comments and Our Evaluation

We provided a draft of this report to DHS, DOT, and DOD for their review and comment.

In DHS's letter, the department generally agreed existing forums provide a good opportunity to conduct outreach to and participation by stakeholders from various federal, state, and local agencies and, as appropriate, industry and nongovernmental organizations. However, the department said it did not endorse placing responsibility for disaster contingency

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planning on existing committees in ports and said these responsibilities should remain with state and local emergency management planners. Our recommendation was not to place responsibility for such planning within port committees, but rather to use these existing forums as a way to engage all relevant parties in discussing natural disaster planning for ports. The problem we found at various locations we visited was that all parties have not been involved in these efforts. In our view, these committees represent a ready way to accomplish this task. While we understand Coast Guard's concern with diluting existing statutorily mandated port-related committees, we found during the course of our fieldwork that some ports were already using existing port committees effectively to plan for all hazards. Further, we believe that the unique nature of ports and their criticality to goods movement warrants that all ports be encouraged to have a specific forum for all-hazard planning. DHS's letter is reprinted in appendix II. DHS officials provided technical comments and clarifications, which we incorporated as appropriate to ensure the accuracy of our report.

In general, DOT agreed with the facts presented in the report. Department officials provided a number of comments and clarifications, which we incorporated as appropriate to ensure the accuracy of our report. The department generally concurred with GAO's recommendation.

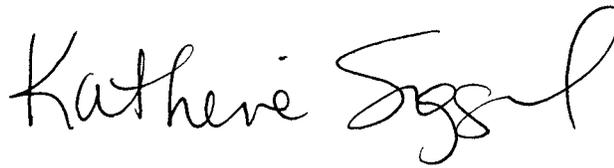
Additionally, DOD generally agreed with the facts presented in the report. Department officials provided some technical comments and clarifications, which we incorporated as appropriate to ensure the accuracy of our report.

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We will send copies of this report to the interested congressional committees, the Secretary of Transportation, and other interested parties. We also will make copies available to others upon request. In addition, the report will be available at no charge on the GAO Web site at <http://www.gao.gov>.

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If you or your staff has any questions about this report, please contact me at (202) 512-6570 or sigerrudk@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made major contributions to this report are listed in appendix III.

A handwritten signature in black ink that reads "Katherine Siggerud". The signature is written in a cursive, flowing style.

Katherine Siggerud  
Director, Physical Infrastructure

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*List of Committees*

The Honorable Daniel K. Inouye  
Chairman  
Committee on Commerce, Science and Transportation  
United States Senate

The Honorable Joseph I. Lieberman  
Chairman  
The Honorable Susan M. Collins  
Ranking Member  
Committee on Homeland Security and Governmental Affairs  
United States Senate

The Honorable Robert C. Byrd  
Chairman  
Committee on Appropriations  
United States Senate

The Honorable James Oberstar  
Chairman  
Committee on Transportation and Infrastructure  
House of Representatives

The Honorable Bennie G. Thompson  
Chairman  
Committee on Homeland Security  
House of Representatives

The Honorable David E. Price  
Chairman  
Subcommittee on Homeland Security  
Committee on Appropriations  
House of Representatives

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# Appendix I: Objectives, Scope, and Methodology

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This report, initiated under the Comptroller General’s authority to examine government operations, examines (1) the challenges port authorities have experienced as a result of recent natural disasters, (2) the efforts under way to address challenges from these disasters, and (3) the manner in which port authorities prepare for disasters and the effect of this approach on their ability to share information with port stakeholders and access federal resources.

To address these objectives, we focused much of our work on 17 U.S. ports. We focused primarily on commercial ports and various commercial aspects of these ports. The main criteria we used to select ports for study were as follows:

- *Size of port, based on the value of imported cargo.* To ensure a varied size of ports, we selected ports that were among the top 50 in size, but within these 50, we chose ports whose total cargo values were greater than and less than the average cargo value for all 50 top ports.
- *Experience with recent natural disasters.* We focused our efforts primarily—but not exclusively—on ports that had some degree of experience with a natural disaster since 1998. Based on Department of Homeland Security (DHS) guidance about the most significant disaster threats and potential hazards, we limited our focus to ports that have hurricane or seismic threats. In particular, we included a number of ports affected by the 2005 hurricane season—primarily hurricanes Katrina, Wilma, and Rita. In all, 10 of the 17 ports we selected were affected by hurricanes that year.
- *Operational type.* We chose ports that reflected a range of operating types, including those that (1) manage port operations and provide all services, (2) act as a landlord and lease operations and facilities to tenants, and (3) conduct limited operations in the port and lease facilities to others.
- *Region of the United States.* We selected ports from the East, Gulf, and West Coasts. There is an overrepresentation of Gulf region ports to ensure adequate coverage of hurricane affected ports.

In making our selections, we used information from the Maritime Administration, including port demographics operational, legal type, and region from the Public Port Finance Survey Report and Maritime Administration waterborne statistics which report the top 50 ports in terms of total cargo value. We determined that what we found at those ports is not generalizable to all U.S. ports. We used disaster data from Federal Emergency Management Agency (FEMA) to assess how many

natural disasters had affected the counties in which each port was located. Based on our review of data documentation, we determined that the data we used in applying our criteria for port selection were sufficiently reliable for our purposes.

We took two approaches to reviewing these ports—site visits and telephone interviews. We conducted site visits at seven ports, as follows:

- Tacoma, Washington
- Houston, Texas
- Oakland, California
- Gulfport, Mississippi
- Mobile, Alabama
- Miami, Florida
- Savannah, Georgia

During these visits, we gathered information from various maritime stakeholders, including officials from port authorities, emergency management agencies, the U.S. Coast Guard, the U.S. Army Corps of Engineers, and the Maritime Administration. Although we talked to four private operators, we excluded interviewing other private operators because their roles and responsibilities vary greatly from port to port and because their efforts for natural disasters, unlike their efforts for homeland security, are not subject to federal requirements or guidelines. We designed our case study interview questions to provide insight on (1) general governance and operations of the port, (2) impacts from recent natural disasters, (3) lessons learned from previous natural disasters, (4) risk management procedures, and (5) stakeholder collaboration.

We conducted telephone interviews with officials at 10 ports, as follows:

- Freeport, Texas
- Jacksonville, Florida
- Los Angeles, California
- Morgan City, Louisiana
- New Orleans, Louisiana
- Pascagoula, Mississippi
- Port Arthur, Texas
- Richmond, Virginia
- San Diego, California
- Wilmington, North Carolina

At these ports, we limited our telephone interviews to port authorities only. These semi-structured interviews addressed the same topics as the case study but focused more on damages and lessons learned as a result of recent natural disasters. For both sets of ports, we also reviewed numerous planning documents from port stakeholders including emergency preparedness plans, disaster recovery plans, hurricane operations, hurricane manuals, seismic guidelines, and business continuity plans.

To assess the challenges port authorities experienced as a result of recent natural disasters, we used the interviews we conducted and the documents we obtained from officials at the 17 ports. To determine the efforts under way to address these challenges, we reviewed information from our interviews with and documents from American Association of Port Authorities (AAPA) officials and various federal agencies. In particular, we reviewed the *Emergency Preparedness and Continuity of Operations Planning: Manual for Best Practices* that was developed through several working groups coordinated by the AAPA. The working groups provided a forum for port officials across the United States and Canada to share their experience in planning for the impacts of recent natural disasters and to share their best practices. We conducted interviews with the Chair of the working groups and other AAPA officials to gather more information about the working group's procedures and vetting process. Additionally, we interviewed various regional and headquarter officials of the Maritime Administration, U.S. Coast Guard (Coast Guard), Department of Transportation, U.S. Army Corps of Engineers, FEMA, and DHS. We reviewed the following federal risk management plans:

- The draft appendix for maritime resources for the Federal Support Plan. The appendix is part of a one-time joint planning document between the Department of Transportation and FEMA for the state of Louisiana (2006 Hurricane Season). The Maritime Administration, an agency within the Department of Transportation, developed this appendix to assist in future recovery efforts by identifying resources, protocols, and organizations for maritime resources.
- The *Port Risk Management and Insurance Guidebook*, developed by the Maritime Administration. This publication is a best practices guide for port risk management, including information on how ports obtain insurance coverage and facilitate emergency management.

To determine how port authorities plan for natural disasters and the effects of that approach on information-sharing among port stakeholders and access to federal resources, we reviewed port and federal disaster planning documents collected from various port stakeholders at each of the seven ports we visited in person. In order to gain an understanding of best practices for such planning efforts, we interviewed academic, industry, and government experts.<sup>1</sup> In particular, we interviewed risk management experts from the following organizations:

- Georgia Institute of Technology’s Port Seismic Risk Management Team conducted damage assessments at seven ports in south Louisiana in October 2005 immediately following Hurricane Katrina.
- ABS Consulting has worked with a variety of clients including the Coast Guard, Maritime Administration, and FEMA and thus helped develop several port risk management tools.
- The Office of Grants and Training at DHS administers both Port Security and Homeland Security Grants.
- The Coast Guard has expertise in utilizing the Maritime Security Risk Assessment Model (MSRAM) to assess security risk and has plans to incorporate natural disaster risks into the model.

We also reviewed related laws and mandates that provide federal oversight to ports—namely the Maritime Transportation Security Act of 2002<sup>2</sup> and its implementing regulations and other applicable law. We also reviewed the Puget Sound area maritime security plan and attended an Area Maritime Security Committee meeting at the Port of Houston-Galveston. To determine steps that federal agencies were taking with regard to all-hazards risk management, we reviewed (1) the Security and Accountability for Every Port Act (SAFE Port Act),<sup>3</sup> which addresses risk mitigation of transportation disruptions, including disruptions caused by natural disasters and (2) policy documents including the National

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<sup>1</sup>For risk management, which is a central component of best practices, we limited our investigation to the context of emergency planning and did not address insurance-related risk management.

<sup>2</sup>Pub. L. No. 107-295, 116 Stat. 2064 (2002).

<sup>3</sup>Security and Accountability for Every Port Act of 2006 (SAFE Port Act), Pub. L. No. 109-347, 120 Stat. 1884. We also reviewed the SAFE Port Act Conference Report—House Report 109-711.

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Response Plan and the National Incident Management System. We also reviewed a presentation on the Coast Guard's MSRAM.

Our work, which we conducted from December 2005 through February 2007, was conducted in accordance with generally accepted government auditing standards.

# Appendix II: Comments from the Department of Homeland Security

U.S. Department of Homeland Security  
Washington, DC 20528



**Homeland  
Security**

March 13, 2007

Ms. Katherine Siggerud  
Director, Physical Infrastructure  
U.S. Government Accountability Office  
441 G Street, NW  
Washington, DC 20548

Dear Ms. Siggerud:

RE: Draft Report GAO-07-412, Port Risk Management: Additional Federal Guidance Would Aid Ports in Disaster Planning and Recovery (GAO Job Code 542083)

The Department of Homeland Security (DHS) appreciates the opportunity to review and comment on the draft report referenced above. The Government Accountability Office (GAO) recommends that the Secretary encourage port stakeholders to use existing forums for discussing all hazards planning efforts and include appropriate representatives from DHS, the port authority, representatives from the local emergency management office, the Maritime Administration, and vessel and facility owner/operators. The intent of the recommendation is to ensure or otherwise encourage ports to adequately plan for natural disasters and effectively manage risk associated with a variety of threats.

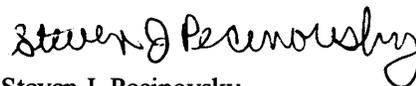
Across the nation, the U.S. Coast Guard serves a leadership role in a wide variety of port level committees. Some of these committees specifically address contingency planning such as Area Committees and Area Maritime Security Committees (AMSC), which focus on oil/hazardous material preparedness and response, and port security respectively. Additionally, where applicable, the Coast Guard is formally involved in Harbor Safety Committees that primarily focus on ports and waterways management issues. Each of these committees involves extensive outreach to and participation by stakeholders, including various federal, state, and local agencies, and, as appropriate, industry and non-governmental organizations to address their specific focus areas. At the national level, the Coast Guard provides forums such as the Towing Safety Advisory Committee so that specific maritime stakeholder groups can communicate with the Coast Guard. The National Response Plan establishes a comprehensive all-hazards approach to enhance the ability of the United States to manage domestic incidents. Collectively these various committees and organizations may provide extensive opportunities for stakeholder involvement in contingency planning.

We agree that existing forums provide a good opportunity for the agency/agencies responsible for disaster planning to engage an appropriate array of port stakeholders to ensure the ports are adequately represented. DHS does not, however, endorse placing the responsibility for disaster contingency planning on existing committees as those responsibilities should properly remain with state and local emergency management planners and other responsible government agencies. Additionally, many of the existing port-related committees were statutorily mandated to fulfill specific responsibilities and we must caution against diluting their ability to effectively carry out those missions.

GAO's recommendation does align well with DHS Preparedness Directorate's Office of Grants and Training initiative to, in conjunction with the United States Coast Guard, reach out to appropriate port stakeholders to foster the concept of Port Wide Risk Management. This concept, based on the risk management framework identified in the National Infrastructure Protection Plan, will assist the ports in the management of resources (including federal grant funds) to address all risks encountered in their ports.

A port-wide risk management program will also be fully integrated into the broader regional planning construct that forms the core of the Urban Area Security Initiative (UASI), as well as applicable statewide initiatives. Adoption of a deliberate risk management planning process, consistent with that employed in the UASI and state programs, is also a key focus of the recently signed Security and Accountability For Every Port (SAFE Port) Act.

Sincerely,



Steven J. Pecinovsky  
Director  
Departmental GAO/OIG Liaison Office

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# Appendix III: GAO Contact and Staff Acknowledgments

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## GAO Contact

Katherine Siggerud, (202) 512-6570, siggerudk@gao.gov

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## Staff Acknowledgments

In addition to the individual named above, Sally Moino, Assistant Director; Casey Hanewall; Lindsey Hemly; Christoph Hoashi-Erhardt; Bert Japikse; Erica Miles; Sara Ann Moessbauer; Jamilah Moon; Sharon Silas; Stan Stenerson; and Randall Williamson made key contributions to this report.

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