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WATER QUALITY

Program Enhancements Would Better Ensure Adequacy of Boat Pumpout Facilities in No-Discharge Zones



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Highlights

Highlights of [GAO-04-613](#), a report to the Honorable Jim Saxton

Why GAO Did This Study

Clean Water Act regulations generally prohibit boats from discharging untreated sewage but allow the discharge of treated sewage using certified marine sanitation devices. The act allows states to designate “no-discharge zones”—areas in which vessels are prohibited from discharging any sewage—if the Environmental Protection Agency (EPA) finds that adequate facilities exist in such zones for the removal and treatment of sewage from vessels. In some cases, such as for drinking water intake zones, EPA makes the designation. As requested, this report assesses 1) EPA’s process for determining the adequacy of facilities to remove and treat sewage in proposed no-discharge zones; (2) the extent to which EPA and the states ensure that adequate facilities remain available after designation; (3) the extent to which the Coast Guard and the states enforce discharge prohibitions; and (4) various effects of no-discharge zones, as identified by EPA, states, and localities.

What GAO Recommends

GAO recommends that EPA better ensure that facilities are and remain adequate in no-discharge zones and that EPA and the Coast Guard meet with relevant states to review and clarify enforcement roles. EPA agreed with the recommendations and EPA and the Coast Guard provided technical comments about the Coast Guard’s enforcement role that are incorporated in the report.

www.gao.gov/cgi-bin/getrpt?GAO-04-613.

To view the full product, including the scope and methodology, click on the link above. For more information, contact John Stephenson at (202) 512-3841 or stephensonj@gao.gov.

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What GAO Found

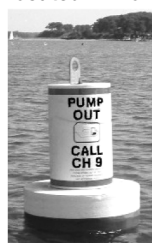
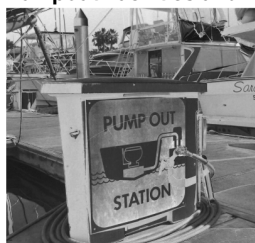
EPA’s process for determining whether adequate facilities are reasonably available to remove and treat sewage from boats in proposed no-discharge zones could be improved. EPA currently requires states to submit general estimates of need for facilities (known as pumpouts) in state applications for no-discharge zones, but other information that would support site-specific estimates is optional. As a result, EPA does not receive this information consistently. Moreover, EPA generally makes its determinations on adequacy without site visits to evaluate the facilities identified in the applications to ensure, for example, that they are accessible and functioning.

GAO found no EPA and limited state oversight of pumpout facilities after no-discharge zones are established. The Clean Water Act does not address the monitoring of such facilities in established no-discharge zones, nor does it define a specific role for EPA after the agency has initially determined that the facilities are adequate. Because the success of no-discharge zones depends in large measure on adequate facilities, GAO believes that EPA should assess the continued adequacy of these facilities, seeking additional authority, if needed, to require periodic recertifications or reassessments.

The Coast Guard limits its enforcement of no-discharge prohibitions to the three federally designated no-discharge zones; it does not enforce them in the 56 state-designated zones. While the Clean Water Act grants the Coast Guard authority to enforce in all no-discharge zones, Coast Guard’s regulations exercise enforcement authority only in areas where discharges are prohibited by EPA regulations—currently the three federally designated zones. EPA and others were not aware of the Coast Guard’s regulatory limitation of its enforcement authority. GAO found that states enforced in different ways, such as by issuing tickets or inspecting boats. Many states place more emphasis on boater education than on penalizing violators.

Although few data are available to assess the effects of no-discharge zones, a number of EPA, state, and local officials believe that water quality and environmental stewardship have increased after designation of these zones. In addition, officials cite gallons of boat sewage pumped as evidence that no-discharge zones reduce water pollution.

Pumpout Facilities and Buoy Located in No-Discharge Zones



Source: GAO.

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Abbreviations

EPA U.S. Environmental Protection Agency
GAO General Accounting Office

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United States General Accounting Office
Washington, D.C. 20548

May 24, 2004

The Honorable Jim Saxton
House of Representatives

Dear Mr. Saxton:

The number of recreational boats in the United States increased from nearly 8 million in 1977 to approximately 13 million in 2002. With the increase in boating, there has been a corresponding rise in the potential for sewage from boats to damage water quality generally and to harm sensitive areas such as shellfish beds and beaches. Waters in sheltered areas where boats congregate, such as harbors and marinas, are particularly susceptible to sewage accumulation because water in these areas may not circulate as freely as in the ocean and other well-circulating waterways.

Under the Clean Water Act, the discharge of both untreated and treated sewage from boats is generally banned in bodies of water that cannot be navigated by interstate vessels. In waterways that can support interstate vessel traffic—such as the coastlines, the Great Lakes, and many rivers and lakes—Clean Water Act regulations prohibit boats from discharging untreated sewage within 3 nautical miles of U.S. territory but generally allow the discharge of treated sewage that meets EPA treatment standards. The act requires that boats with installed toilets be equipped with systems, called marine sanitation devices, that either treat and discharge sewage into the water or hold untreated sewage until it is removed. EPA has established standards of performance for marine sanitation devices, and the Clean Water Act generally prohibits states from establishing their own standards. It does, however, authorize them to designate “no-discharge zones”—areas in which vessels are prohibited from discharging any sewage, whether treated or untreated, under certain circumstances.¹ The Clean Water Act provides for U.S. Coast Guard and state enforcement of the provisions of the act governing marine sanitation devices.

The first no-discharge zones were established in 1975, and currently there are 59 no-discharge zones in 23 states (see app. I). The Clean Water Act authorizes state-designated no-discharge zones in which states may completely prohibit the discharge of sewage from all vessels into certain

¹The Clean Water Act also allows states to establish more stringent requirements for houseboats.

state waters if the state determines that the protection and enhancement of the quality of those waters require greater environmental protection and EPA determines that adequate facilities are reasonably available for the safe and sanitary removal and treatment of sewage from all vessels in the proposed no-discharge zones. The required facilities include devices that remove sewage from holding tanks on boats—known as pumpout facilities—and are generally located either on a dock, where boats pull up to use them, or on pumpout boats, which travel to boats to empty the holding tanks. When the areas to be protected involve drinking water intake zones or other “special protection areas,” such as wildlife sanctuaries, Clean Water Act regulations require states to apply to EPA for the designation but do not require a determination that adequate facilities are available. In these cases, EPA rather than the states may officially establish the no-discharge zones (federally designated no-discharge zones) via a final rule in the *Federal Register*, while the states establish the zones in all other cases (state-designated no-discharge zones). Of the 59 no-discharge zones, only 3 are federally designated. Thus, most of the no-discharge zones are designated by states following determinations by EPA that the areas had adequate pumpout facilities.

Some boaters have raised questions about the condition and availability of pumpout facilities in some no-discharge zones, generally those that encompass larger areas. In addition, some boaters have questioned the need for no-discharge zones, contending that vessel discharges constitute a relatively small portion of water pollution and that improved marine sanitation devices could treat waste to levels that exceed water quality standards. On the other hand, some federal, state, and local officials question the performance of marine sanitation devices over the number of years they may be used; point out that vessel discharges can concentrate in or near shore areas; and say that even minimal amounts of pollution near beaches and shellfish beds, for example, can harm sensitive marine life or cause disease.

As agreed with your office, this report (1) evaluates EPA’s process for determining whether states have adequate facilities for the safe and sanitary removal and treatment of sewage from boats in proposed no-discharge zones, (2) assesses the extent to which EPA and the states ensure that adequate pumpout facilities remain available after a no-discharge zone is designated, (3) evaluates the extent to which the Coast Guard and the states enforce compliance with the prohibition against vessel sewage discharges in no-discharge zones, and (4) identifies the effects of no-discharge zones that EPA, states, and localities have reported.

Unless otherwise specified, this report focuses on the no-discharge zones that the states designate because 56 of the 59 zones as of March 2004 were state-designated zones.² We studied 12 of the 23 states that have established no-discharge zones: California, Florida, Maryland, Massachusetts, Michigan, Minnesota, Missouri, New Jersey, New York, Rhode Island, Texas, and Utah. Our criteria for state selection included that states be geographically dispersed; be located in coastal, noncoastal, and Great Lakes locations; and have a range of no-discharge zone designation dates, among other factors. We reviewed the requirements for designating no-discharge zones, pumpout facility monitoring, and enforcement in statutes, regulations, and federal guidance, as well as criteria developed by EPA regions. We interviewed and obtained documents from officials in EPA's regional offices and agencies in the selected states to evaluate the basis of no-discharge zone designations, and we collected pumpout monitoring data. We interviewed and collected data from officials at the Coast Guard and state law enforcement agencies to determine the extent of enforcement for these states. Finally, we identified surveys and interviewed EPA, state, and local officials to determine what effects of no-discharge zones have been identified in the selected states. Appendix II provides additional details on our scope and methodology. We conducted our review from July 2003 through May 2004 in accordance with generally accepted government auditing standards.

Results in Brief

EPA's process for determining the adequacy of facilities for boat sewage in proposed no-discharge zones allows EPA to make general estimates of facility needs—such as a general ratio of the number of pumpouts needed for the number of boats in the area—but has some limitations. For example, EPA requires states to identify in their applications for no-discharge zones the number of pumpout facilities in the proposed zones and the number of boats operating there. However, EPA does not require other information that could be used to develop site-specific estimates of facility needs, such as information on the sizes of boats in the area and the number of boats estimated to have holding tanks that require pumpout facilities. While EPA guidance states that such information would help the agency make informed and balanced decisions, EPA requests but does not require this information and thus does not consistently obtain it. Further, EPA generally makes its determinations without conducting site visits to

²The federally designated no-discharge zones are subject to different application requirements than those that are designated by the states.

the facilities identified in the applications to ensure, for example, that the facilities are accessible and functioning. Finally, while EPA's determination process consistently requires states to provide information on the number and location of pumpout facilities to address the sewage disposal needs of boaters with installed toilets, it does not consistently require information on the number and location of facilities known as dump stations that are needed by the many boaters who use on-board portable toilets.

We found no EPA and limited state oversight of pumpout facilities after the no-discharge zones are established. The Clean Water Act does not address the monitoring or oversight of pumpout facilities in established no-discharge zones nor does it define a role for EPA after it has determined that pumpout facilities are adequate in proposed no-discharge zones. Nonetheless, the continued adequacy of pumpout facilities in no-discharge zones is essential so that boaters can comply with the sewage discharge prohibitions. Over time, pumpout facilities may become inadequate if some pumpout owners do not keep the existing pumpouts in working order or if pumpout facilities do not keep pace with boat populations. Of the 12 states we reviewed, we found 2—Michigan and California—that had formally reevaluated the adequacy of facilities in no-discharge zones. In both cases, the states found a need for more facilities. California found other problems as well, such as poorly maintained equipment. While some localities appear to provide effective monitoring and oversight of pumpout stations in no-discharge zones, EPA and the states cannot be assured that such monitoring is occurring consistently in the absence of effective federal and/or state oversight.

While the Clean Water Act grants the Coast Guard authority to enforce in all no-discharge zones, under its regulations the Coast Guard generally limits its enforcement of the discharge prohibitions to areas where discharges are specifically prohibited by EPA regulations—currently the three federally designated no-discharge zones—and does not enforce discharge prohibitions in the state-designated zones. EPA and state officials were generally not aware of the Coast Guard's regulatory limitation of its enforcement authority. Enforcing discharge prohibitions is inherently difficult, but EPA and others agree that some enforcement presence is important for encouraging boater compliance. States can enforce discharge prohibitions under the Clean Water Act or they can enact their own discharge prohibitions for no-discharge zones, and the states we reviewed enforce prohibitions against discharge in a variety of ways and to varying degrees. Enforcement tools used by states include citations for illegal discharges, dye tablets in marine sanitation devices to identify leaks

or illegal discharges, and inspections of marine sanitation devices to ensure that they are secured against discharges. In some cases, states place greater emphasis on boater education than enforcement. We found that local enforcement of the discharge ban, such as by harbormasters and marina owners, may also take place.

Although few data are available, EPA, state, and local officials report that water quality and environmental stewardship have increased following designation of no-discharge zones. States and localities value no-discharge zones as a part of comprehensive plans to improve water quality, such as the water quality improvement plan for the Chesapeake Bay. However, because it can be difficult to link water pollution to specific sources or water quality improvements to specific programs, quantifying the effect of no-discharge zones versus other pollution control programs is problematic. As a result, some state and local officials cite proxy measures, such as the number of gallons of sewage pumped from boats through pumpout facilities, as evidence that no-discharge zones help protect water quality. Along with the water quality benefits, some state and local officials say that no-discharge zones have fostered a sense of environmental stewardship among boaters and marina owners and have encouraged them to take concrete steps to protect sensitive waters. Additional perspectives on the effects of no-discharge zones, as well as other issues, may be provided by a recent EPA survey of boaters, marina owners, state officials, marine sanitation device manufacturers, and laboratories that test marine sanitation devices. Results of this survey have not yet been published.

We are making five recommendations to enhance the effectiveness of the no-discharge zone program. For example, we are making recommendations that would help ensure that EPA consistently collects and verifies information to develop site-specific estimates of the pumpout and dump station facilities needed and that mechanisms are developed to ensure the ongoing adequacy of such facilities. We are further recommending that EPA and the Coast Guard (1) meet with relevant states to review enforcement roles in the state-designated no-discharge zones, (2) determine whether current enforcement is adequate, and (3) clarify the respective enforcement roles in EPA and Coast Guard guidance and, if appropriate, revise federal regulations.

Background

As discussed above, for navigable waterways, the Clean Water Act generally allows the discharge of treated sewage that meets EPA standards but prohibits boats from discharging untreated sewage into waters within 3 nautical miles of U.S. territory. States wanting to establish no-discharge zones in which both treated and untreated sewage is banned generally must demonstrate in written applications to EPA that adequate facilities are reasonably available for the safe and sanitary removal and treatment of sewage from vessels in the potential no-discharge zones. In 1976, EPA issued a regulation that established the information requirements for state applications to EPA for no-discharge zone determinations. In 1984, the authority to make determinations regarding the no-discharge zones in their respective regions was delegated to EPA's 10 regional offices.³ EPA Region I and EPA headquarters developed additional guidance for states and localities in 1991 and 1994, respectively.⁴ Region I and headquarters guidance documents are generally consistent in terms of application information requirements; however, Region I's guidance is more specific in some areas and also places greater emphasis on obtaining some additional information in support of the applications.

EPA, in accordance with the Clean Water Act, requires that states certify the need for the no-discharge zones being sought. Thus, while EPA guidelines request that states provide EPA information in support of the need for no-discharge zones, EPA does not make a determination regarding the state's position that the no-discharge zones are needed. EPA's regional offices review state applications to determine whether adequate facilities are reasonably available for the safe and sanitary removal and treatment of sewage from vessels in the potential no-discharge zones. Before issuing final decisions—called determinations—on the adequacy of the pumpout facilities, the regional offices generally seek public comments via a notice in the *Federal Register*. The final decision is also published in the *Federal Register*. As discussed above, in most cases, EPA's determination, based on the information provided by the states in their applications, addresses the adequacy of the facilities and authorizes the states to establish the

³EPA Region 10 is the only EPA region without no-discharge zones.

⁴Region I's guidance is *Guidance for States and Municipalities Seeking No-Discharge Area Designations for New England Coastal Waters*, June 1991 (Rev. April 1992); EPA's overall guidance is *Protecting Coastal Waters from Vessel and Marina Discharges: A Guide for State and Local Officials*, August 1994.

requested no-discharge zones. Eight of the 12 states we reviewed formally designated the no-discharge zones with state laws.

Seven of the 23 states with no-discharge zones have statewide no-discharge zones, which include most state waters.⁵ In the sixteen other states that have designated no-discharge zones, only specific bodies of water or parts of water bodies are included. As shown in figure 1, the 23 no-discharge zone states include:

- all but two of the eastern coastal states
- one western coastal state
- four of the eight states bordering the Great Lakes
- two states with coastal waters on the Gulf of Mexico
- six inland states.

⁵The seven states are Michigan, Missouri, New Hampshire, New Mexico, Rhode Island, Wisconsin, and Vermont.

Boats with installed toilets must be equipped with systems, called marine sanitation devices, that either treat and discharge sewage into the water or hold untreated sewage until it is removed. Under the Clean Water Act, EPA is to set standards of performance for marine sanitation devices to prevent the discharge of untreated or inadequately treated sewage from vessels into navigable waters. The U.S. Coast Guard is to provide certification of design, installation, operation, and material of marine sanitation devices. Three types of marine sanitation devices are certified by the Coast Guard: Types I and II treat sewage, typically through maceration and chlorination, and then release it through the hull into the water.⁶ Releases can be controlled by Y-valves—devices that allow through-hull discharges when in an opened position. In no-discharge zones where both treated and untreated sewage is prohibited, Y-valves must be closed and secured. The Type III marine sanitation devices are holding tanks that store but do not treat sewage. Type III devices can also be retrofitted with Y-valves that can permit release of untreated sewage through the hull when in an opened position. In addition, boats with Type I and Type II devices may also have holding tanks installed. The treatment standards for marine sanitation devices were promulgated by EPA in 1972 and 1976.

Many boaters, particularly those with smaller recreational vessels, rely on portable toilets, which are not installed in the vessel, to store sewage onboard. The contents of portable toilets are generally emptied into dump stations, which are designed to receive the waste and allow boaters to rinse out the portable toilet. Figure 2 shows a photograph of a dump station, in the bottom left corner, and a pumpout station, which is to the immediate right of the dump station.

⁶Type I marine sanitation devices may be used on recreational boats 65 feet long or less, while the more complex Type II devices may be used on any size boat but must be used on larger boats equipped with installed toilet facilities.

Figure 2: Pumpout and Dump Station in Channel Islands Harbor, California



Source: GAO.

Funds for sewage removal facilities in no-discharge zones are not provided to states under the Clean Water Act; however, federal funds have been available to states under the Clean Vessel Act to construct pumpout facilities in many areas, including the no-discharge zones. Specifically, to help reduce pollution from vessel sewage discharges, the Clean Vessel Act has authorized funding to states for a program for the construction, renovation, operation, and maintenance of pumpout and dump station facilities. Using grants, this program has funded the construction of more than 2,700 pumpout and 1,800 dump station facilities—including many in no-discharge zones—according to the U.S. Fish and Wildlife Service, which administers the program.⁷ The grant recipients—either public or private marinas—are required to ensure pumpout and dump station accessibility by, for example, making the pumpout facilities and dump stations available

⁷Data from Fish and Wildlife Service covers 1993 through 1999.

to all recreational vessels and charging reasonable fees. Under this program, the fees charged to boaters for pumpout services cannot exceed \$5 unless justified before the grant proposal is approved.

To implement its pumpout grant program, the U.S. Fish and Wildlife Service has developed guidelines⁸ for what constitutes adequacy of facilities for the removal and treatment of sewage from vessels that states may use to identify facility needs. Among other things, the guidelines provide states with technical information on the adequacy of and appropriate types and location of pumpout stations and dump stations. The Fish and Wildlife Service guidelines addressing the adequacy of facilities are broadly applicable and are neither limited to nor directed at no-discharge zones. The Fish and Wildlife Service developed its guidance in consultation with EPA, the National Oceanic and Atmospheric Administration, the Coast Guard, coastal states, local municipalities, boat users, manufacturers of pumpout equipment, marina operators, conservation groups, and others, in a process that included seeking public comments on draft guidelines. Because of their broad applicability, the Fish and Wildlife Service guidelines represent a resource upon which the states and EPA may choose to refer in addressing and evaluating the adequacy of facilities in no-discharge zones. For example, the guidelines identify key factors that impact the demand for pumpout and dump stations that can be helpful to EPA and the states in considering the need for facilities in proposed no-discharge zones. EPA acknowledges the relevance of this guidance to the no-discharge program by citing it in its 1994 guidance.

The Oceans Act of 2000 established a 16-member U.S. Commission on Ocean Policy for the purpose of assessing U.S. ocean policy and making recommendations for a new, comprehensive national policy. The commission's preliminary report, which was issued in April 2004, includes recommendations related to the approval of no-discharge zones, pumpout facility supply and maintenance, and marine sanitation device standards. The final report will be issued after the commission considers comments from the nation's governors and other interested parties.

⁸U.S. Fish and Wildlife Service published the guidelines in the Federal Register, *Clean Vessel Act: Pumpout Station and Dump Station Technical Guidelines*, 59 Fed. Reg. 11,290 (1994) (codified at 50 C.F.R. pt. 85).

EPA's Process for Determining the Adequacy of Facilities Could Be Improved

EPA's process for determining the adequacy of facilities for boat sewage in proposed no-discharge zones has some limitations. First, the information that EPA requires states to provide in their no-discharge zone applications supports general but not site-specific estimates of pumpout facility needs; additional information needed for more meaningful site-specific estimates is optional. Second, EPA generally makes its determinations without conducting site visits to the facilities identified in the applications. Finally, EPA does not request information on the number of boats with portable toilets, which need dump station facilities; the agency requests, but does not require, information on the number and location of dump station facilities in proposed no-discharge zones.

EPA Requires States to Provide Information That Supports General Estimates of Pumpout Facility Needs

EPA's regulation implementing the no-discharge zone provisions of the Clean Water Act, issued in 1976,⁹ provides that state applications for no-discharge zones must meet the following seven minimum requirements—most of which relate to pumpout facilities:

- a certification that the protection and enhancement of the waters described in the application require greater environmental protection than the applicable federal standard,
- a map showing the location of commercial and recreational pumpout facilities,
- a description of the location of the pumpouts,
- the general schedule of operating hours of the pumpout facilities,
- the draught requirements on vessels that may be excluded because of insufficient water depth adjacent to the facility,¹⁰
- information indicating that treatment of waste from pumpout facilities is in conformance with federal law, and
- information on vessel population and vessel usage of the subject waters.

⁹The regulation was amended in 1995, 1998, and 2002.

¹⁰Draught, also spelled draft, refers to the depth to which a boat is immersed in the water.

In 1994 guidance that augments the regulation, EPA clarified these requirements. For example, the guidance specifies that applications must state the number and type of pumpout facilities (e.g., stationary or mobile). The guidance also indicates that the information to be provided on vessel population should reflect the peak occupancy rate—that is, the percentage of the population expected to be in use on peak holiday weekends. EPA further clarifies that the boat population identified is to include boats that are moored in the area as well as transient boats that traverse the area. With regard to the treatment of waste from pumpout facilities, EPA identifies the treatment options that are acceptable and further identifies the two options it prefers.

With these clarifications, the elements related to pumpout facilities that states must include in their applications can provide EPA with information sufficient to assess pumpout facility adequacy in broad terms—using a general ratio of the number of pumpouts needed for the number of boats in the area. For example, the information is generally sufficient for EPA to determine whether there is at least one pumpout station for every 300 to 600 boats in the proposed no-discharge zone—the general criterion that the Fish and Wildlife Service provides in its guidance on pumpout adequacy.¹¹ While EPA does not directly endorse this broad estimate in its regulation or its 1994 guidance on no-discharge zones, it does refer states and localities to the Fish and Wildlife Service guidance for use as a resource in preparing no-discharge zone applications. Further, in our review of 30 applications for no-discharge zones,¹² we found that most of them demonstrated ratios that fell within the Fish and Wildlife Service’s broad general guide of one pumpout facility per 300 to 600 boats.

Information That Would Support Site-Specific Estimates Is Generally Optional

Although the number of pumpout facilities in a majority of state applications fell within the broad guide, the broad guide does not ensure that pumpout facilities will be adequate in every case because adequacy depends in part on site-specific conditions. As such, the Fish and Wildlife Service indicates in its general guidance on pumpout adequacy that its broad guide for pumpout adequacy is not a definitive rule, but should be

¹¹As discussed further below, the Fish and Wildlife Service guidance also directly addresses the number of dump stations that are available, while EPA does not.

¹²Eighteen of the 48 applications for the twelve states included in our review date back to the 1970s and were no longer available. Further, 8 of the 30 applications we reviewed were submitted before the EPA and Fish and Wildlife Service guidance documents were available.

modified to reflect varying circumstances for each area. Further, the Fish and Wildlife Service provides a formula that may be used to develop more site-specific estimates of the number of pumpout facilities needed to service vessels in a given area (see fig. 3). One key variable included in the formula is the size of boats in the area. Generally, the larger the boat, the more likely it is to have a holding tank. Because boats with holding tanks use pumpout facilities, the size of boats in a proposed no-discharge zone is a pertinent factor in estimating pumpout needs.

Figure 3: Fish and Wildlife Service Formula for Evaluating the Adequacy of Pumpout Facilities in an Area

$$\frac{\left[\left(\frac{\text{Number of boats } 26'-40'}{\text{Boats served per hour}} \times \frac{\text{Number with holding tanks}}{\text{Number of hours of operation per weekend}} \right) + \left(\frac{\text{Number of boats } > 40'}{\text{Boats served per pumpout}} \right) \right] \times \frac{\text{Peak occupancy rate}}{\text{Boats requiring pumpout facilities}}}{\text{Boats served per pumpout}} = \text{Pumpout stations required}$$

Source: Fish and Wildlife Service.

Note: The formula contained in the Fish and Wildlife Service guidelines assumes that 50 percent of boats from 26 to 40 feet and all boats over 40 feet have holding tanks and need access to pumpout facilities. These assumptions are derived from a 1981 EPA assessment of boat size and use of marine sanitation devices. Federal officials with whom we spoke were unaware of any current national estimates on the number of marine sanitation devices. The formula can be adapted to varying estimates regarding the number or percent of boats needing pumpout facilities, the number of boats that can be serviced per hour, and the number or percent of boats at peak occupancy.

Thus, to the extent that states provide information on the numbers of boats in size categories and other information needed for the formula, EPA can use, or adapt, the formula to develop a more site-specific estimate of pumpout needs. While EPA's 1994 guidance refers to the Fish and Wildlife Service's formula as a method to determine adequacy of pumpout facilities in no-discharge zones, EPA does not require state no-discharge zone applications to include all the information necessary to use the formula. Instead, some of the information that may be provided to EPA optionally by the state is needed for the formula.

Specifically, EPA suggests, but does not require, states to submit information such as

- estimates of the number of boats in various size categories that would travel in the proposed no-discharge zones,
- the estimated number or percentage of boats with holding tanks, and

-
- the operating capacity, which can be measured as the number of boats that can be served by each pumpout facility per hour.

We note that EPA's guidance states that the additional information that is requested, but not required, would enable EPA to make "an informed and balanced decision" about the adequacy of the pumpout facilities. Many of the state applications we reviewed included some of the optional information, but not always in a form that could be used in the Fish and Wildlife Service formula.¹³ For example, some states provided information about boat sizes, but categorized the information in ranges that were incompatible with the ranges used in the formula. In terms of pumpout operating capacity, some states noted the storage capacity of the pumpout facility, which is only one factor in determining operating capacity. We note that the EPA guidance also provides general estimated values that can be used as defaults if site-specific information is not available for some of the elements of the formula. However, the use of default values can diminish the assurance that the estimate of pumpout facilities needed will be adequate for the specific area being evaluated.

EPA Region I acknowledges the importance of site-specific determinations of adequacy of pumpout facilities in guidance it provides to applicants for no-discharge zones. That is, while providing a broad general guide on adequacy, the guidance also states that there is no set ratio or formula to determine the exact number of pumpout facilities necessary to serve a given population of boats. Further, the guidance recommends varying numbers of pumpout facilities depending on certain site-specific circumstances. For example, while the Region I guidance states that a ratio of one pumpout facility per 450 boats with holding tanks should be sufficient to meet the demand for pumpout services in most areas, it recommends a minimum of one pumpout per 300 boats with holding tanks be provided in areas where a larger percentage of boats are 25 feet in length and over because these boats are more likely to have holding tanks. Accordingly, Region I requires applicants to provide the actual or estimated number or percentage of boats with holding tanks. Region I indicates in its guidance that the estimates of adequacy provided are based on their best professional judgment and on the experiences of regulatory officials in other parts of the country where no-discharge standards are in effect.

¹³GAO obtained copies of no-discharge zone applications from 10 of the 12 states identified for this report. GAO was unable to obtain (1) each application submitted by these 10 states and (2) any applications from 2 states; the applications were considered in the 1970s.

Further, the guidance states that the region will maintain flexibility on the issue of adequacy, reviewing all applications on a case-by-case basis.

Aside from ensuring that facilities function and exist, it is also important to assess factors that are likely to limit boaters' use of and access to pumpout stations. Two such factors are fees charged for pumpout facility use and whether private facilities restrict the public's access to pumpouts. For example, expensive pumpout services raise the concern that boaters would illegally discharge sewage into the water instead of paying a high pumpout fee. The Clean Vessel Act regulations recognize that fees are an important part of pumpout usage and limit the fees charged at facilities funded by the grant program generally to \$5. EPA, however, has not consistently obtained information about fees in evaluating the adequacy of pumpout stations. Specifically, EPA's guidance requests but does not require the states to provide information on pumpout fees in the applications. Several of the no-discharge zone applications that we examined either did not identify the fees or included incomplete information about the pumpout facility fees. For those no-discharge zones that included this information, the fees for pumpout facilities ranged from no charge to \$25. At the time of the application, six of the nine pumpout facilities in one no-discharge zone cost \$15 for service, and several facilities were free only to marina tenants.

EPA Generally Does Not Conduct Site Visits to Facilities Identified in Applications

Ensuring the existence and availability of adequate pumpout facilities is important because (1) EPA only reviews pumpout adequacy at the time of states' applications for no-discharge zones and (2) once EPA has determined pumpout adequacy, the states may establish no-discharge zones that are essentially permanent designations. Complaints about the lack of adequate pumpout facilities even in newly established no-discharge zones further underscore the importance of site visits to verify the information provided on pumpout stations in the state applications. For example, some boaters raised concerns that pumpout facilities malfunction or are otherwise unavailable in some no-discharge zones. One boater with whom we spoke believes that EPA "rubber stamps" no-discharge zone applications and stated that the agency routinely approves applications without confirming the availability of pumpout facilities.

Site visits would provide the most accurate method of verification of the pumpout facilities and the related treatment facilities. In addition to confirming their existence and location, site visits permit evaluations of the condition of the facilities and the boater access to them—factors that phone calls to pumpout owners, for example, could not confirm. However,

according to EPA regional office officials, the agency generally does not verify in person either the availability or the accessibility of pumpout facilities described in no-discharge zone applications. Specifically, of the nine EPA regions that have processed no-discharge zone applications, four regions have verified some information about the pumpout facilities through site visits. One of these regions has received only one application for a no-discharge zone. Of the remaining three regions that have conducted site visits, only one region visited a majority of the proposed no-discharge zones.¹⁴

An official at a region that has consistently verified the availability of pumpout facilities in person explained that the visits help “ground truth” the information submitted in no-discharge zone applications. Along these lines, the *Preliminary Report of the U. S. Commission on Ocean Policy*, issued for public comment by the nation’s governors and other interested parties in April 2004, recommends that EPA conduct a thorough assessment, including field inspections, to verify the availability and accessibility of functioning pumpout facilities in existing no-discharge zones and prior to the approval of any new no-discharge zones.

Some EPA officials who did not verify any or most of the application information through site visits attributed this decision to lack of authority, inadequate resources, or an EPA presence in the area that precluded the need to visit. In terms of authority, however, the EPA guidance states that officials may contact owners of pumpout facilities to verify information.

EPA’s Determination Process Does Not Consistently Consider the Needs of Boaters with On-Board Portable Toilets

We also found that EPA does not consistently address the adequacy of dump stations in its determinations of adequacy of the sewage facilities in proposed no-discharge zones. As discussed in the background section, many recreational boaters rely on portable toilets and require dump stations to dispose of sewage. Fish and Wildlife Service guidelines state that more dump stations than pumpout facilities would be desirable in an area that has a majority of boats less than 26 feet in length because the smaller boats would be more likely to have portable toilets that require dump stations. Similar to the formula for estimating the demand for pumpout facilities in a given area, the Fish and Wildlife Service provides a formula to estimate the demand for dump stations using site-specific

¹⁴Three EPA regional offices could not confirm whether the agency had verified the application information. Most of these designations had been made in the 1970s.

information. The Fish and Wildlife Service estimates that 20 percent of the boats between 16 and 26 feet in length have portable toilets. Although the need for dump stations will vary in the proposed no-discharge zones, EPA requests but generally does not require information on the number and location of dump station facilities in proposed no-discharge zones. Further, EPA does not request information on the number of boats with portable toilets that would need dump station, rather than pumpout, facilities.

The Clean Water Act Does Not Address EPA Monitoring of Facilities After No-Discharge Zones Are Established, and State Monitoring Is Limited

The continued adequacy of pumpout facilities in no-discharge zones is essential so that boaters can comply with the prohibitions of any sewage discharges from boats. Over time, pumpout facilities may become inadequate, but we found no EPA and limited state oversight of pumpout facilities after no-discharge zones are established. The Clean Water Act does not address monitoring or oversight of pumpout facilities in established no-discharge zones nor does it define an ongoing role for EPA after the establishment of such zones. However, studies by two states of the adequacy of pumpout and dump station facilities in long-standing no-discharge zones identified problems—including facility shortages—that support the need for such oversight. While higher-level oversight is minimal, we found that some localities appear to provide effective monitoring and oversight.

Pumpout Needs Are Likely to Change over Time

Continued adequacy of pumpout facilities is a critical component of an effective no-discharge zone because such facilities both allow and encourage compliance with the no-discharge prohibitions. Along these lines, guidelines issued by the Fish and Wildlife Service on pumpout and dump stations encourage the states to conduct periodic surveys to ensure an adequate number of both pumpout and dump stations. According to the Fish and Wildlife Service guidance, patterns of use identified by such surveys will indicate where and if additional pumpout and dump stations are needed. Pumpout needs can increase for several reasons. First, some pumpout owners may not maintain their pumpout stations in working order or may close the facilities. Second, high use of pumpouts and dump stations has been related to aggressive management practices, active enforcement in no-discharge zones, and good maintenance. That is, as boaters are encouraged to use pumpout services and the pumpout facilities become more convenient and widespread, demand for such services can increase. The operator of a pumpout boat in one no-discharge zone said that he has observed that boaters are using larger holding tanks since the

town began providing pumpout services, moving away from 5-gallon holding tanks to 20-, 30-, or 50-gallon tanks.

Third, the capacity of pumpout facilities may not keep pace with increases in the boat populations. For example, while Michigan designated all of its waterways as a no-discharge zone in 1976, the number of registered boats in that state doubled from 535,000 in 1974 to 1 million in 2002—with most of the growth occurring after the no-discharge zone was designated. In addition, some boating groups believe that initial determinations of adequacy of facilities, which are based on a number of assumptions, may result in an inaccurate assessment of the need for pumpout services. We believe that periodic reevaluations based on actual use and needs would be appropriate. Along these lines, in its April 2004 draft report, the U.S. Commission on Ocean Policy recommends that EPA conduct a thorough assessment, including field inspections, to verify the availability and accessibility of functioning pumpout facilities in existing no-discharge zones because of inadequate pumpout facilities in some coastal areas.

After No-Discharge Zones Are Established, Federal and State Monitoring Is Limited

Under the Clean Water Act, once EPA has determined that proposed no-discharge zones have adequate pumpout facilities, the areas remain state-designated no-discharge zones essentially in perpetuity. We found that little or no monitoring of pumpout facilities is done at the federal and state levels. First, in part because the act does not address monitoring or oversight of the pumpout facilities by EPA after states establish no-discharge zones, EPA does not periodically inspect or recertify its initial determinations that the facilities are adequate. Similarly, the act does not specify any subsequent requirements for the states to ensure the continued adequacy of the pumpout facilities. Thus, the states each determine how and to what extent they will monitor the maintenance and availability of pumpouts in no-discharge zones and determine if they will periodically evaluate whether the existing pumpout facilities remain sufficient.

We found that some states have laws that could help ensure that pumpout facilities are maintained in working order, if implemented effectively. For example, Texas requires that pumpout facilities, wherever they are located, be certified annually and that inspections “may be required of pumpout facilities prior to certification.” To the extent inspections take place, this requirement would give the state some assurance that pumpouts in no-discharge zones and other areas are being maintained and are available to boaters. However, according to an official with the Texas Commission on Environmental Quality, currently inspections are not being done at the

state level because of funding constraints. In addition, we found that a 1994 Maryland law requires most marinas to have pumpouts available but does not provide for their systematic monitoring. We also found that a Michigan law generally requires that all docking facilities provide pumpout facilities that are approved by the Department of Health and that inland marinas are required to have an operating permit that is renewed every 3 years. For the permit renewal, the marina must continue to meet the requirements governing marinas, including the provision requiring pumpout stations. However, an official in Michigan could not confirm whether inspections of pumpouts are occurring as part of this recertification process.

Further, of the 12 states we reviewed, we found that 2—Michigan and California—had formally reevaluated the adequacy of pumpouts in no-discharge zones. In both cases, they identified a need for more facilities. Michigan, which has had a statewide no-discharge zone since 1976, conducted a comprehensive study in the mid-1990s that identified the need for 96 additional pumpout and 169 dump station facilities. Similarly, in 2003, a California regional water board conducted a review of the pumpout and dump stations in 2 of the state's 12 individual no-discharge zones.¹⁵ The California regional water board concluded that the pumpout and dump stations in the 2 no-discharge zones, which had been established in 1976, were not adequate and requested that the state water board require additional pumpout and dump stations in these no-discharge zones. Further, in one of the no-discharge zones, the water board found that three out of the four pumpout stations were inoperable. The water board also found a number of problems that could undermine the effectiveness of these no-discharge zones including

- limited or no access to pumpout stations;
- pumpout hoses lying on the boat slips, which could result in spillage of sewage;
- broken valves, hoses repaired by duct tape, and a lack of required meters to determine usage;

¹⁵Under California law, regional water board staff are to inspect pumpouts at least annually; the water boards may determine the need for additional pumpout facilities at any time and request the state board to require specified marine terminals to install and operate pumpout facilities where necessary to protect water quality.

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- lack of a current phone number to report an inoperable pumpout;
 - lack of signs on how to operate pumpout stations;
 - lack of signs indicating that the harbor is a no-discharge zone; and
 - lack of maps showing pumpout locations.

The regional board made recommendations to address these deficiencies to the state board and issued a compliance schedule for the actions to be taken. In addition, a California official said that the state water board is developing a pumpout and dump station monitoring plan for the entire state, based on regional pilot projects, that will include standards for pumpout and dump station monitoring, operation, and maintenance.

Localities Sometimes Monitor Facilities

As noted in the Fish and Wildlife Service guidelines, pumpout monitoring is best done by those closest to the area, such as marina personnel. We found that effective local monitoring does occur in some of the no-discharge zones. Local leadership and support appears to be an important factor that can make no-discharge zones successful by ensuring that the proper facilities are available when needed. Local leadership can be provided by a proactive harbormaster responsible for the facilities or a watchdog group in the area. For example, the harbormaster in a long-term (1979) no-discharge zone in California—Avalon Bay Harbor—has few problems with the operations and maintenance of the pumpout facilities. The harbormaster, who has worked in the harbor throughout the life of the no-discharge zone, is employed by the city of Avalon, which also pays for the operation and maintenance of the pumpouts. The city replaced the pumpouts in 1995 using Clean Vessel Act funds, relocating them away from a dock that shared a ramp with a ferry and had caused some boat congestion. The harbormaster said this change has reduced congestion. The harbor also has a pumpout boat funded by the city that can service boats away from the dock.

Another no-discharge zone that appears to be benefiting from local monitoring is Key West, Florida. The city of Key West maintains all the pumpout facilities in its citywide no-discharge zone, using mooring fees to offset costs. A spokesperson for an environmental organization said that the city is very proactive in making sure that pumpouts are available. For example, they said the city's pumpout boats are very active and responsive to requests for pumpouts at all hours. Further, under a city ordinance, the

city requires both marinas and boaters to keep pumpout logs. Pumpout facilities may be monitored by meters that record the quantity of sewage pumped. Pumpout records from meters can serve multiple purposes, such as tracking the use of pumpouts over time and identifying the quantity of sewage not being discharged into the water.

Inherent Difficulties, Limited Coast Guard Enforcement, and Varying State and Locality Approaches Result in Varied Enforcement

Despite the inherent difficulties in enforcing discharge prohibitions, EPA and others believe an enforcement presence is important because it encourages boater compliance. Under its regulations, the Coast Guard generally limits its enforcement of the no-discharge prohibitions to the three federally designated no-discharge zones. Accordingly, the Coast Guard does not enforce the prohibitions in the vast majority of no-discharge zones, which are designated by states. States can also enforce discharge prohibitions under the Clean Water Act or they can enact their own discharge prohibitions for no-discharge zones, and the states we reviewed enforced prohibitions against discharge in a variety of ways and to varying degrees.

Illegal Discharges from Boats are Inherently Difficult to Detect

Practical considerations make enforcement of the discharge prohibitions in no-discharge zones a difficult task. Illegal discharges from boats may be made underwater—through the hull, as with Type I and II marine sanitation devices and Type III holding tanks retrofitted with Y-valves—making it difficult to link evidence of sewage discharges to the violators. Moreover, sewage discharges may rapidly dissipate in the water before evidence of violations can be obtained.

In light of the practical enforcement challenges, officials have relied on various methods to enforce the ban against discharges in no-discharge zones. The enforcement methods include (1) inspecting boat equipment to ensure that Y-valves have been closed to prevent sewage discharges, (2) placing dye tablets in boat toilets, and (3) patrolling waterways and issuing citations for identified illegal discharges. The penalties for illegal discharges in the areas we reviewed included fines and prohibiting violators from boating in the no-discharge zone.

EPA guidance on no-discharge zones concludes that while enforcement methods can encourage compliance, education and outreach are necessary to “complement and supplement enforcement efforts.” Similarly, an official overseeing a no-discharge zone stated that he has focused compliance

efforts on preventing discharges from occurring rather than catching violators. Along these lines, many officials identified tasks such as education and outreach as effective methods to achieve compliance with the discharge ban.

The Coast Guard Does Not Enforce Discharge Prohibitions in Most of the No-Discharge Zones

The Clean Water Act states that the Coast Guard shall enforce the marine sanitation device provisions of the act, which include the provisions allowing for the establishment of no-discharge zones. In addition, the act specifies that the Coast Guard may develop agreements with other federal or state agencies to provide enforcement of the marine sanitation device provisions. According to Coast Guard officials, although the agency has not specifically delegated enforcement authority to enforce no-discharge zones to any other entity, various regional agreements are in place that delegate law enforcement authority to some state agencies for enforcing federal boating standards and associated equipment on recreational and uninspected small passenger vessels. Irrespective of any agreements with the Coast Guard, the Clean Water Act authorizes states to enforce all of the marine sanitation device provisions, including discharge prohibitions established under those provisions.

While the Clean Water Act grants the Coast Guard general authority to enforce all no-discharge zones, the Coast Guard's implementing regulations only exercise authority to enforce no-discharge zones in those areas where EPA has specifically prohibited discharges under its implementing regulations. The EPA regulations that the Coast Guard's regulations cite prohibit the discharge of treated and untreated sewage into three named, federally designated no-discharge zones and into fresh waters which do not allow ingress or egress and rivers not capable of navigation by interstate vessel traffic. EPA's regulations also allow states to establish no-discharge zones but do not identify the state-designated zones that have been established. As a result, the Coast Guard enforces the discharge prohibitions only in the three federally designated zones, which include drinking water intake zones and areas of particular environmental importance.¹⁶

¹⁶Coast Guard officials said that enforcement in waterways that are not navigable generally fall within state jurisdiction. EPA's regulations cite three federally designated no-discharge zones that cover five distinct locations.

EPA and many state officials were not aware of the limitation in enforcement authority in the Coast Guard's regulations. EPA headquarters and many regional officials with whom we spoke said they believed that the Coast Guard had the authority to enforce the discharge ban in both state-designated and federally designated no-discharge zones. Further, EPA's Web site on vessel sewage discharges states that the Coast Guard and the state in which the no-discharge zone has been designated "have enforcement authority of the no-discharge zones for vessel sewage." In addition, state officials we spoke with believed that the Coast Guard had enforcement responsibility for all of the no-discharge zones, whether they were state-designated or federally designated.

Despite the common belief that the Coast Guard has enforcement authority in all no-discharge zones under the Clean Water Act, EPA and state officials also said that enforcement at the local level can provide the most effective enforcement. And we found that, in practice, local communities typically serve as the primary enforcement authority in no-discharge zones. Further, state officials believe that other priorities limit the Coast Guard's ability to enforce the ban against discharges in no-discharge zones. Resource constraints have also been cited by the EPA as a reason for limited Coast Guard enforcement under the Clean Water Act in the past. For example, the no-discharge zone guidance developed by EPA Region I in 1991 states that resource constraints have limited the ability of the Coast Guard to effectively enforce the marine sanitation standards for recreational and small commercial vessels. The guidance notes that to compensate for the lack of enforcement, the Coast Guard has entered into an agreement with the New England states to share enforcement responsibilities for federal boating safety standards and associated equipment. The EPA guidance states that although it "does not state so explicitly," the Coast Guard's intent under the agreement is that the state may also assume responsibility for enforcement of marine sanitation device and vessel sewage discharge regulations in this region.

States Vary in the Manner and Extent to Which They Ensure Compliance

The extent to which states ensure compliance with the discharge ban in no-discharge zones varies in part because states can enforce discharge provisions under the Clean Water Act or enact their own no-discharge prohibitions. Of the states that we studied, eight states have enacted legislation to make the ban against sewage discharges in their no-discharge zones effective. Two of the states have not enacted legislation but have instead relied on either interagency agreements or local ordinances to make the prohibition against sewage discharges effective. Officials in the

two remaining states identified state laws that prohibit the release of any pollutants as the legal basis for enforcement of the sewage discharge ban in no-discharge zones.

There is variety in the extent to which agencies ensure compliance even among the states that have enacted no-discharge zone laws. Officials in the 12 states we reviewed identified boater education as a tool to encourage compliance, but not all of these states may have effective mechanisms to penalize violators. For example, the Maryland Department of the Environment has primary enforcement responsibility for the state's two no-discharge zones but does not patrol waterways to monitor the no-discharge zones for violations. According to one of the state's no-discharge zone applications, the environmental agency relies primarily on violations being reported to it from sources such as the Natural Resources Police, local health agencies, marina owners, and boaters. Discussing this situation with Maryland officials, including two officers with Maryland's Natural Resource Police, we were told that Natural Resources Police officers patrol the state waterways and can check for improper installation of marine sanitation devices during courtesy boat inspections. However, a Natural Resource Police officer said that if an officer witnessed a discharge violation, the Natural Resources Police would need an authorization from the state Department of the Environment to issue any penalties because the state has not established any policies or procedures allowing the Natural Resources Police to do so directly.

Some states are enforcing the no-discharge prohibitions

Natural resource or law enforcement agencies in several of the states that we considered conduct some enforcement of no-discharge zones at the state level by inspecting vessel equipment or issuing tickets. For example, the Michigan Department of Natural Resources enforces the statewide no-discharge zone in part by conducting vessel inspections to ensure that marine sanitation systems are sealed shut and thus rendered incapable of overboard discharge. Michigan natural resource officers can inspect boats under the following circumstances: (1) in response to a complaint that discharges occurred or for any other violation of a state law, (2) with probable cause, or (3) with permission of the boater. Michigan law enforcement officers place stickers with dates on the exterior of vessels to indicate that the systems were sealed.

Some states have used dye tablets as part of inspections to detect leaks in the marine sanitation systems on vessels in no-discharge zones. Officials place a dye tablet in a boat's toilet and identify any leaks in the marine sanitation system by observing whether the dye is released into the water.

Monetary penalties for illegal discharges can potentially range from several hundred dollars in some states to several thousand dollars in others.¹⁷ State law enforcement officials pointed out the challenge of issuing tickets for illegal discharges because of the difficulties in detecting violations. We found that at least one state has issued tickets with monetary penalties to boaters for violating the sewage discharge ban in a no-discharge zone.¹⁸ However, reliable data that would indicate the frequency of tickets issued for illegal sewage discharges in no-discharge zones were not available in many of the states that we considered. Further, one state official explained that such data might not identify all sewage discharge citations because in some cases local authorities can also issue tickets.

Other states emphasize education over enforcement

We found that many states have encouraged compliance by educating boaters about the ban on sewage discharges rather than penalizing violators. For example, one official at the Minnesota Pollution Control Agency periodically visits marinas and explains the sewage discharge ban to boaters. This official has not issued tickets, but relies on these interactions to encourage compliance with the discharge ban in no-discharge zones. Also, Maryland has sought to encourage compliance with the discharge ban in no-discharge zones by educating boaters about the ban on discharges, proper installation of marine sanitation equipment, and the location and operation of pumpout facilities. State officials believe that these outreach efforts influence boater attitudes and enhance compliance with the discharge restrictions.

Enforcement may occur at the local level

Irrespective of state enforcement efforts, enforcement may occur at the local level. For example, we found that marina owners and town harbormasters may rely on vessel equipment inspections, water patrols, tickets, or dye tablet programs to help enforce the ban against discharges in no-discharge zones.¹⁹ Further, some localities have enacted ordinances to authorize local enforcement of the discharge prohibitions.

¹⁷The penalties in some states are linked to statutes that generally prohibit the discharge of pollutants, not just sewage, into waterways.

¹⁸Other state officials reported that they have issued tickets for illegal sewage discharges, but could not confirm the number of citations issued for illegal discharges in no-discharge zones. Also, local officials reported that they have issued tickets for illegal sewage discharges in no-discharge zones.

¹⁹We interviewed representatives of local entities in 14 of the 48 no-discharge zones reviewed in this study.

Local law enforcement officers have inspected recreational vessels to ensure that equipment is securely closed to prevent sewage discharges into the water. Inspections are typically voluntary. Some localities direct officers to patrol harbor areas in vessels and observe boating activity. In one of those localities, the patrol officers do not screen the area for illegal discharges but rather monitor compliance with all boating laws. Local law enforcement officials acknowledge that such surveillance is unlikely to catch all illegal discharges.

Dye tablets have helped officials detect illegal discharges and prosecute violators in some areas. For example, Avalon Harbor, a no-discharge zone off Catalina Island, California, uses a dye tablet program to enforce the ban against vessel sewage discharges. Avalon harbormaster officials place a dye tablet in each toilet of every boat that enters the harbor. The tablet dyes the waste in the holding tank, producing a lime green color. If a boater discharges the tank contents into the water, the bright green dye appears in the water and clearly marks the identity and location of the illegal discharge. The dye plume remains visible in the water for approximately 15 to 20 minutes. According to an Avalon Harbor official, they have identified about 450 violators since the program's inception in 1988. He said that the city of Avalon has authority to assess monetary penalties of up to \$500 for sewage discharges but typically assesses penalties of less than \$300. He said they have also prohibited violators from using the harbor for one year, noting that the possibility of being barred from the harbor is actually a greater deterrent than fines. The photograph in figure 4 shows in the lower left corner a dye plume, which was released by a dye tablet in Avalon Harbor, California.

Figure 4: Dye Tablet Used in Avalon Harbor, California



Source: GAO.

While dye tablets can help officials link violators to illegal discharges, they are a resource-intensive method. The dye tablets themselves are inexpensive, but the locality must have officers to distribute them and then monitor the waters for dye releases. Furthermore, other localities point out that dye tablets would not be effective in all waterways because in some areas the dye would not show up well or would dissipate too quickly to be effective.

The city of Key West, Florida, provides an example of how municipalities can use ordinances to help enforce the ban on sewage discharges. Specifically, the city has enacted an ordinance to recognize the discharge ban and implement compliance requirements. The ordinance requires all marinas with pumpout facilities and each vessel to maintain logs that track sewage pumpout activities. These records allow the city to monitor pumpout activity. The city also has a dedicated marine unit that actively enforces the discharge ban in the no-discharge zone, in conjunction with the Florida Fish and Wildlife Conservation Commission.

Representatives of local entities also have cited other informal or indirect methods that promote compliance with the discharge prohibitions, such as peer pressure and marina lease agreements. For example, one local representative said that boaters often encourage each other to refrain from discharging. Other representatives of local entities stated that boaters report suspected violators to harbor officials. In addition, some noted that marinas also often include discharge bans in lease agreements as conditions for slip rentals.

Finally, we note that a lack of effective coordination among authorized enforcement agencies can impede compliance efforts. For example, a Texas marine protection official explained that multiple entities—including municipalities, a county sheriff's department, a state natural resources agency, health districts, and the Coast Guard—have authority to enforce the discharge ban, yet none of the entities have actively done so. This official reported that enforcement did not occur for the following reasons: (1) the agencies did not know how to screen for violations, (2) a desire to avoid jurisdiction conflicts, (3) concerns that fining boaters would be perceived as an attempt to obtain extra funds, and (4) the belief of each agency that another agency was enforcing the discharge ban.

Although Few Data Are Available, EPA, State, and Local Officials Report Benefits After Designation of No-Discharge Zones

A number of EPA, state, and local officials believe that water quality and environmental stewardship have increased following designation of no-discharge zones. While it is difficult to measure the specific effect of no-discharge zones on overall water quality, officials cite various reasons for believing that the zones help protect water quality, and states and localities often include no-discharge zones in comprehensive water quality improvement plans. Further, state and local officials told us that no-discharge zones result in a sense of increased environmental stewardship among boaters and marina owners. In 2003 EPA hired a contractor to conduct a series of surveys to assess various no-discharge zone issues. As

of April 15, 2004, EPA had not received the contractor's report. This information may offer additional perspectives on the effects of no-discharge zones.

Water Quality Improvements Reported

Because it is difficult to distinguish boat discharges from other sources of water pollution or to link water quality improvements to specific programs, measuring the specific effect of no-discharge zones as opposed to other pollution programs on overall water quality is problematic, and few data are available on the effect of no-discharge zones. However, some officials report that water quality has improved following the establishment of no-discharge zones. For example, 3 years after Great Salt Pond in Rhode Island was designated a no-discharge zone in 1993, shellfish beds were reopened for harvesting. The shellfish beds had been closed since 1983 because of increases in fecal coliform bacteria concentrations during increased boating activity in the summer. According to a state official, a decrease in nutrients from sewage discharges has also resulted in fewer algae blooms. EPA and Rhode Island officials attribute these changes to the designation of Great Salt Pond as a no-discharge zone, along with an increase in the number of pumpout facilities and better boater education.

Officials also cite good water testing results as at least partially attributable to no-discharge zones. For example, California law requires water quality testing for waters adjacent to public beaches for microbiological contaminations, including total coliform, fecal coliform, and enterococci bacteria, to monitor potential human health risks. The harbormaster in Channel Islands Harbor, a no-discharge zone in California, said that quarterly water quality testing results there consistently show good water quality, even though the harbor is large, with more than 2,600 slips, and about 5,000 visiting boats per year, plus 100 permanent and 40 to 50 transient commercial fishing boats. Another official also said a measure of the success of the no-discharge zone in his area is that while the boating population has increased greatly, the level of water quality, while it has not improved, has not declined.

Some no-discharge zone officials also measure improvements to waters in no-discharge zones using proxy measures such as the quantity of sewage that was prevented from polluting the water because it was pumped out of boats by pumpout facilities. For example, according to the Nantucket harbormaster, 110,000 to 120,000 gallons of sewage are pumped annually from boats in the Nantucket Harbor no-discharge zone in Massachusetts. Rhode Island, which has a statewide no-discharge zone, tracks data on the

number of gallons of sewage pumped for marinas throughout the state. According to a state official, gallons pumped from boats statewide grew from 254,500 in 2000 to 371,000 in 2002, an increase of 46 percent.

By a similar gauge of damage averted, EPA, state and local officials also told us that the ban against treated sewage is a valuable pollution prevention measure in some areas because marine sanitation devices do not fully eliminate pathogens—of particular importance in human bathing and shellfish bed areas—nor do they remove nutrients from the discharge. Excessive nutrients can be a problem because they encourage the thick growth of aquatic plants that contribute to an unhealthy environment, including low dissolved oxygen levels, which harm aquatic life, such as fish and coral reefs. For example, the Chesapeake Bay has been listed as an impaired water body under the Clean Water Act due to low dissolved oxygen related to excess nutrients, which has killed fish and other organisms. In addition, new coral growth that has been found off Key West may be resulting, in part, from the Key West no-discharge zone that disallows the release of treated sewage. Although it is difficult to attribute water quality and other improvements directly to any one pollution prevention program, an environmental organization has related the no-discharge zone and the advanced wastewater treatment system to the new coral growth that it states has not been found elsewhere in the Florida Keys.

In addition, states and localities often cite the no-discharge zone designation as an important element of comprehensive plans to improve water quality for large water areas, including bay and estuary management plans.

- Most of the New England coast is under EPA's National Estuary Program, which was authorized by the Congress to improve the quality of estuaries of national importance. No-discharge zones are included in these Comprehensive Conservation and Management Plans. Similarly, the plan for Barnegat Bay, New Jersey, also included a no-discharge zone in order to improve water quality. In 2003, after EPA made a determination that the pumpout facilities were adequate, the Barnegat Bay no-discharge zone was established.
- Maryland's no-discharge zones are part of comprehensive plans to improve the water quality in the Chesapeake Bay and in Maryland's coastal bays. The Chesapeake Bay Agreement—signed by EPA, the Chesapeake Bay Commission, and the states of Virginia, Maryland,

Pennsylvania, and the District of Columbia—identified no-discharge zones as a tool for improving water quality in the bay. Similarly, the Maryland Coastal Bays Conservation and Management Plan, developed in 1995 under the National Estuary Program, included an action item for no-discharge zone designation. In 2002, EPA determined that Herring Bay in the Chesapeake Bay and Northern Coastal Bays had adequate pumpout facilities and these became no-discharge zones.

- In New York State, proposed no-discharge zones have been included as components of a federally approved Coastal Zone Management Program to advance coastal policies related to the protection of sensitive areas. To identify sensitive areas for possible designation as no-discharge zones, New York did a comprehensive assessment of the state's coastal areas, including those affected by the introduction of nitrogen or chemicals from marine sanitation devices, such as shellfish beds. New York determined that part of the Hudson River should be designated a no-discharge zone, but the area had an inadequate number of pumpout facilities. Using Clean Vessel Act funding, pumpout facilities were added and this area was established as a no-discharge zone in 2003.
- An advisory committee recommended no-discharge zone designation as one of a number of tools to minimize sewage being discharged into Lake Powell, located in Utah and Arizona. The advisory committee included representatives from state government, the National Park Service, two universities, and the Navajo Nation and was formed to study ways to address beach closures resulting from fecal contamination. In 2000, EPA determined that Lake Powell had adequate facilities to establish a no-discharge zone.

Finally, some officials also cited economic benefits related to no-discharge zones. For example, a Rhode Island official said that boat sewage is incompatible with shellfish health, and thus the statewide no-discharge zone benefited the offshore clamming industry. A marina owner in the no-discharge zone in Maryland's Chesapeake Bay said that the cleaner water resulting from the no-discharge zone is beneficial to the marina business. Officials in Newport Bay, a California no-discharge zone, said there was a "huge" economic value in having clean water in the bay. They said that increases in boat discharges would result in property values decreasing and a drop in tourism and in sport and commercial fishing because the visitors would go elsewhere if the water were dirty.

Increases in Environmental Stewardship Reported

Along with the water quality benefits, a number of EPA, state, and local officials told us that no-discharge zones have fostered a sense of environmental stewardship or responsibility among boaters and marina owners and have encouraged them to take concrete steps to protect sensitive waters. One marina owner said that the presence of a no-discharge zone “drives new environmental programs.” Another often-mentioned feature of environmental stewardship that is cited is the phenomenon of peer pressure, or boaters monitoring other boaters to prevent them from discharging.

Recent EPA Surveys May Provide Additional Perspectives

A national assessment of no-discharge zones was conducted by a contractor for EPA in the fall of 2003 in the form of surveys of groups that are relevant to no-discharge zones, such as boaters and marina owners. One of EPA’s goals was to use the survey data to evaluate the effectiveness of no-discharge zones and of marine sanitation devices. EPA officials said the marine sanitation device standards have been in place for a long time and do not incorporate current limits for water pollution, such as for nutrients and enterococcus. EPA is also concerned about how well marine sanitation devices perform over time because there are no requirements to determine whether these devices continue to function after initial certification.²⁰

The set of surveys was tailored to obtain information from specific groups involved with no-discharge zones, as follows:

- to survey boat owners and operators about boating activity, pumpout station usage, reasons for using or declining to use pumpout stations, volume of boat waste generated, and effectiveness of no-discharge zones;
- to obtain information from states about enforcement and water quality for specific no-discharge zones, such as changes in the frequency of beach closures and changes in shellfish bed contamination after no-discharge zone designation; and

²⁰The *Preliminary Report of the U.S. Commission on Ocean Policy* includes a recommendation that EPA revise its regulations to require that new marine sanitation devices meet significantly more stringent pathogen-reduction standards and that the U. S. Coast Guard should require manufacturers to provide warranties that the devices meet these new standards for a specified period of time.

-
- to assess marina owners' and operators' knowledge of no-discharge zones and pumpout stations.

EPA also surveyed marine sanitation device manufacturers and laboratories that certify marine sanitation devices on how these devices treat bacteria and pathogens. EPA estimates that there are about 30 to 40 marine sanitation device manufacturers in the U.S. and approximately 60 worldwide. As of April 15, 2004, EPA had not yet received the draft report on the surveys' results from the contractor. However, an EPA official said that information provided by the contractor to date was consistent with the issues we have identified.

Conclusions

The success of no-discharge zones in improving water quality depends in large measure on the ongoing availability of accessible and affordable pumpout and dump station facilities that encourage and allow all boaters to comply with the discharge restrictions. EPA has developed a workable framework for determining the initial adequacy of pumpout facilities in proposed no-discharge zones, although this determination process could be enhanced and better supported. Some of the key information needed to develop site-specific estimates of pumpout facility needs is optional, and EPA would be better able to make informed, balanced determinations if it consistently received this information. Also, EPA's determinations of adequacy would be better supported if the agency conducted site inspections of the facilities identified in the applications, as recommended in the April 2004 *Preliminary Report of the U.S. Commission on Ocean Policy*. In addition, we believe that EPA's determination process would be more comprehensive if it also covered the adequacy of dump stations, which it does not currently address.

Given that no-discharge zones are established in perpetuity, some monitoring is warranted to ensure the ongoing adequacy of pumpout and dump station facilities in these zones. For no-discharge zones to be effective, pumpout facilities need to be adequate not only when the no-discharge zones are designated but also over time. Pumpout facilities may not remain available for various reasons, including inadequate maintenance; and increases in the use of pumpout facilities and the number of boats in no-discharge zones may require additional facilities in order to help boaters comply with the discharge prohibitions. While the Clean Water Act does not specify a continuing EPA role, we believe that EPA needs to develop a mechanism to address the continued adequacy of the pumpout and dump station facilities over time, such as requiring periodic

recertifications. Such a mechanism would be consistent with the recommendation contained in the April 2004 *Preliminary Report of the U.S. Commission on Ocean Policy* that EPA reevaluate the adequacy of facilities in existing no-discharge zones.

We recognize that enforcing discharge prohibitions is inherently difficult and requires resources that may also be needed for other activities such as, in the case of the Coast Guard, rescue operations and homeland security. In our view, states and localities may reasonably be expected to provide the primary enforcement of the discharge prohibitions in their no-discharge zones. However, the Coast Guard could enhance compliance with the discharge bans by providing some level of enforcement in state-designated no-discharge zones. While the states should not look to the Coast Guard to take the lead in such enforcement, it is not clear why the Coast Guard does not exercise its statutory authority to enforce the restrictions in no-discharge zones in which the Coast Guard operates, such as in coastal areas. In any event, the Coast Guard and EPA should work with the relevant states to ensure that all parties understand and agree on their respective enforcement roles. Clarity is needed so that EPA and the states can ensure that appropriate enforcement efforts are made in no-discharge zones.

Recommendations for Executive Action

To enable EPA regions to consistently develop site-specific estimates of the need for pumpout facilities and thereby better assess the adequacy of the pumpout services in reviewing applications for no-discharge zones, we recommend that the Administrator of EPA

- require EPA regions to obtain and consider all information needed to develop site-specific estimates of pumpout facilities to adequately support proposed no-discharge zones, such as information on pumpout fees and estimates of the number of boats in various size categories and/or those with holding tanks; and
- require EPA regions to conduct site inspections to verify that the pumpout facilities identified in proposed no-discharge zone applications are available, in good working order, and accessible to boaters.

To better ensure that the boaters using on-board portable toilets in no-discharge zones have adequate facilities for the safe and sanitary removal and treatment of sewage from their boats, we recommend that the Administrator of EPA require EPA's regions to also evaluate the adequacy

of dump station facilities when determining whether adequate facilities for the safe and sanitary removal and treatment of sewage from all boats are reasonably available.

To ensure that pumpout and dump station facilities remain available in existing no-discharge zones, we recommend that the Administrator of EPA develop a mechanism or mechanisms to help ensure that facilities in established no-discharge zones remain adequate and available over time, seeking additional authority, if needed, to require periodic recertifications in which the adequacy and availability of facilities would be reevaluated by EPA or by reviewing periodic state assessments of the adequacy and availability of facilities in existing no-discharge zones.

Because of the current confusion about the Coast Guard's enforcement role for no-discharge zones, we recommend that the Coast Guard and EPA (1) meet with the relevant states to review the enforcement roles in the state-designated no-discharge zones, (2) determine whether current enforcement is adequate, and (3) clarify the respective enforcement roles in EPA and Coast Guard guidance and, if appropriate, revise federal regulations.

Agency Comments and Our Evaluation

We provided copies of a draft of this report to EPA and the Coast Guard. The chief of EPA's Marine Pollution Control Branch said that the agency generally agreed with the findings and recommendations in the draft report. In addition, both EPA and the Coast Guard provided some technical suggestions that we incorporated into the final report. EPA and the Coast Guard also met to discuss the enforcement recommendation in the draft report that called for EPA and the Coast Guard to review the interplay between their respective regulations implementing the no-discharge zone provisions of the Clean Water Act and determine and clarify the Coast Guard's role in enforcing the restrictions in state-designated no-discharge zones. At the meeting, EPA and the Coast Guard agreed that the Clean Water Act provides the Coast Guard with authority to enforce discharges in no-discharge zones and that the Coast Guard had limited this authority in its implementing regulations. Because the confusion over the Coast Guard's role extended beyond EPA to the states and localities that were also not aware of the limited enforcement authority by the Coast Guard in the majority of the no-discharge zones (the 56 state-designated zones), we revised the recommendation in the report to ensure that EPA, the Coast Guard, and relevant states review enforcement roles, determine the adequacy of enforcement, and for EPA and the Coast Guard to revise their

guidance to clarify the respective enforcement roles of the states and the Coast Guard in all no-discharge zones.

As agreed with your office, unless you publicly announce the contents of this report earlier, we will plan no further distribution until 30 days after its issue date. At that time, we will send copies of this report to other interested congressional committees, the Administrator of the U.S. Environmental Protection Agency, and the Secretary of Homeland Security. We will make copies available to others upon request. In addition, the report will be available at no charge on GAO's Web site at <http://www.gao.gov>.

If you or your staff have any questions, please call me at (202) 512-3841. Key contributors to this report are listed in appendix IV.

Sincerely yours,

A handwritten signature in black ink, reading "John B. Stephenson". The signature is written in a cursive style with a long horizontal flourish extending to the right.

John B. Stephenson, Director
Natural Resources and Environment

EPA- and State-Designated No-Discharge Zones

A total of 59 no-discharge zones have been designated by either the EPA or states in 23 states since 1975. The following table provides information on no-discharge zones that have been designated as of March 31, 2004, and includes the type of designation; the state or states where the no-discharge zone is located; the name of the body of water designated; and the year that EPA's rule establishing an EPA-designated no-discharge zone was published in the *Federal Register* or that EPA made a determination that adequate pumpout facilities were available in a proposed no-discharge zone.

Table 1: No-Discharge Zones

Type of designation	State	Waterbody	Year
State: Particular Environmental Importance When Adequate Pumpout Facilities Are Available	California	Mission Bay	1976
	California	Oceanside Harbor	1976
	California	Dana Point Harbor	1976
	California	San Diego Bay (30 ft. deep at Mean Lower Low Water ^a)	1976
	California	Newport Bays	1976
	California	Sunset Bay	1976
	California	Pacific Coast Highway Bridge	1976
	California	Huntington Harbor	1976
	California	Channel Islands Harbor	1979
	California	Avalon Bay Harbor	1979
	California	Richardson Bay	1987
	California/Nevada	Lake Tahoe	1977
	Connecticut	Pawcatuck River, Little Narragansett Bay, portions of Fishers Island Sound and Stonington Harbor	2003
	Florida	Destin Harbor	1988
	Florida	City of Key West waters	1999
	Maryland	Herring Bay	2002
	Maryland	Northern Coastal Bays	2002
	Massachusetts	Nantucket Harbor	1992
	Massachusetts	Wareham Harbor	1992
	Massachusetts	Westport Harbor	1994
	Massachusetts	Waquoit Bay	1994
	Massachusetts	Wellfleet	1995
	Massachusetts	Stage Harbor Complex	1997
	Massachusetts	Harwich	1998
	Massachusetts	Buzzards Bay	2000

**Appendix I
EPA- and State-Designated No-Discharge
Zones**

(Continued From Previous Page)

Type of designation	State	Waterbody	Year
	Massachusetts	Three Bay/Centerville Harbor	2001
	Michigan	All	1976
	Minnesota	St. Croix River	1996
	Minnesota	Mississippi River (part)	1977
	Minnesota	Minnesota River (part)	1977
	Missouri	All (except Mississippi River, Missouri River, part of Bull Shoals Lake)	1975
	New Hampshire	All (except coastal waters)	1975
	New Jersey	Barnegat Bay	2003
	New Jersey	Shark River	1998
	New Jersey	Manasquan River	1998
	New Jersey	Navesink River	1999
	New Jersey	Shrewsbury River	2000
	New Mexico	All	1976
	New York	Hudson River (Manhattan to Troy, 153 miles)	2003
	New York	Lake Champlain	1976
	New York	Lake George	1976
	New York	Mamaroneck Harbor	1997
	New York	East Hampton (7 water bodies)	1999
	New York	Greater Huntington-North Port	2000
	New York	Port Jefferson Harbor Complex	2001
	New York	Peconic Estuary	2002
	Rhode Island	Great Salt Pond, Block Island	1993
	Rhode Island	All	1998
	South Carolina/Georgia	Hartwell Lake	1995
	South Carolina/North Carolina/Georgia	Broad Creek, Lake Keowee, Lake Murray, Lake Thurmond, and Lake Wylie	1999
	Texas	24 freshwater bodies	1999
	Texas	Clear Lake	1996 ^b
	Utah and Arizona	Lake Powell	2000
	Vermont	All (including parts of Lake Champlain and Lake Memphremagog)	1975
	Virginia	Smith Mountain Lake	2000
	Wisconsin	All (except Lake Superior, Mississippi River, part of St. Croix River)	1976
EPA: Particular Environmental Importance	Florida	State waters within the Florida Keys National Marine Sanctuary	2002
	Minnesota	Boundary Waters Canoe Area	1977
EPA: Drinking water intake zone	New York	Hudson River (part)	1995

Appendix I
EPA- and State-Designated No-Discharge
Zones

Source: U.S. EPA and GAO.

^aMeans Lower Low Water is the average height of the lower of the two low waters of any tidal day over a 19-year period.

^bThis date is approximate. EPA did not announce the determination of adequate pumpout facilities for Clear Lake in the *Federal Register*, but the applicant estimated that Clear Lake was designated as a no-discharge zone in spring 1996. The application was submitted to EPA Region 6 on April 21, 1994.

Objectives, Scope, and Methodology

Our objectives were to (1) evaluate EPA's process for determining whether states have adequate facilities for the safe and sanitary removal and treatment of sewage from boats in proposed no-discharge zones, (2) assess the extent to which EPA and the states ensure that adequate pumpout facilities are available after a no-discharge zone is designated, (3) evaluate the extent to which the Coast Guard and the states enforce compliance with the prohibition against vessel sewage discharges in no-discharge zones, and (4) identify the effects of no-discharge zones that EPA, states, and localities have reported.

To achieve our first objective, we reviewed the requirements for designation of no-discharge zones in statutes, regulations, and federal guidance, as well as additional formal and informal criteria that have been developed by EPA regions. We interviewed and obtained documents from officials in EPA's regional offices and state environmental and/or natural resource agencies, as appropriate, to assess the basis of no-discharge zone approvals for 12 of the 23 states that have received no-discharge zone designations: California, Florida, Maryland, Massachusetts, Michigan, Minnesota, Missouri, New Jersey, New York, Rhode Island, Texas, and Utah. State selection factors included: geographic dispersion; coastal, noncoastal, and Great Lakes locations; a range of no-discharge zone designation dates; both partial and total inclusion of state surface waters in no-discharge zones; no-discharge zones that include both recreational and commercial vessel traffic; and at least one no-discharge zone petition for designation that was denied. Also, we evaluated at least one state in each of the nine EPA Regions that have no-discharge zones. EPA was unable to provide copies of the applications for no-discharge zone determinations made prior to 1984. For established no-discharge zones, we were able to obtain copies of 30 of the 48 no-discharge zone applications for the 12 states we reviewed. We were not able to obtain every application submitted by 10 of the states nor any applications from 2 states; these applications were considered in the 1970s. We also reviewed the Pumpout Station and Dump Station Technical Guidelines developed by the Fish and Wildlife Service under the Clean Vessel Act.

To assess the extent to which EPA and the states ensure that adequate pumpout facilities are available after a no-discharge zone is designated, we reviewed statutes and regulations, analyzed federal guidance, and interviewed federal and state officials in the nine regions with no-discharge zones. We requested and collected available state data on monitoring for the 12 states in our review, and we interviewed representatives of local entities in 14 of the 48 no discharge zones in the 12 states.

To assess the extent to which the Coast Guard and the states enforce compliance with the prohibition against vessel sewage discharges in no-discharge zones, we analyzed the requirements for enforcement that are contained in statutes and regulations and also analyzed federal guidance. We interviewed officials at Coast Guard and state and local law enforcement agencies to determine the extent of enforcement activities for the 12 states we reviewed. We collected and analyzed the available data on the enforcement actions in these 12 states.

To achieve the final objective, we interviewed federal and state officials and representatives of local entities to obtain their views and available information on the effects of the no-discharge zones in the 12 states we reviewed. We reviewed the surveys that EPA was using for its 2003 review of no-discharge zones, but the findings were not available as of May 15, 2004.

Overview of Marine Sanitation Devices

A marine sanitation device includes any equipment for installation on board a vessel, which is designed to receive, retain, treat, or discharge sewage, and any process to treat such sewage.¹ The following table presents information for each type of marine sanitation device, including the function, the use and applicability, and effluent limits.

Table 2: Marine Sanitation Devices

Type of marine device	Function	Use and applicability	Effluent limits
Type I	<p>Physical and chemical treatment of sewage prior to discharge.</p> <p>Type I devices generally macerate and chlorinate the waste.</p>	<p>Type I marine sanitation devices are acceptable on vessels that are 65 feet in length and under.^a</p> <p>Coast Guard reports that most Type I devices are found on vessels built before 1980.</p>	<p>Device must be certified to treat waste to a fecal coliform bacteria count no greater than 1000/100 milliliters and with no visible floating solids.</p>
Type II	<p>Biological or physical and chemical treatment of sewage prior to discharge.</p> <p>Includes biological (aerobic digestion) treatment devices and devices that macerate and chlorinate waste.</p>	<p>Type II marine sanitation devices are permitted on all vessels. Type II devices are generally installed on vessels that are over 65 feet in length.^b</p> <p>Commonly used on commercial vessels and can treat several hundred to many thousand gallons of sewage per day.</p> <p>Type II devices are larger than Type I devices and generally require more power to operate.</p>	<p>Device must be certified to treat waste to produce effluent having a fecal coliform bacteria count no greater than 200/100 milliliters and suspended solids no greater than 150 milligrams/liter.</p>
Type III	<p>Sewage storage prior to pumpout at a pumpout facility.</p>	<p>Used on vessels of any size.</p> <p>Commonly include holding tanks, but other devices that qualify as Type III are:</p> <p>vacuum collection systems, incineration systems, recirculation systems, and a composting system.</p> <p>Most recreational boats built since the late 1970s have included holding tanks.</p>	<p>There is no waste effluent standard because the device does not treat waste.</p>

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

^aVessels 65 feet in length and under with an installed toilet must be equipped with a marine sanitation device.

^bVessels over 65 feet in length with an installed toilet must be equipped with either a Type II or Type III marine sanitation device.

¹33 U.S.C. §1322(a)(5).

Appendix III
Overview of Marine Sanitation Devices

Boaters may retrofit, or make modifications to, marine sanitation devices, as shown in table 3.

Table 3: Retrofitted Marine Sanitation Devices

Components	Function	Relevant Standards
Boaters modify (1) Type I or II marine sanitation devices so they can store waste to be pumped out of a holding tank. For example, a boater may incorporate a holding tank into the plumbing system that connects to a Type I device, or (2) Type III marine sanitation devices so that they can treat waste with a Type I or II device.	Allows boats to comply with varying discharge restrictions when traveling in and out of no-discharge zones.	The retrofitted marine sanitation device is not a separate category recognized by EPA or Coast Guard regulations. The applicable standards will depend on whether the boater wants to treat and discharge or store and receive a pumpout.

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

GAO Contacts and Staff Acknowledgments

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Staff Acknowledgments

In addition to those individuals named above, Kate Cardamone, Karen Keegan, Cynthia Norris, Ilga Semeiks, and Amy Webbink made key contributions to this report.

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