

45

TESTING THE WATERS

VOLUME VI

WHO KNOWS WHAT YOU'RE GETTING INTO



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TESTING THE WATERS

Volume VI

Who Knows What You're Getting Into?

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The Natural Resources Defense Council (NRDC) is a national non-profit environmental organization dedicated to protecting the world's natural resources and ensuring a safe and healthy environment for all people. With more than 250,000 members and a staff of lawyers, scientists, and other environmental specialists, NRDC combines the power of law, the power of science, and the power of people in defense of the environment. NRDC has been actively involved in protecting our coasts and water resources for many years. NRDC has offices in New York City, Washington, DC, San Francisco, and Los Angeles.

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Every summer since 1991, NRDC has undertaken a nationwide survey of beach closings and beachwater monitoring programs in coastal states. This year as in past years, we found that water pollution continues to affect the quality and safety of our nation's ocean, bay, and Great Lakes beachwater. There also remain significant stretches of coastline that are not monitored for swimmer safety. Our hope is that a yearly comprehensive portrait of the waters washing onto U.S. beaches will provide an incentive for states and localities to improve controls over the sources of coastal pollution and to close the gaps in monitoring along our coasts.

FINDINGS

Below are the major findings of this report regarding 1995 beach closings and advisories, their causes, health risks, and economic impacts, along with the status of legislative measures affecting beachwater quality.

Beach Closings

- Pollution continues to degrade our nation's ocean, bay, and Great Lakes waters, threatening human health. Despite the persistent threat of pollution, many states and localities with popular beach areas still do not have regular beachwater monitoring programs in place to provide regular beachwater monitoring and to protect the health of swimmers.
- During 1995, U.S. ocean, bay, and Great Lakes beaches were closed, or advisories were issued against swimming, on more than 3,522 occasions. Since 1988, there have been over 15,994 closings and advisories. (See Table 1: Ocean, Bay, and Great Lakes Beach Closings & Advisories, 1988-1995 on page viii.)

Causes of Closings/Advisories

- High levels of bacteria—indicating the presence of pathogens from human or animal waste—are responsible for the vast majority of beach closings and advisories.
- Major pollution sources responsible for 1995 beach closings and advisories include:
 - sewer overflows—over 842 closings/advisories;
 - stormwater runoff—over 823 closings/advisories;
 - sewage treatment plant malfunctions—over 236 closings/advisories;
 - polluted runoff—over 143 closings/advisories.

Health Risks

- Because a wide range of diseases can be carried by pathogens in sewage-contaminated waters, including gastroenteritis, dysentery, and hepatitis, beachwater pollution threatens the public's health. The consequences of these types of swimming-associated illnesses can be greater for children, elderly people, and those with weakened immune systems.
- A recent large-scale epidemiological study conducted in California showed an increased risk of illness associated with swimming in ocean waters contaminated by urban runoff as compared to swimming in cleaner waters. For example, it found that people swimming near storm drains are at greater risk of developing fever, chills, ear discharge, vomiting and other health problems than

those swimming farther away. This study underscores the importance of monitoring beaches affected by stormwater runoff and of reducing this pollution source.

Lack of Monitoring

- Eight states still lack any regular monitoring for swimmer safety (Alabama, Georgia, Louisiana, Mississippi, North Carolina, Oregon, South Carolina, and Washington), and New Hampshire monitors very infrequently.
- Certain popular vacation spots such as Santa Barbara in California, Key West and Miami Beach in Florida, the Mississippi Gulf Coast, Myrtle Beach in South Carolina, and Cape Hatteras in North Carolina do not regularly monitor their beachwater for swimmer safety.
- Only five states comprehensively monitor all of their beaches. Connecticut, Delaware, Illinois, Indiana, and New Jersey monitor recreational ocean, bay, and Great Lakes beaches regularly for swimmer safety. New York comprehensively monitors its coastal beaches, but not its Great Lakes beaches. And in 1995, Hawaii monitored only a portion of its beaches, but in 1996 plans to resume the comprehensive program it had in place in previous years.
- Fourteen states have regular monitoring programs for only a portion of their recreational beaches. In California, Florida, Maine, Maryland, Massachusetts, Michigan, Minnesota, Ohio, Pennsylvania, Rhode Island, Texas, Virginia, and Wisconsin, and New York Great Lakes counties, monitoring is performed for only some of the beaches, leaving other portions of these coastlines unmonitored.

Inconsistent Standards

- There continues to be a lack of uniform standards for beach closings and advisories, and a lack of federal leadership in setting standards. EPA has not made any significant moves toward establishing a National Beach Protection Program.
- State and local governments continue to conduct inconsistent and insufficient monitoring of beachwater quality, and to provide inadequate public notification. The majority of states have not adopted EPA-recommended standards and continue to use standards that may not adequately protect swimmers from health risks.
- Even if a state regularly tests the waters of its beach, it may not close a beach that registers a water quality violation. Only Connecticut, Indiana, New Jersey, New York, and Pennsylvania consistently close beaches every time bacterial water quality standards are violated. When standards are violated in other states, immediate action is not always taken. For example, California, Hawaii, Massachusetts (Barnstable County), and Ohio do not always close beaches when the standards are violated.
- Puerto Rico monitors tourist-zone beaches monthly, but does not have an advisory and closing program based on bacteria violations. The Virgin Islands monitors its beaches, but only quarterly. Guam's monitoring program appears to be fairly comprehensive.

Economic Impacts

- Coastal water pollution has a significant economic effect on coastal states. Failing to invest in clean water costs coastal states potential jobs, tourism dollars, and economic growth.

There continues to be a lack of uniform standards for beach closings and advisories, and a lack of federal leadership in setting standards. State and local governments continue to conduct inconsistent and insufficient monitoring of beachwater quality, and to provide inadequate public notification.

Water pollution continues to affect the quality and safety of our nation's ocean, bay, and Great Lakes beachwater. During 1995, U.S. ocean, bay, and Great Lakes beaches were closed, or advisories were issued against swimming, on more than 3,522 occasions.

Controls over all of the sources of beachwater pollution must be tightened. Legislation now pending in Congress including the Clean Water Act reauthorization, "regulatory reform" bills, and budget and appropriations bills are in direct opposition to this goal.

- Coastal tourism is an important source of revenue for states. For example, tourist expenditures in coastal areas totaled \$46.6 billion dollars in Florida, Hawaii, and New Jersey in 1995. (See Table 4: Value of Coastal Tourism to Selected States on page 11)
- Polluted waters also cause an economic loss from both swimming-related illnesses and loss of the values beachgoers place on their day at the beach. A recent draft EPA study found that the costs of monitoring beaches are very small relative to the other economic values at stake.

Legislative Threats

- Both the Clean Water Act reauthorization bill and portions of the Contract With America, passed by the House of Representatives, continue to pose a threat to effective regulation of beachwater quality and to effective control of the sources of pollution.
- During the debate over the 1996 federal budget, EPA funding was threatened in a number of important areas. The final cuts were not drastic, but renewed attacks are beginning to appear over the fiscal 1997 budget, again putting important protection programs for coastal waters under immediate threat.

RECOMMENDATIONS

- Controls over all of the sources of beachwater pollution must be tightened. Legislation now pending in Congress including the Clean Water Act reauthorization, "regulatory reform" bills, and budget and appropriations bills are in direct opposition to this goal. Rather than weakening existing laws, we must use them more effectively, strengthen them where necessary, and continue to improve the health of our coastal waters.
- The EPA should establish and require consistent national standards for beachwater safety, monitoring of beachwater quality, and public notification when water-quality standards are violated.
- State and local governments should make prevention of beachwater pollution a priority. They should develop and implement more effective and enforceable controls on the sources of this pollution, including tightening controls on stormwater runoff. They should also adopt monitoring and closure programs that adequately protect the public.
- A portion of the revenues generated by tourism should be allocated to monitoring programs to ensure that coastal waters do not jeopardize the health of beachgoers.
- Individuals can also help clean up beach pollution. Simple things like conserving water, using natural fertilizers such as compost for gardens, disposing of animal waste in the garbage when you walk your pets, and properly disposing of household toxics and used motor oil can reduce the amount of pollution in coastal waters.

Figure 1: State Monitoring and Closings/Advisories, 1995

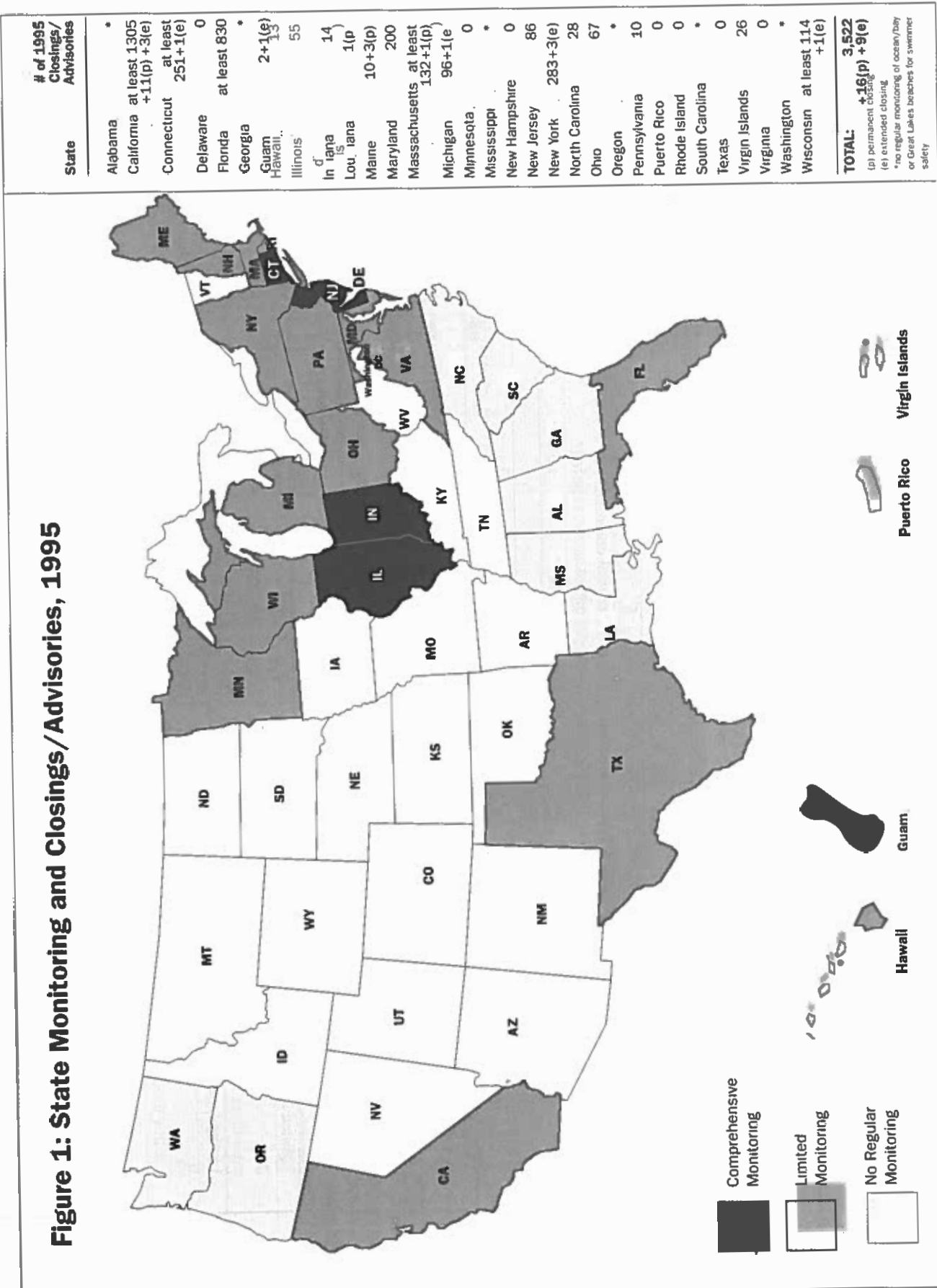


Table 1
Ocean, Bay, and Great Lakes Beach Closings and Advisories 1988-1995

	1988	1989	1990	1991	1992	1993	1994	1995*
AL	No regular monitoring of ocean/bay beaches for swimmer safety							
CA	Limited monitoring of ocean/bay beaches for swimmer safety (9 of 17 coastal counties)							
	**	at least 64	at least 338	745 +5 (p)	609 +1 (p) +1 (e)	1,397 ^a +2 (p) +2 (e)	at least 910 +6 (p) +2 (e)	at least 1,305 ^b +11 (p) +3 (e)
CT	**	at least 103	218	293 +1 (e)	223	at least 174	at least 162 +1 (e)	at least 251 +1 (e)
DE	1	62	11	11	5	0	0	0
FL	Limited monitoring of ocean/bay beaches for swimmer safety (11 of 35 coastal counties)							
	**	**	303	299	772 ^c +1 (e)	101 ^d +1 (e)	at least 215 +1 (e)	at least 830 ^e
GA	No regular monitoring of ocean/bay beaches for swimmer safety							
Guam	**	**	**	**	**	0	unknown # advisories	2 +1(e)
HI	In 1995, limited monitoring of ocean/bay beaches for swimmer safety							
	at least 9	at least 23	at least 22	106	29	6	16 +1 (e)	13
IL	**	**	**	**	**	73	36	55
IN	**	**	**	**	**	at least 30	36	14
LA	No regular monitoring of ocean/bay beaches for swimmer safety (since 1988)							
	**	**	**	1 (p)	1 (p)	1 (p)	1 (p)	1 (p)
ME	Limited monitoring of ocean/bay beaches for swimmer safety							
	**	1	30 +1 (e)	47 +3 (p)	at least 3 (p)	35 +3 (p)	at least 15 +3 (p)	at least 10 + 3 (p)
MD	Limited monitoring of ocean/bay beaches for swimmer safety							
	0	0	0	24 + 3 (p) +2 (e)	at least 6 +3 (p) +2 (e)	at least 106 +3 (p) +1 (e)	82 +3 (p)	200
MA	Limited monitoring of ocean/bay beaches for swimmer safety							
	at least 75	at least 60	at least 59	at least 59	at least 60	at least 61	at least 58 +1 (e)	at least 132 +1 (p)

MI	Limited monitoring of Great Lakes beaches for swimmer safety (10 of 30 counties)							
	**	**	**	**	**	**	26 +2 (p) +3 (e)	96 +1 (e)
MN	Limited monitoring of Great Lakes beaches for swimmer safety							
	**	**	**	**	**	0	0	0
MS	No regular monitoring of ocean/bay beaches for swimmer safety (since 1989)							
NH	Infrequent monitoring (once annually) of ocean/bay beaches for swimmer safety							
	**	**	**	1 (e)	0	0	0	0
NJ	126	266	228	108	112	88	238	86
NY	Limited monitoring of Great Lakes beaches for swimmer safety							
	273 +1 (p)	473 +5 (p)	383 +3 (p)	314 +3 (p) +2 (e)	799 ^f	at least 212 ^g +1 (e)	227 +1 (e) +24 days of restricted use	283 +3 (e)
NC	No regular monitoring of ocean/bay beaches for swimmer safety							28
OH	Limited monitoring of Great Lakes beaches for swimmer safety							
	**	**	**	**	**	0	96	67
OR	No regular monitoring of ocean/bay beaches for swimmer safety							
PA	Limited monitoring of Great Lakes beaches for swimmer safety							
	**	**	**	**	**	19	14	10
PR	Infrequent monitoring (monthly and bi-monthly) of ocean/ bay beaches for swimmer safety							
	**	**	**	**	**	0	1 (e)	0
RI	Limited monitoring of ocean/bay beaches for swimmer safety							
	0	0	0	0	0	0	0	0
SC	No regular monitoring of ocean/bay beaches for swimmer safety							
	**	**	**	**	**	**	**	**
TX	Limited monitoring of ocean/bay beaches for swimmer safety (two local programs)							
	**	**	**	0	1 medical advisory	42	1(e)	0
Virgin Islands	Limited monitoring of ocean/bay beaches for swimmer safety (quarterly)							
	**	**	**	**	**	0	0	26
VA	Limited monitoring of ocean/bay beaches for swimmer safety (two local programs)							
	**	**	**	2	0	0	0	0
WA	No regular monitoring of ocean/bay beaches for swimmer safety							

SOURCES OF BEACHWATER POLLUTION AND THREATS TO CLEAN WATER LAWS

In addition, officials cited rain as the cause of 371 closings. Rain is an important factor in coastal water pollution; areas that receive more rain tend to have more polluted beaches. Rain flows over streets and through sewage systems, causing pollutants to be discharged into waterways, and increasing the flow through sewage systems, which can lead to discharges of raw or inadequately treated sewage.

A state by state break-down of pollution sources is found in the state analyses in Chapter 5. The major causes and number of closings in 1995 attributable to these causes are summarized in the following table:

Cause	Number of Closings/Advisories
Sewage overflows*	842 plus 1(e)
Stormwater runoff **	823
Sewage treatment plant malfunctions	236
Polluted runoff	143 plus 3(e)

The exact source of pollution for other causes reported to NRDC, such as rain (371 closings/advisories) or high bacteria levels (510 closings/advisories), were not specified and therefore are not included in this table.

The following is a description of the different sources of beachwater pollution.

* Table summarizes information detailed in Chapter 5 (State Summaries).

(n) Permanent beach closure

(b) Extended head closure

(c) Excluded each cross

This increase appears to be due to 700 San Diego County closings/advisories that followed heavy winter storms.

A portion of this increase was due to heavy storms that caused pollution, particularly in Santa Barbara County.

This increase appears to be due to 506 warnings against swimming in Dade County after heavy rains caused sewage spills.

The decrease in the number of Florida closings/advisories appears to be due to significantly less rainfall in 1993 compared with

1992, particularly in Pasco and Dade counties.

Hurricane Opal caused 465 closings in Okaloosa County because of debris, flooded septic systems, and

other pollution.

Included in this total are 706 rainfall advisories issued in New York City.

The decrease in New York closings/advisories appears to be due to less rainfall in 1993 compared with 1992 and a change in

New York City's standing rainfall advisory, which covered fewer beaches for a shorter period.

A beach closure/advisory is a single beach for which a closure/advisory has been issued for a single day. Permanent closings were for

at least the entire summer while extended closings were for more than 6 weeks.

Because of inconsistencies in monitoring and closing practices among states and over time, it is difficult to make comparisons between

states or to assess trends over time based on the closing data.

Compiled by the Natural Resources Defense Council

Stormwater Runoff

Stormwater starts as rain or snowmelt. As it washes over roads, rooftops, parking lots, construction sites, and industrial or commercial sites, it becomes contaminated with oil and grease, heavy metals, and other vehicle exhaust pollutants, pesticides and litter. Stormwater also often picks up fecal matter from dogs, cats, pigeons, other urban animals, and even humans on its way to storm drains, which flow into combined sewers that were designed to carry both stormwater runoff and human waste. Almost a quarter of our nation's polluted estuaries and lakes are fouled by urban stormwater,¹ and it is a significant source of bathing beach pollution in many regions. Some municipalities initiate preemptive beach closings/advisories when there is heavy rainfall, because heavy rains often bring pollution and accompanying high levels of bacteria into coastal waters.

Sanitary Sewer Overflows (SSOs)

Many "sanitary sewers," those designed to carry only human waste from buildings to sewage treatment plants, pose a threat to bathing beach safety. Human-waste sewage lines have breaches, obstructions (such as tree roots), cracks, stormwater drain cross-connections, and open manholes that permit infiltration by groundwater and inflows of stormwater. These sanitary sewers can become overloaded, especially during rains, and can overflow and discharge raw sewage from manholes, manhole bypasses, pump station bypasses, and treatment plant bypasses. This overflow often discharges, untreated, directly into coastal waterways or their tributaries.

Combined Sewer Overflows (CSOs)

Combined sewers are pipes designed to carry both raw sewage and stormwater runoff to sewage treatment plants. When a high volume of flow overwhelms treatment plants—for example, during heavy rains—the flow is diverted to outfall points that discharge the raw sewage, floatables such as garbage, syringes and tampon applicators, toxic industrial waste, and contaminated stormwater into the nearest stream or coastal waterway. These untreated discharges can be as potent as direct sewer emissions.

Combined sewer overflows (CSOs) are one of the major causes of pathogen contamination in marine and Great Lakes waters near urban areas. CSOs also contaminate shellfish waters and recreational beaches. Combined sewers serve 40 million people nationwide.² Though most prevalent in urban areas, CSOs occur throughout coastal and Great Lakes states, and have overflow problems in these areas.³

Overloaded Sewage Treatment Plants

Sewage plants in coastal areas tend to serve densely populated, rapidly growing urban areas. When too many homes and businesses are hooked up to a sewage treatment plant, it cannot treat wastewater completely. Between 1990 and 2010, it is estimated that the coastal population will grow from 112 million to more than 127 million, according to the National Oceanic and Atmospheric Administration (NOAA), an increase of almost 13 percent.⁴ Plants that are now operating at or near their capacity may soon be overloaded and prone to more frequent episodes of bypasses and inadequate treatment.

Raw sewage can also overflow into bathing beach areas from storm drains designed to carry only stormwater. Human waste may find its way into these drains from businesses or residences that are illegally hooked up or from adjacent sewage pipes that leak. In Los

Angeles County, for instance, the sewer system is separate from the storm-drain system, yet Santa Monica Bay storm drains sometimes discharge runoff containing human enteric viruses, indicating the presence of human wastes.⁵

Polluted Runoff

In less urban areas, rain water often flows directly over farms, roads, and lawns into waterways. Farm runoff may contain high concentrations of pathogenic animal waste. Suburban lawn runoff often contains significant amounts of fertilizer, animal waste, and other chemicals. This uncontrolled runoff can foul beaches in these less densely populated areas.

Septic Systems

Dwellings built near the coast may be equipped with underground septic systems, which can leach wastewater into coastal recreational waters. The EPA estimates that 25 percent of all U.S. dwellings use some kind of septic-tank or on-site waste disposal system. Bathing beaches can be contaminated by fecal matter from malfunctioning or overloaded septic systems.

Boating Wastes

Improperly handled boating wastes can pose a health and aesthetic threat to the quality of coastal bathing beaches. Elevated fecal coliform concentrations have been found in areas with high boating density.⁶ Federal law requires boats with on-board toilets to either treat the waste (through chemical treatment) before discharging it, or to hold the waste and later pump it out for treatment at a sewage treatment plant. Compliance with the law, however, appears to be poor in many areas.⁷

Oil Spills

Oil spilled during tanker accidents, pipelines breaks, or refinery accidents can foul beaches. Many oils evaporate quickly, creating unsafe fumes. Other oils form globules that can float for days, and wash onto beaches for weeks after a spill.

THREATS TO CLEAN WATER LAWS

The current Congress began its term with an all-out assault on the environment that seriously threatened the quality of coastal waters. These legislative threats were both direct, such as the Clean Water Act Reauthorization bill passed by the House of Representatives, and indirect, as in portions of the Contract With America. The public expressed its strong concern over this assault, and in response legislators attempted to reframe the debate. Despite friendlier rhetoric, these same dangerous bills in various stages continue to be considered by Congress. In addition, budget negotiations in 1996 provided a forum for many members of Congress to express their hostility toward environmental laws, although they were not able to change the laws themselves. Budget and appropriations bills being considered for fiscal 1997 continue this more subtle attack on laws that protect the quality of beachwater. Any cuts to EPA's funding and to other important programs will have a direct effect on beachwater pollution.

Almost a quarter of our nation's polluted estuaries and lakes are fouled by urban stormwater, and it is a significant source of bathing beach pollution in many regions.

In less urban areas, rain water often flows directly over farms, roads, and lawns into waterways. This uncontrolled runoff can foul beaches in these less densely populated areas.

The Clean Water Act Reauthorization

The Clean Water Act (CWA) is the principal federal law designed to prevent the pollution of the nation's rivers, lakes, and coastal waters. The CWA came before Congress for reauthorization in 1992; but the legislature has not yet been able to pass a reauthorization bill. The debate continues between those who seek to weaken the Act significantly and those who recognize the importance of its protections and seek to preserve and strengthen them.

The CWA sets forth a clear and concise goal: to make our nation's waters "fishable and swimmable," and to "restore and maintain the chemical, physical and biological integrity" of our waters.⁴ Since its adoption in 1972, the CWA has produced tangible improvements in our nation's waters, yet its goal has not been fully met, and in some areas, it must be strengthened.

Beachwater contamination can most effectively be reduced by a policy of pollution prevention. Such a policy would address the key threats to beachwater quality and to human health: it would prevent stormwater and polluted runoff, stop raw sewage discharges from combined and sanitary sewers, and improve antiquated or overloaded sewage treatment plants. It would also protect the public by creating national standards for beach monitoring and closings.

Pending legislative proposals such as the Clean Water Act Reauthorization bill (H.R.961) that passed the House of Representatives in May 1995 would greatly hinder the adoption of such a pollution prevention policy. If enacted, the bill would have a number of adverse effects on coastal waters. It would reduce controls over key sources of pollution by establishing broad waivers for secondary treatment of sewage in coastal cities. It would also repeal stormwater permit requirements, authorize sanitary sewer overflows, and weaken existing programs to prevent polluted runoff. It would allow facilities to backslide on permit requirements, would turn the Great Lakes Initiative into a voluntary program, and would threaten important protections of wetlands. A Senate bill (S. 851) that mirrors the wetlands portion of the House bill is still under consideration. Wetlands are critical to the protection of coastal water quality because they filter out pollutants. Without these natural filters coastal areas would be forced to increase spending on source control to achieve the same water quality.

The Contract With America

Regulatory Reform The "regulatory reform" portion of the Contract With America (H.R.9) passed by the House in March 1995 would, under the guise of government reform, create numerous new analytical requirements prior to the establishment of new regulations and safeguards. It would create new opportunities for industry to challenge and roll back existing environmental protection through the courts, and would make it difficult, time-consuming, and costly for EPA to control pollution sources. The bill would replace the current health- and safety-based standard with a cost-benefit analysis, making money rather than the health of the public or our children's health the overriding concern of regulatory action. By requiring reviews of existing rules, it could lead to a rollback of those laws that currently limit pollution. Finally, with all the constraints created by the regulatory reform bill, EPA would face great obstacles in establishing a National Beach Protection Program that would include uniform standard and monitoring requirements and mandatory closure and advisory requirements.

The Senate bill (S. 343) contains even greater threats to U.S. beaches than the House bill. It is stalled in the Senate after three failed attempts to end debate last July, yet certain senators continue to search for ways to revive this legislation. Even if this comprehensive Senate bill does not move forward, three pieces of the "regulatory reform" agenda remain active as separate bills. Two of these are active in the House.

One of these is H.R. 3307, the so-called "Regulatory Fair Warning Act." This bill would allow companies that are violating laws such as pollution limitations —no matter how egregiously—to avoid paying penalties as long as they believed they were in compliance or a state official (even one with no legal authority) had approved the action. Current limitations on discharge of pollution into coastal waters could be weakened significantly. This bill appears to have support in both the House and the Senate.

The second of these regulatory reform bills, the "Voluntary Environmental Audit Protection Act" (S.582), would immunize those who are violating environmental laws from all possible penalties —civil, administrative, or criminal—if the offender discloses its violations to a federal or state agency. Any company that is violating environmental protection laws could, under this legislation, conceal the evidence of its violations from the government and the public simply by labeling the information an "environmental audit." Under this approach, an enterprise that is knowingly polluting coastal waters in violation of federal law could simply inform the government of its failure to comply, and it would not be subject to any enforcement action. Amazingly, the bill does not even require violators to correct their actions.

Third, the "Local Empowerment and Flexibility Act" (H.R. 2086), would create a powerful new "Community Empowerment Board" made up of state administrators, with authority to waive virtually any environmental law or regulation if any federal grant support is provided. In the name of providing flexibility to local governments, this bill would allow waivers of many requirements of the CWA.

Takings The takings bill that passed the House as part of the Contract with America (H.R. 9) directs the federal government to compensate landowners when the value of any portion of their property is reduced by 20 percent or more as a result of the Endangered Species Act or Clean Water Act wetland rules. While couched in terms of property rights (which are already protected by the Fifth Amendment), this bill would make it prohibitively expensive for the government to protect wetlands and endangered species. Rather than changing the laws on their face, takings legislation is a back-door attack that requires taxpayers to pay polluters not to pollute.

The Senate bill (S. 605) has been marked up by the Senate Judiciary Committee and awaits action on the floor; it is broader than the House bill. It would force the government to pay profit-making companies to limit their discharge of pollutants into coastal waters. It would force the government to pay almost every time it acts to protect the public, and would necessarily result in less control over sources of coastal water pollution.

EPA Budget Cuts Without the funds necessary to run important research and enforcement programs, the EPA's authority to ensure clean water would be severely weakened. A number of proposals for significant reductions to EPA's budget in fiscal year 1996 were put forward by Congress. Due in part to firm opposition by concerned environmentalists, the final amount appropriated to EPA was not drastically reduced.

The debate over fiscal year 1997 has begun, and several key members of Congress have suggested their intent to resurrect the anti-environmental riders that became a major battleground in the 1996 budget debate.

One proposal for limiting EPA funding is in the form of an authorization bill, which would put a cap on the amount that could be allocated to certain programs of both EPA and NOAA during the appropriations process. This bill (H.R.3322) would, among other things, slash funding for important research programs in both agencies.

The "regulatory reform" portion of the Contract With America passed by the House in March 1995 would, under the guise of government reform, create new opportunities for industry to challenge and roll back existing environmental protection through the courts, and would make it difficult, time-consuming, and costly for EPA to control pollution sources.

The Clean Water Act Reauthorization bill that passed the House of Representatives in May would reduce controls over key sources of beach pollution.

HEALTH RISKS AND ECONOMIC IMPACTS OF BEACH POLLUTION

The sources of pollution that pose a risk to swimmers are present, at least to some degree, in every state. Monitoring beaches is the only way to guarantee that they are free from pollution that may pose health risks to swimmers.

Diseases Caused by Pathogens in Bathing Waters

Waters that are polluted may contain several different disease-causing organisms, commonly called “pathogens.” Enteric pathogens (*i.e.*, those that live in the human intestine) can carry or cause a number of different infectious diseases. (*See Table 3: Pathogens and Swimming Associated Illnesses on page 9.*) Swimmers in sewage-polluted water could contract any illness that is spread by anal-oral routes and whose disease-causing agents are shed in the feces of ill individuals or carriers.⁹ (AIDS and many other diseases are not carried by enteric pathogens.)

Viruses are believed to be the major cause of swimming-associated diseases, and are responsible for gastroenteritis and hepatitis, the two most common swimming-associated diseases worldwide. Gastroenteritis can also be caused by bacteria and is a common term for a variety of diseases that can have one or all of the following symptoms: vomiting, diarrhea, stomachache, nausea, headache, and fever. Other bacterial diseases that can be contracted by swimmers include salmonellosis, shigellosis, and infection caused by the toxigenic bacteria *E. coli* (a type of fecal coliform). Other microbial pathogens found at varying concentrations in recreational waters include amoeba and protozoa, which can cause giardiasis, amoebic dysentery, skin rashes, and “pink eye” condition.

Incidence of Diseases Contracted by Swimmers

Swimming in polluted water can make you sick. Studies conducted during the past several decades show a definite relationship between the amount of indicator bacteria in coastal and Great Lakes waters and the incidence of swimming-associated illnesses.

A recent large-scale epidemiological study investigated possible adverse health effects associated with swimming in ocean waters contaminated by urban runoff. It was conducted in the summer of 1995 by the Santa Monica Bay Restoration Project.¹⁰ The study involved initial interviews of 15,492 beachgoers who bathed and immersed their head and follow-up interviews with 13,278 to ascertain the occurrence of certain symptoms including fever, chills, nausea, diarrhea, etc. Water samples were taken and analyzed for total and fecal coliforms, enterococci, and *E. coli*. Water samples were also collected at storm drain sites and analyzed for enteric viruses.

Swimming-associated illnesses can cause dehydration, vomiting and, in extreme cases, collapse. The swimmer who contracts a sewage-borne illness may also pass the disease on to household members, multiplying the effect of the polluted water.

The study found that there is an increase in risk of illness (with symptoms including fever, chills, ear discharge, and vomiting) associated with swimming near flowing storm-drain outlets in Santa Monica Bay as compared to swimming over 400 yards away. For example, swimmers near storm drains were found to have a 57 percent greater incidence of fever than those swimming farther away. This study also confirms that there is an increased risk of illness associated with swimming in areas with high densities of bacterial indicators. Illnesses were reported more often on days when the samples were positive for enteric viruses.

In addition to this study of the effects of urban runoff, previous studies have found a strong correlation between sewage-polluted marine waters and swimmers' illness. The most influential of these, based on recruitment of swimmers at saltwater beaches who agreed to answer questions about their health and swimming habits, was directed by Dr. Victor Cabelli, for the EPA, from 1972 to 1979. This study examined swimmer illness rates and bacterial indicator densities in five different areas. It found: "a direct, linear relationship between swimming-associated gastrointestinal illness and the quality of the bathing water." The study noted also that even those swimming in marginally polluted water run the risk of contracting gastroenteritis.¹¹

Symptoms of swimming-related illnesses are usually not severe or life-threatening. However they can take a substantial toll in terms of convenience, comfort, and the well-being of the affected individuals and also can result in substantial economic costs in terms of lost work/sick days.¹² Moreover some cases of gastroenteritis can be serious for certain people, such as small children, infants, the elderly, and those with compromised immune systems. Swimming-associated illnesses can cause dehydration, vomiting and, in extreme cases, collapse. The swimmer who contracts a sewage-borne illness may also pass the disease on to household members, multiplying the effect of the polluted water.

Adequacy of Water Quality Standards

The EPA recommends a geometric mean standard of 35 enterococcus bacteria per 100 ml of water and an instantaneous (single sample) standard of 104 enterococcus bacteria per 100 ml of water for monitoring of ocean and bay recreational beaches.¹³ Waters just meeting this standard will result in an estimated 19 illnesses for every 1,000 swimming days.¹⁴ The EPA-recommended standard for Great Lakes waters is a geometric mean of 33 enterococcus bacteria per 100 ml or 126 *E. coli* bacteria per 100 ml of water. Waters just meeting this standard will cause an estimated eight illnesses per 1,000 swimmers. For example, if a family of four swam once a week in June, July, and August in ocean waters that just met EPA's standard, one member of the family would probably become ill. Likewise, if 3,000 people swam one day in the same waters, 57 illnesses would be expected.

Most states do not use the recommended standard, but instead use fecal coliform or total coliform as an indicator organism (a bacteria that is not itself disease-carrying but is present when disease-carrying pathogens are present). Both EPA and the National Technical Advisory Committee have dismissed total coliform as an inaccurate indicator. Similarly, a recent scientific study of gastroenteritis among bathers in Britain found that out of a range of possible indicator organisms (including total and fecal coliform but not including enterococcus), only fecal streptococci was an accurate indicator for gastroenteritis.¹⁵ This study found that at the standard of 33 fecal streptococci per 100 ml of water, the risk to swimmers is roughly zero. The study appears to confirm the earlier finding that coliform and fecal coliform are not adequate indicator organisms. States still using these bacteria as indicators, even if they monitor consistently, may not be adequately protecting the public from the risk of getting sick. The recent Santa Monica Bay study supported the finding that neither fecal nor total coliform are by themselves an accurate indicator, but also found that the ratio of total to fecal coliform was the best indicator for predicting health risks. All of

these studies substantiate the connection between swimming in polluted waters and becoming ill

Table 3
Pathogens and Swimming-Associated Illnesses

Pathogenic Agent	Disease
bacteria	
<i>E. coli</i>	Gastroenteritis
<i>Salmonella typhi</i>	Typhoid fever
Other salmonella species	Various enteric fevers (often called paratyphoid), gastroenteritis, septicemia (generalized infections in which organisms multiply in the bloodstream)
<i>Shigella dysenteriae</i> and other species	Bacterial dysentery
<i>Vibrio cholera</i>	Cholera
viruses	
Rotavirus	Gastroenteritis
Norwalkvirus	Gastroenteritis
Poliovirus	Poliomyelitis
Coxsackievirus (some strains)	Various, including severe respiratory disease, fevers, rashes, paralysis, aseptic meningitis myocarditis
Echovirus	Various, similar to coxsackievirus (evidence is not definite except in experimental animals)
Adenovirus	Respiratory and gastrointestinal infections
Hepatitis	Infectious hepatitis (liver malfunction), also may affect kidneys and spleen
protozoa	
<i>Cryptosporidium</i>	Gastroenteritis
<i>Giardia lamblia</i>	Diarrhea (intestinal parasite)
<i>Entamoeba histolytica</i>	Amoebic dysentery, infections of other organisms
<i>Isospora belli</i> and <i>Isospora hominus</i>	Intestinal parasites, gastrointestinal infection
<i>Balantidium coli</i>	Dysentery, intestinal ulcers

THE ECONOMIC IMPACTS OF BEACH POLLUTION

Millions of people use ocean and bay beaches and would benefit from the cleanup of pollution sources and better monitoring. Beaches, rivers, and lakes are the number one vacation destination for Americans. Each year, Americans take over 1.8 billion trips to waters to fish, swim, boat, or just relax. About one-fourth of the population goes swimming in these waters every year.¹⁶

Coastal tourism generates substantial revenues for state and local governments. For example, tourist expenditures in Hawaii amounted to \$10.6 billion in 1995. In the coastal counties of Florida they were \$23 billion and in New Jersey coastal regions \$13 billion. These tourist dollars are put at risk if beachwater is polluted and unsafe for swimming.

Tourists spend billions of dollars annually visiting coastal and Great Lakes counties and their beaches (See Table 4: Value of Coastal Tourism to Selected Coastal States on page 11). Polluted water puts these values at risk. Investing in clean water will help protect the millions of visitors to ocean and bay beaches and the jobs of local business people who rely on beach recreation, as well as fishing. Investments in clean water will also serve to create new jobs.

Coastal tourism, attributable in part to clean beaches, generates substantial revenues for state and local governments. For example, tourist expenditures in Hawaii amounted to \$10.6 billion in 1995. They equaled \$23 billion in the coastal counties of Florida and \$13 billion in New Jersey coastal regions. These tourist dollars are put at risk if beachwater is polluted and unsafe for swimming.

Polluted beaches not only cost local economies in lost tourist dollars, they also cause a loss to those who had planned to visit the beach and swim in the water. Economists estimate that a typical swimming day is worth \$30.84 to each individual.¹⁷ Depending on the number of potential visitors to a beach, this “consumer surplus” loss can be quite significant.

Many areas either do not monitor their beaches or do not close them when waters exceed standards. This might result in less short-term losses for businesses in the area, but it also means that those who get sick will incur medical costs and lost work days as a result. Cleaning up the sources of pollution so that beachwater does not pose a health risk is the optimal solution. In the meantime, however, it makes sense from a public health perspective to monitor beachwater and close beaches with contaminated waters rather than to allow people to swim and get sick.

Until beachwater pollution is cleaned up, monitoring is the best way to protect swimmers from polluted water. A recent draft EPA study found that the nationwide economic losses incurred from the health effects of swimming in polluted waters dramatically outweighed the costs of monitoring in all but the most pristine waters.¹⁸ Given the large number of people using beaches and the substantial income from coastal tourism, the cost of monitoring programs is reasonable (See Table 5: 1995 Costs of Ocean, Bay and Great Lakes Beach Monitoring Programs for Selected States on page 12).

Table 4
Value of Coastal Tourism to Selected Coastal States

State	Dollar Value
Alabama	1.26 billion
Florida	23.0 billion
Georgia	1.53 billion
Hawaii	10.6 billion
New Jersey	13.0 billion
North Carolina	1.19 billion
Oregon	.97 billion
Texas	6.06 billion

Sources

AL: Alabama Bureau of Tourism and Travel - estimated tourist expenditures for 1995 (Gulf Coast Region)

FL: Department of Revenue, Tax Research Division. (This figure is based on Tourism & Recreational Sales Tax Collections, calendar year 1995.)

GA: Georgia Department of Industry, Trade and Tourism, 1994

HI: Hawaii Visitor's Bureau, Marketing Research Department, 1995.

NJ: Department of Commerce and Economic Development Division of Travel and Tourism (\$3.3 billion in the Shore region, \$7.5 billion in the Greater Atlantic Region, and \$2.2 billion in the Southern Shore Region), 1995.

NC: Department of Commerce, Travel and Tourism Division, 1995.

OR: Oregon Tourism Division, 1994.

TX: Texas Department of Commerce, Tourism Division, 1994.

STATE STANDARDS, MONITORING, AND CLOSURE PRACTICES

Table 5
1995 Costs of Selected Ocean, Bay, and Great Lakes Monitoring Programs

State	Miles of Beach Monitored	Monitoring Costs	Annual Cost/Mile
CALIFORNIA (4 counties) Los Angeles Orange Santa Cruz San Diego	229	\$575,000	\$2,511
CONNECTICUT (16 municipalities)	53	\$75,125	\$1,473
DELAWARE (entire state)	32	\$35,000	\$1,094
FLORIDA (1 city) City of St. Petersburg	3	\$10,000	\$3,333
NEW JERSEY (entire state)	127	\$400,000	\$3,150
NEW YORK (2 counties) Suffolk Westchester	25	\$225,000	\$9,000
WISCONSIN (3 counties) Kenosha Milwaukee Racine	7.2	\$19,536	\$2,713
ASSATEAGUE ISLAND NATIONAL SEASHORE (Maryland/ Virginia)	37	\$20,000	\$541

While EPA has recommended bacteria standards, it has put forth no mechanism to ensure that states adopt those standards. Bacteria standards vary from state to state, as do testing procedures and closure practices. Although EPA has the authority to mandate that states adopt its recommended standard or one that is equally protective, the agency has not done so. As a result, there is great inconsistency in the standards used among—and within—states. There is also no federal requirement that the public be notified when water-quality standards are violated. This lack of leadership at the national level leaves American beachgoers without the necessary information to protect themselves and their families from unnecessary health risks.

The Clean Water Act requires each state to adopt water-quality standards for bacteria and other pollutants, subject to EPA review and approval. Criteria for pathogens should be sufficient to protect human health, that is, to ensure that all waters are safe for “recreation in and on the water”—the so called “swimmable waters” goal of the CWA.”

If EPA disapproves of the standard proposed by a state and the state does not change it, the agency must issue a substitute federal standard. The Act gives EPA the power to require states to adopt uniform standards, yet the agency has failed to do so. Furthermore, although the CWA addresses water-quality standards, it does not require states to adopt closure or public notification programs.

EPA officials have stated that the agency would like to reinstitute negotiations on regulations for national standards, but that the process is being impeded somewhat by the debate over the reauthorization of the CWA. Budget cuts also make the process more difficult.

Lack of Uniform Standards for Beach Closings and Advisories

States themselves could, of course, choose to adopt the standards recommended by EPA, and to monitor beaches consistently. A few have, many have not, and some leave the decision up to local governments. There is substantial variation in testing protocols, indicator organisms, and beach-closing standards among and within coastal states and territories.

Despite EPA's recommendations that health officials use enterococcal bacteria to monitor marine recreational beaches and enterococcal or *E. coli* bacteria to monitor Great Lakes recreational waters, most state monitoring programs still test only for fecal coliform and several test for total coliform. This means that the standards used by states, even if they have a regular monitoring program, may not adequately protect swimmer health.

The lack of uniformity among and within states and territories means the protection of public health is variable. One county may monitor and close beaches due to high bacteria levels and an adjacent county may not. As a result, the public may bypass a closed beach in favor of an unmonitored—but equally polluted—beach.

Eight states do little or no regular monitoring of their recreational beaches for swimmer safety. Beaches in Alabama, Georgia, Louisiana, Mississippi, North Carolina, Oregon, South Carolina, and Washington are not monitored regularly for swimmer safety, and monitoring in New Hampshire is extremely infrequent. The Virgin Islands monitors beaches only quarterly.

Only six coastal or Great Lake states—Connecticut, Delaware, Hawaii, Indiana, Maine, and New Hampshire, and two metropolitan areas—Los Angeles County and the Metropolitan District Commission in Massachusetts (including Boston), as well as Assateague Island National Seashore on the Maryland-Virginia border, consistently use the EPA-recommended indicator organism. Of these states, only Connecticut, Hawaii, Indiana, Maine, and New Hampshire consistently use EPA's recommended standard, or an even stricter one.

Unsafe levels of pollution often can be predicted based on rainfall levels. The public has a right to know about suspected health risks prior to the delay required for test results. Orange County, Santa Cruz County, Los Angeles, and San Diego County in California; several municipalities in Connecticut; New York City, Monroe, and Westchester Counties in New York; the City of Portland in Maine; Cecil and Queen Anne's Counties in Maryland; one bay beach in New Jersey; the city of St. Petersburg, Florida; two beaches in Delaware, and the state of Indiana warn swimmers of potential pollution risks by issuing closings and advisories based on a threshold level of rainfall.

Inconsistent and Insufficient Monitoring and Public Notification

Eight states do little or no regular monitoring of their recreational beaches for swimmer safety. Beaches in Alabama, Georgia, Louisiana, Mississippi, North Carolina, Oregon, South Carolina, and Washington are not monitored regularly, and monitoring in New Hampshire is extremely infrequent. The Virgin Islands monitors beaches, but only quarterly.

Fourteen states have regular monitoring programs for only a portion of their recreational beaches. In California, Florida, Maryland, Massachusetts, Michigan, Minnesota, Ohio, Pennsylvania, Texas, Virginia, and Wisconsin, and New York Great Lakes counties, monitoring is performed in only some of the counties or municipalities, leaving other portions of the coastline unmonitored. In Maine and Rhode Island, state monitoring agencies regularly check only those areas exhibiting actual or potential water-quality problems.

Five states comprehensively monitor their beaches. Connecticut, Delaware, Illinois, Indiana, and New Jersey monitor all recreational ocean, bay, and Great Lakes beaches regularly for swimmer safety. New York coastal beaches are comprehensively monitored. During 1995 Hawaii monitored only a portion of its beaches because of budgetary constraints, but it plans to resume its comprehensive program in 1996. Guam's monitoring program appears to be fairly comprehensive.

Unfortunately, even when the waters of a beach are regularly tested, states may not actually close polluted beaches. Only Connecticut, Indiana, New Jersey, New York, and Pennsylvania consistently close beaches every time bacteria water-quality standards are violated. When standards are violated in other states, immediate action is not always taken or, in many instances, no action is taken at all. For example, California (some counties), Hawaii, Massachusetts (Barnstable County), Ohio, and Puerto Rico do not always close beaches when the standards are violated.

In some cases, notification comes too late. In Rhode Island, high bacteria levels may not be confirmed for more than a week after testing and the beach closing may be delayed for that time as well. In Barnstable County, Massachusetts, results of analysis are received and then the water is resampled. It is only after these second results that beaches may be closed. Puerto Rico monitors tourist zone beaches monthly, but lab results can take up to two or three weeks, and the commonwealth has no advisory and closing program based on bacteria violations.

Information on beach closings is often not compiled and made available to the public. California, Delaware, New Jersey, and Rhode Island are the only states that compile and make available records of beach closings and bacteria levels. San Diego and Orange Counties in California, Delaware, New Jersey, Indiana, and Anne Arundel County in Maryland provide telephone information numbers to inform bathers of the status of their local beaches

PLAN OF ACTION

Strong laws limiting discharge of pollutants and requiring certain types of treatment for sewage and other pollutants are essential to any effort to keep our coasts clean. The Clean Water Act has been instrumental in reducing the amount of pollutants being discharged into our nation's waters. The House-passed reauthorization bill would severely threaten these controls on sources of pollution.

Provisions of the Contract With America, and other proposals of government "reform," would make federal control of pollution sources more costly and time consuming, and in some instances would grant polluters immunity from laws limiting discharges of pollutants. They would do all this without changing the actual laws governing clean water. Likewise, possible budget cuts in 1997 threaten EPA's ability to administer and enforce federal laws addressing coastal water.

It is crucial for the public to let members of Congress and the President know how much they care about clean water and safe beaches. It is essential that Congress keep in mind how much the Clean Water Act has achieved and recognize the importance of clean, safe beaches for our health and the health of our children.

Creating a National Beach Protection Program

In the 1992 edition of this report, NRDC unveiled a National Beach Protection Program designed to provide a strong foundation for coastal water-quality monitoring and public health protection at our beaches. Our findings this year continue to illustrate the need for such a program. NRDC urges EPA to exercise leadership and establish a National Beach Protection Program. Such a program should include the following elements:

A uniform beach protection standard applicable nationwide that would: 1) establish minimum monitoring standards to evaluate the degree of microbial contamination and overall water quality in all U.S. coastal and territorial waters; and 2) establish minimum microbial standards that will determine the acceptability of all U.S. bay, ocean, and Great Lakes waters for recreational and other primary contact activities. The standard should be more protective than EPA's current recommended criteria, which allows 19 illnesses per 1,000 ocean or bay swimmers and eight illnesses per 1,000 Great Lakes swimmers.

With a uniform standard and monitoring requirement, the public will be assured a consistent level of protection. The frequency of the monitoring requirements should reflect the degree of pollution in the waters to be monitored. When monitoring reveals that the national bacteria standard is violated, mandatory closure and advisory requirements will ensure that the public is notified in a timely manner. Notification should include toll-free phone lines, posting of signs at beaches, and press releases. Where a correlation between rainfall and water quality exists, preemptive rainfall advisories in anticipation of high bacterial levels should be issued.

The program should include funding for research to identify the best disease-specific indicator for ocean and bay beachwaters. Under the program, the health risks associated with non-human sources of indicator bacteria should also be studied.

Everyone can help reduce beachwater pollution by reducing the amount of water he or she sends to sewage treatment plants, using best management practices to reduce polluted runoff, and disposing of boating waste properly. Individuals can also make a difference by becoming educated and voicing their desire for healthy water quality.

WHAT INDIVIDUALS CAN DO

Everyone can help reduce beachwater pollution by reducing the amount of water he or she sends to sewage treatment plants that have the potential to overflow, using best management practices to reduce polluted runoff, and disposing of boating waste properly. Individuals can also make a difference by becoming educated and voicing their desire for good, healthy water quality.

10 SIMPLE THINGS INDIVIDUALS CAN DO TO HELP IMPROVE BEACHWATER QUALITY

1. **Conserve water.** Conserve the amount of water you use at home. Extra water overwhelms sewage treatment plants and contributes to raw sewage overflows. 1) Do not let the water run unnecessarily when brushing your teeth, shaving, or washing dishes: save 9-25 gallons each time. 2) Install a displacement device in your toilet such as a small plastic bottle, or install a low-flush toilet: save thousands of gallons annually. 3) Install water conservation devices on your faucets and shower: save 50 percent of water previously used. 4) Use a bucket and sponge instead of a hose when washing your car: save over 100 gallons.²⁰
2. **Decrease toilet flushing.** Try not to flush your toilet during heavy rains. This will reduce the amount of water and waste going to sewage treatment plants. Heavy rains can overwhelm treatment plants and sewage is then diverted to outfall points that discharge raw sewage directly into ocean, bay, or Great Lake waters.
3. **Maintain septic systems.** Monitor your tank yearly and have a reputable contractor remove sludge and scum every three to five years to prevent solids from escaping the absorption system. Fecal matter from malfunctioning septic systems can contaminate beaches.
4. **Curb your pets.** Pick up animal waste when walking your pet and dispose of it in the garbage to reduce animal waste in polluted stormwater runoff.
5. **Practice proper lawn care.** Use natural fertilizers such as compost on your garden and minimize use of pesticides. Landscape with natural vegetation rather than lawns, which require fertilizers and pesticides. This can reduce the amount of runoff and pollution.
6. **Practice proper marine and recreational boating-wastes disposal.** Dispose of your boat sewage in onshore sanitary facilities. Don't dump sewage or trash overboard. Boating wastes discharged into coastal waters can be a significant cause of high fecal coliform concentrations.
7. **Learn about the water quality at local beaches.** Ask your local health official: 1) What are the sources of pollution affecting the waters where you swim? 2) What sort of water-quality monitoring is performed at these beaches? 3) Are beaches always closed when monitoring shows that the bacterial standard is exceeded? and 4) What is the current status of these waters (are they closed or open), and what warning signs you can look for?
8. **Choose your beaches carefully.** Whenever possible, swim at the beaches that your research shows have the cleanest waters or are carefully monitored with strict closure or advisory procedures in effect. Beaches adjacent to open ocean waters, and beaches that are removed from urban areas, generally pose less of a health risk than beaches in developed areas or in enclosed bays and harbors with little water circulation. Stay away from beaches with visible discharge pipes and avoid swimming at urban beaches after a heavy rainfall.
9. **Wade or bathe without submerging your head.** If you feel there is a possibility that a local beach is polluted, do not put your head in the water. By avoiding beachwater ingestion, you will significantly reduce your chance of contracting a swimming-associated illness. Try to keep children from splashing in water you suspect is polluted.
10. **Support local, state, and federal legislation** that promotes the cleanup of pollution sources. Write to your Congressperson and the Senators of your state; let them know you support clean water and safe beaches.

CHAPTER 5

STATE SUMMARIES

The following pages contain the summaries of state beach-monitoring practices and standards and NRDC's database of 1995 closings and advisories, listed alphabetically by state and territory. *It is impossible to make direct comparisons between states or to assess trends over time based on this closure data.* Standards, monitoring, and closure practices vary from state to state, making it difficult to know, for example, whether a state with many closings has vigilant health officials or has more coastal pollution. Until procedures are consistent, it will be very difficult to assess trends in beachwater quality. It is also impossible to make comparisons because of the way in which beaches are designated by officials. Some areas may have a greater number of beaches per mile of coast than others.

High numbers of closings and advisories, while indicating pollution problems, may also indicate that the state or county is making a good effort at protecting the public health by monitoring their waters and closings the beaches when they are polluted. States with comprehensive programs and closure practices should be commended for their efforts.

NRDC obtained its information by sending questionnaires to states and localities. We requested information on the number of ocean, bay, and Great Lakes beach closings and advisories, major sources of pollution in the area, the costs of monitoring, total miles of beach/miles of beach monitored, and the cause of each closing or advisory. The data we received from states, counties, and localities were sometimes incomplete, and the specificity of information respondents gave varied from state to state. Many of the state summaries also include information from water-quality reports the states file with the EPA—305(b) reports. Each state designates particular uses for every body of water within its borders, such as swimming or shellfishing. 305(b) reports state what percentage of a state's waters support their designated uses, a helpful indicator of water quality.

The terminology used by states and municipalities in referring to the source of pollution that caused each closing was not always consistent, nor always clear as to the precise source of pollution.

For example, over 371 closings were reportedly caused by rain. Pollutants are discharged into waterways because rains increase the volume of polluted runoff and increase the amount of water flowing through sewage systems, so raw or inadequately treated sewage is discharged into waterways during and after rains. When rain is cited as the cause of a closing, states did not report whether the type of pollution causing the closing was polluted runoff or raw sewage overflows.

Similarly, many respondents to our survey listed high bacterial levels as the pollution source. In these cases, they did not specify the individual source of pollution responsible for the high bacterial levels.

METHODOLOGY

NRDC looked at several different criteria to evaluate the efficacy of beach-monitoring programs: indicator organism, standards, methods used for testing for the indicator organism, and testing frequency.

Indicator Organisms The type of "indicator organism" a monitoring program tests for is important because it indicates whether or not a disease-causing bacteria may be present in the

water. Monitoring programs usually test for total coliform, fecal coliform, or enterococcus bacteria. EPA recommends using the enterococcus indicator for marine waters, and enterococcus or *E. coli* indicators for the Great Lakes, because these indicators provide the most reliable estimate of whether disease-causing bacteria and viruses are present in the water. Despite EPA's recommendation, several monitoring programs continue to test for the less accurate total or fecal coliform. (Total coliform is the less accurate of the two, because it includes bacteria that are virtually ubiquitous in the environment and may occur in soil as well as in animal and human fecal matter.)

Standards NRDC examined the standards that individual monitoring programs used to determine whether waters are polluted. In 1986, EPA recommended that state health officials adopt a geometric mean standard of 35 enterococcus bacteria per 100 ml of water for monitoring ocean and bay recreational beaches and a geometric mean standard of 33 enterococcus bacteria per 100 ml or 126 *E. coli* bacteria per 100 ml of water for Great Lakes states. EPA has the power to mandate the use of these standards, but the agency has not done so, so standards vary from state to state, and even within states. States may also establish rainfall standards: threshold levels of precipitation that, when exceeded, result in preemptive beach advisories or closings.

Methods NRDC looked at the methods used in testing for the indicator organisms. Normally, one of two testing methods is used: most probable number (MPN), or membrane filtration (MF). EPA currently recommends MF as the best testing method because it produces faster, more accurate results than MPN. MF, however, is a more complex procedure that requires greater interpretive expertise by the analyst.

Testing Frequency EPA does not mandate a minimum testing frequency for recreational beaches, and many states do not test ocean and bay waters at all. Although frequent sampling is the best guarantee of public health, the frequency of testing ranges from region to region. The best current programs test beachwater several times a week during the summer months. Some areas, however, only conduct pre-season sanitary surveys, analyzing water quality to approve or disapprove beaches for summer operation.

In an effort to be consistent in tabulating closings and advisories, NRDC followed these guidelines: 1) closings and advisories are not differentiated in the data listings; 2) permanent closings (beaches closed for the entire summer or longer) and extended closings (beaches closed for six weeks or more) are noted, but not included in the totals; and 3) closings or advisories issued for an individual beach for one day are counted as one closing/advisory. Beach closings and advisories, extended closings, and permanent closings are all included in each state summary and in *Table 1: Ocean, Bay, and Great Lakes Beach Closings & Advisories 1988-1995 on page viii.*

EXAMPLE:

1995 STATE CLOSINGS AND ADVISORIES

Closed	Opened	Beach	Source/Cause
5/5	5/9	Long Beach	Polluted runoff
5/11	5/13	North Beach & South Beach	Combined sewer overflow
5/5	7/5	East Beach	High bacteria level/cause unknown
permanent		West Beach	Polluted runoff

TOTAL:8, plus 1 extended, 1 permanent

Alabama does not have a water-quality monitoring program designed to protect swimmer safety at its ocean or bay beaches.

ALABAMA

Alabama does not have a water-quality monitoring program designed to protect swimmer safety at its ocean or bay beaches. Coastal waters are monitored by the Alabama Department of Environmental Management (ADEM) only to determine the quality of the waters, sediments, and biologic communities, and to determine trends in quality. The program is not designed to inform beachgoers of potential hazards.

According to the state's 1994 305(b) report, pollution prevents about 20 percent of the surveyed estuaries from fully supporting aquatic life use. In coastal waters, the leading sources of pollution are urban runoff and storm sewers, municipal sewage treatment plants, and combined sewage overflows.

Standards and Testing

Indicator Organisms Fecal coliform

Standards 100 fecal coliform/100 ml, a geometric mean of no less than 5 samples collected over a 30-day period at intervals not less than 24 hours.

Monitoring

Testing Frequency There is no monitoring specifically for swimmer safety. ADEM monitors approximately 150 surface-water stations once a year, of which 50 percent are proximate to bay bathing areas.

Areas Monitored No areas are monitored specifically for swimmer safety.

Closing/Advisory Issuance

Based on discretion of the Alabama Department of Public Health, beaches may be closed.

Miles of Ocean and Bay Beach

Baldwin County Gulf Shore: 32 miles. Dauphin Island: 16 miles. Approximately 64 miles of bay beaches including Mobile Bay, Mississippi Sound, Perdido Bay, and Wolf Bay.

CALIFORNIA

The state of California is one of the most popular beach spots in the country. Tourists and residents alike use the beaches for a variety of activities. Yet these beachgoers are not assured of safe swimming water, since the state continues to have no mandatory testing program for its coastal waters. Monitoring and closure is left up to the counties and standards and monitoring procedures continue to vary widely throughout the state. The state has set standards for beachwater quality in the California Code of Regulations (CCR), and does require both the posting of waters that violate the CCR and the reporting of all closings and advisories to the state. Not all counties have implemented a monitoring program, however. The State Water Resources Control Board is required to publish an annual report on beach

closings and postings in counties with saltwater beaches. The first such report was issued in September 1994, documenting closures in 1993. The 1995 version has not yet been issued.

The California Code includes only a standard for total coliform, an indicator organism that both the National Technical Advisory Committee and EPA have rejected as inadequate. While the State Water Quality Control Board's "California Ocean Plan" contains standards for enterococcus and fecal coliform, few counties have adopted these standards.

The Santa Monica Bay Restoration Project recently completed an epidemiological study of the health effects of swimming in Santa Monica Bay. The study found an increase in risk of colds, fever, chills, sore throats, diarrhea and other symptoms of illness in those swimming near storm drains; as compared to those swimming farther. The study also formulated an agenda for action that includes educating and advising the public about the health risk of swimming near storm drains, implementing source control measures, and incorporating the findings of the report into standards and monitoring programs. The Los Angeles County Department of Health Services has already begun to strengthen the wording on warning signs posted near storm drains, and to post them in both English and Spanish.

In 1995, nine of California's 17 counties and the Pt. Reyes National Seashore regularly monitored their ocean and bay beachwater for swimmer safety. These nine counties are: Alameda, Los Angeles, Monterey, Orange, San Diego, San Francisco, San Luis Obispo, San Mateo, and Santa Cruz. But several counties that support robust coastal recreation, including Santa Barbara, Ventura, Marin, Mendocino, Del Norte, Contra Costa, Humboldt, and Sonoma do not have regular recreational beach-monitoring programs. Even though cold waters often discourage swimming off counties north of San Francisco, plenty of hardy windsurfers, boaters, and skin divers use these waters and they should be protected from exposure to pollution. Many counties that do not have regular monitoring programs do test coastal waters following reported sewage discharges.

In addition to regular monitoring, Los Angeles, Orange, Santa Cruz, and San Diego counties issue rainfall advisories.

During 1995, Orange County was able to continue its weekly monitoring despite budget cuts resulting from the county's 1994 bankruptcy. A temporary program was developed for 1995 by the Orange County Environmental Management Agency (EMA). The county hopes in 1996 to maintain the same monitoring locations, frequencies, and procedures as in 1995, but officials assert that the program may be in jeopardy due to lack of funding.

The following counties continue to have no regular monitoring program for coastal waters, and cite budget constraints as the reason:

- Santa Barbara County continues to have no regular monitoring program despite officials' recommendations to the Board of Supervisors that a program would be desirable. During a major storm in January 1995, emergency funds were made available for ocean monitoring, and sampling continued on a roughly weekly basis until the end of March 1995.
- Ventura County still has no monitoring program and officials cite lack of funds as the reason. The Ventura County Environmental Health Division developed a proposal for a routine ocean water-quality monitoring program in 1993, but until funds exist, the department will continue to respond only to complaints and to investigate known sewage spills.
- Mendocino County has tentative plans to initiate a testing program (in 1993 the Health Department had a trial program in effect), but staffing and budget constraints prevent the initiation of the program at this time. The county continues to respond to identified problems only, and closes the beach if necessary.

A recently completed epidemiological study of the health effects of swimming in Santa Monica Bay found an increase in risk of colds, fever, chills, sore throats, diarrhea and other symptoms of illness in those swimming near storm drains, as compared to those swimming farther away.

Several groups including NRDC have been actively working to control the sources of pollution in California.

San Diego County beaches are impacted by local sources of pollution, as well as by sewage contaminated waters from Mexico's Tijuana River, which discharges at southern San Diego beaches. Population growth has far outpaced Tijuana's ability to process sewage, so an average of 3 million gallons of raw sewage are diverted into river and ocean waters every day. The Mexican government and the EPA have joined forces to construct a new sewage treatment plant. The International Boundary and Water Commission Project finalized an Environmental Impact Statement in 1994, and construction of the plant is underway. The advanced primary treatment works portion is expected to be on-line in December 1996. The Regional Board is currently considering how to permit the facility, as it is a foreign facility discharging into San Diego's waters.

Several groups including NRDC have been actively working to control the sources of pollution in California. NRDC has been working, along with the Center for Marine Conservation (CMC), to ensure that the State Water Board and California Coastal Commission develop a strong and enforceable program to control coastal nonpoint source pollution. NRDC is also a working member of the state-federal partnership designed to develop a long-term solution to pollution problems in the San Francisco Bay-Delta. The San Diego Baykeeper and NRDC are working to get polluters such as the San Diego shipyards to start complying with direct discharge and stormwater laws.

Stormwater pollution is the largest source of pollution to Santa Monica Bay. NRDC, along with local environmental groups such as Heal the Bay and the Santa Monica Baykeeper, has been active during the past year in pressing the Regional Water Quality Control Board to issue a tough new NPDES stormwater permit to the almost 90 cities in the Los Angeles area. Additionally, in early 1996, the Los Angeles County Board of Supervisors approved a multi-million dollar settlement of a lawsuit NRDC and the Santa Monica Baykeeper brought against the County alleging violations of the County's current NPDES permit. As part of the settlement, the County agreed to implement a comprehensive stormwater management and education program and a far-reaching water-quality monitoring program to help assess the stormwater problem in Southern California. This settlement caps NRDC's stormwater court victory (with the Baykeeper) over the California Department of Transportation in late 1994 and the groups' settlement of lawsuits with three Southern California cities and the Port of Long Beach, each of which will bring improved stormwater practices to Southern California.

Standards and Testing

Indicator Organisms Total coliform (California Code of Regulations), fecal coliform (some counties), enterococcus (Los Angeles and Santa Cruz Counties)

Standards 1) Most probable number of total coliform organisms less than 1,000/100 ml provided that not more than 20 percent of the samples at any station, in any 30-day period, may exceed 1,000/100 ml, and provided further that no single sample, when verified by a repeat sample taken within 48 hours shall exceed 10,000/100 ml. 2) Standard of the geometric mean of 200 fecal coliform/100 ml used by counties that choose to test for fecal coliform.

Testing Methods MPN, MF for enterococcus

Monitoring Programs and Closings/Advisories in California During 1995

County	Monitoring Program	Testing Frequency	Miles of Beach/ Miles Monitored	Number of Closings & Advisories
Alameda	Yes	Monthly or twice a month	2.5 mi all	0
Contra Costa	No	After sewer discharges	unknown	n/a
Del Norte	No		25 mi./none (public) 25 mi./none (private)	n/a
Humbolt	No	-	100 miles of ocean/bay frontage, 20-30 mi. of beach/none	n/a
Los Angeles	Yes	Weekly	60 mi all	23
Marin	No	-	35 mi none	n/a
Mendocino	No	After sewer discharges	120 mi. of ocean/bay frontage, less than 1 mi. suitable for swimming/a	n/a
Monterey	Yes	Monthly	120 mi./unknown	56
Orange	Yes	Weekly	44 mi./all	132
Pt. Reyes National Seashore	Yes	Daily and weekly	80 mi./46 mi.	0
San Digo	Yes	Weekly, bi-weekly or monthly	65 mj./all	338 + 3 perm
San Francisco	Yes	Weekly; some monthly	20 mi./all	331
San Luis Obispo	Yes	Monthly	20 mi./5 mi. (public)	1(e) + 1 perm

San Mateo	Yes	Monthly	55 mi./n/a	180 + 1 extended
Santa Barbara	No	-	104 mi./none	224 + 3 perm
Santa Cruz	Yes	Weekly; some monthly	50-70 mi./all	18 + 4 perm
Sonoma	No	-	55 mi./none (public but much has no access)	n/a
Ventura	No	After sewer discharges	60 mi./5 mi.	3 + 1 extended

Monitoring

Testing Frequency See chart above. Many counties conduct additional testing based on reported sewage discharges or complaints.

Areas Monitored Alameda, Los Angeles, Monterey, Orange, Pt. Reyes National Seashore, San Diego, San Francisco, San Luis Obispo, San Mateo, and Santa Cruz.

Cost of Annual Monitoring and Public Notification Program Counties reporting—Alameda: \$9,575. Los Angeles: \$140,000. Orange: \$80,000. Santa Cruz: \$25,000. San Diego: \$180 - 200,000. San Luis Obispo: ~\$5,000. San Mateo: \$50,000 (1993), now reports it uses volunteers for sampling. Ventura: \$6,000 (1993). It costs the State Water Resources Control Board \$25,000 to administer and prepare the statewide report.

Closing/Advisory Issuance

Closings and advisories are issued on a discretionary basis.

San Diego has a bay and beach hotline that lists current recreational water postings and conditions: (619)338-2073. Orange County hotline is: (714)667-3752.

Causes of Closings/Advisories: Number of Closings/Advisories

Rain: 242; runoff and sewer overflows due to storm: 280 + 1(p); sewage overflow: 151; manhole overflow: 116 + 1 extended; raw sewage overflow: 97; rain/sewage: 80; high bacteria(cause unknown): 60; rain-preemptory: 55; pump station failure: 82; clogged/collapsed sewer line: 44; lift station overflow: 24; force main break: 23; sewage spill: 9; mechanical failure at treatment plant: 4; nonpoint urban runoff: 4(p); sewage bypass: 3; chronically poor water quality: 3(p); sewage associated grease: 2; chemical and pipeline leak: 1 extended; leaking septic system: 1 extended.

Miles of Ocean and Bay Beach/Miles Monitored

See chart above.

1995 CALIFORNIA OCEAN AND BAY CLOSINGS AND ADVISORIES

Los Angeles County

Closed	Open	Beach	Source/Cause
1/5	1/9	Dockweiler Beach and Manhattan Beach (~5 mi.)	Failure of a pump station at Eucalyptus and Franklin in El Segundo due to heavy rains. ~100,000 gallons of raw sewage entered the ocean at Grand Ave., LA.
1/5	1/9	Inner Cabrillo Beach in San Pedro (~1/4 mi.)	Mechanical failure at the Terminal Island Treatment Plant due to heavy rains. ~1,000,000 gallons of raw sewage entered the LA Harbor.
1/10	1/14	Will Rogers State Beach (~2 mi.)	Failure of a pump station due to heavy rain. ~100,000 gallons of raw sewage entered the ocean at the Pulga storm drain.
1/18	1/21	Torrance City in Rancho Palos Verdes (~6 mi.)	A landslide caused the collapse of a 10-inch sewer line. Between 144,000 to 1,000,000 gallons. of sewage entered the ocean at Lanada Bay.
2/25	2/28	Marina del Rey Beach, in Marina del Rey (~1/4 mi.)	High bacteria levels/cause unknown.
10/8	10/9	Venice Blvd. to Sandpiper St. in LA (~2 mi.)	Clogged sewer line allowed raw sewage to discharge into Ballona Creek.

In the addition, the county issues advisories after every storm or substantial rainfall, because these cause major problems with stormwater runoff. Advisories warn against swimming along the entire coast for 72 hours. Records are not kept of the number of advisories issued, therefore they are not included in the numbers.

Subtotal: 23

Monterey County

Closed	Open	Beach	Source/Cause
3/10	4/7	Zmudowski Beach	Flood-related hazardous materials and high bacteria levels.
3/10	4/7	Salinas River Beach	" "
Subtotal: 56			

Orange County

Closed	Open	Beach	Source/Cause
1/8	1/12	Rivera Beach	Raw sewage overflow (6,000-10,000 gal.)
1/11	1/19	Seal Beach	" " (12,000 & 40,000 gal.)
1/11	1/20	Treasure Island Trailer Park Beach	" " (250,000 gal.)
1/11	1/15	Newport Beach	" " (116,000 gal.)
1/11	1/19	El Morro Trailer Park Beach	" " (166,000 gal.)
1/13	1/20	Newport Bay	" " (2-10 million gal.)
2/2	2/6	Cleo Street Beach	" " (3,000 gal.)
3/7	3/15	Doheny State Park Beach	" " (200,000 gal.)
3/7	3/9	Bluebird Canyon Drive Beach	" " (1,000 gal.)
3/8	3/15	Carnation Cove	" " (500-600 gal.)
3/26	3/28	Aliso Beach	" " (1,000 gal.)
4/17	4/20	Boat Canyon	" " (300 gal.)
4/25	4/27	Heilser Park Cove	" " (1,000 gal.)
6/18	6/21	Cleo Street Beach	" " (500 gal.)
7/10	7/13	Treasure Island Trailer Park Beach	" " (500 gal.)
8/5	8/7	Newport Beach	Unknown, sewage associated grease particles
10/1	10/5	Aliso Beach	Sewage (5,000 gal.)
11/6	11/9	Main Beach	" " (500 gal.)
11/6	11/9	Treasure Island Trailer Park Beach	" " (500 gal.)
11/25	11/30	Aliso Beach	" " (4,000 gal.)
12/14	12/19	Newport Bay	" " (500 gal.)
12/26	12/29	Main Beach	" " (4,000 gal.)
1/3	1/6	Entire coastline advisory *	Heavy rains – possible high bacteria due to runoff
1/5	1/8	" "	" "

1/21	1/24	" "	" "
2/14	2/17	" "	" "
3/3	3/6	" "	" "
3/10	3/13	" "	" "
3/21	3/24	" "	" "
4/16	4/19	" "	" "
6/16	6/19	" "	" "
12/13	12/16	" "	" "
12/23	12/26	" "	" "

Subtotal: at least 132

* The advisory recommends that swimmers stay out of ocean and bay waters close to storm drains and outlets of creeks and rivers during and after rainstorms, due to possibly elevated bacteria levels mainly from runoff. Advisories are counted as one per day in our total but include a number of beach areas.

San Diego County

Closed	Open	Beach	Source/Cause
1/1	2/8	Mission Bay	Rain
1/4	1/19	Imperial Beach	Rain/sewage
1/6	1/15	San Diego Bay	Sewage overflows
1/7	1/17	Cardiff St. Bch.	" "
1/8	1/11	Batiquitos Lgn.	" "
1/12	1/15	San Diego Bay	" "
1/14	1/19	Buena Vista Lgn.	" "
1/19	1/23	Windansea Pk.	" "
1/25	1/27	Cardiff	" "
1/25	1/30	Imperial Beach	Rain/sewage
2/2	2/6	San Diego Bay	Sewage overflows
2/4	2/7	Cardiff	" "

2/14	2/23	Imperial Beach	Rain/sewage
2/15	2/23	Mission Bay	Rain
2/24	2/28	Imperial Beach	Rain/sewage
2/26	3/1	San Diego Bay	Sewage overflows
2/26	3/27	Mission Bay	Rain
3/1	3/31	Imperial Beach	Rain/sewage
3/5	3/8	Buena Vista Lgn.	" "
3/5	3/14	San Diego Bay	Sewage overflows
3/6	3/18	Batiquitos Lgn	" "
3/6	3/29	Cardiff	" "
3/11	3/17	San Onofre SB	" "
3/27	3/28	La Jolla	Pump-station failure
4/15	4/18	Cardiff	" "
4/17	4/24	Mission Bay	Rain
4/25	4/30	Imperial Beach	Pump-station failure
4/26	4/28	La Jolla	" "
5/1	5/3	Imperial Beach	" "
5/11	5/13	Imperial Beach	" "
5/22	5/25	Cardiff	Sewage overflows
5/27	6/2	Mission Bay	Rain
6/15	6/18	La Jolla	Pump-station failure
6/20	6/23	San Diego Bay	Sewage overflows
7/1	7/5	San Diego Bay	" "
7/4	7/7	Sunset Cliffs	" "
7/14	7/16	Windansea Pk.	" "
7/23	7/25	Sunset Cliffs	" "

8/4	8/9	La Jolla	Pump-station failure
8/7	8/11	Torrey Pines State Park	Sewage overflows
8/26	8/28	Windansea Pk.	" "
8/31	9/2	Sunset Cliffs	" "
9/3	9/7	Del Mar Beach	" "
9/7	9/9	Mission Bay	" "
9/8	9/9	La Jolla	Pump-station failure
9/16	9/18	San Diego Bay	Sewage overflows
9/22	9/25	San Diego Bay	" "
10/14	10/16	Del Mar Beach	" "
10/26	10/29	Carlsbd St. Bch.	" "
11/12	11/14	San Diego Bay	" "
12/1	12/2	Torrey Pines State Park	" "
permanent		San Luis Rey River Outlet, Oceanside	Chronically poor water quality
permanent		Loma Alta Lagoon @ Buccaneer Beach, Oceanside	" "
permanent		South end of Seacoast Dr. to the Int'l Border	" "
1/3	1/6	Countywide advisory*	(Precautionary) rain
1/5	1/8	" " " "	(Precautionary) sewage contamination
1/12	1/15	" " " "	(Precautionary) sewage contamination
2/14	2/17	" " " "	(Precautionary) rain
3/6	3/9	" " " "	(Precautionary) sewage contamination
3/12	3/15	" " " "	(Precautionary) rain
Subtotal: at least 338, plus 3 permanent			

* Advisory warns against swimming in coastal recreational waters throughout the county near storm drains, creeks, rivers, and lagoon outlets.

San Francisco

Closed	Open	Beach	Source/Cause
1/10	1/15	Ocean Beach	Rain
1/10	1/15	Beach Opposite Lake Merced	" "
1/15	2/18	Baker Beach	" "
2/9	2/17	Beach Opposite Lake Merced	Sewer overflow in N. San Mateo County
2/23	3/31	Baker Beach	Blockage in sewer
3/2	3/16	Ocean Beach	" "
3/2	3/16	Beach Opposite Lake Merced	" "
3/3	3/8	Crissy Field	Rain
3/3	3/8	Aquatic Park	" "
3/20	3/30	Beach Opposite Lake Merced	" "
4/6	5/5	Baker Beach	Rain
5/10	5/30	Baker Beach	High bacteria levels flowing in from Lobo Creek
6/14	6/24	Baker Beach	Rain
8/23	8/26	Baker Beach	Blockage in sewer
9/11	10/18	Baker Beach	High bacteria levels, Lobo Creek
9/11	9/15	Beach Opposite Lake Merced	Sewer overflow in San Mateo
11/1	11/14	Baker Beach	Rain
11/9	11/15	Candlestick Park	" "
12/2	1/1	Baker Beach	" "
12/11	12/20	Ocean Beach	(road construction) Power outage caused pump stations to stop
12/11	12/20	Beach Opposite Lake Merced	" "
12/11	12/20	Crissy Field	" "

12/29	1/4/96	Ocean Beach	Rain
12/29	1/4/96	Beach Opposite Lake Merced	" "
Subtotal: 331			

San Luis Obispo

Closed	Open	Beach	Source/Cause
11/95	1/96	Avila Beach	Chemical and pipeline leak (partial closure to allow for cleanup)
permanent		Avila Beach	High bacteria levels due to flooding
Subtotal: 1 extended, plus 1 permanent			

San Mateo County

Closed	Open	Beach	Source/Cause
1/12	1/14	San Pedro Beach	Sewage bypass
1/30	2/8	Francis Beach	Manhole overflow
1/30	4/3	Montara State B.	" "
2/2	2/3	Linda Mar Pump Station Outfall	Sewage bypass
3/3	3/6*	Colma Creek	Sewage spill
3/13	3/16*	Francis Beach	Manhole overflow
3/14	4/4	Corsica, Trinidad, Gloucester & Dewey (in Foster City)	" "
3/16	4/5	Fitzgerald Marine Res	" "
3/24	3/27*	Colma Creek	Pump-station failure
8/16	8/22	Moss B. Lift Station	" "
8/28	9/20	Lagoons on both sides of Redwood Shores Pkwy.	16" force main break
10/6	10/27	Fitzgerald Marine Res	Lift-station overflow
12/26	1/1	" "	Sewage spill
Subtotal: at least 180, plus 1 extended			

* Dates for reopening were not recorded; officials estimate closure lasted 3 to 4 days.

Santa Barbara

Closed	Open	Beach	Source/cause
1/19	2/2	Rincon Beach Carpinteria Beach Santa Clause Beach Look Out Park East Beach West Beach Leadbetter Beach Arroyo Burro Hope Ranch Beach Goleta Beach Campus Point Beach Devereux Beach Haskell Beach Hammond Beach Loon Point Beach Chase Palm Beach	Major storm caused flooding, sewage overflows, and runoff from industrial areas
Permanent (the rest of 1995)		West Beach at Mission Creek, Hendry's Beach at Arroyo Burro Creek, and Hope Ranch Beach at Las Palmas Creek	
Subtotal: 224, plus 3 permanent			

Santa Cruz

Closed	Open	Beach	Source/Cause
3/11	3/25	Pajaro River Mouth to Sunset Beach	High bacteria levels, major flood bypassed sewers
permanent		San Lorenzo River Mouth	Nonpoint urban runoff
" "		Schwann Lake	" "
" "		Capitola Lagoon	" "
" "		Aptos Creek Mouth	" "
Officials also estimate 4 warnings were issued in the press during major runoff events to warn the public against swimming in areas near storm drains for 24 hours after rainfall. These warnings are counted as one each in our total but included more than one beach.			
Subtotal: 18, plus 4 permanent			

Ventura County

Closed	Open	Beach	Source/Cause
7/13	7/16	Mandalax Bay in Oxhard	Sewage spill from overflow at lift station
7/12	9/20	Malibu Bay Club Beach in Malibu	Leaking septic system (private system)
Subtotal: 3, plus 1 extended			

TOTAL: at least 1,305, plus 11 permanent, plus 3 extended

1994 CALIFORNIA OCEAN AND BAY CLOSINGS AND ADVISORIES

TOTAL: at least 910, plus 6 permanent, plus 2 extended

1993 CALIFORNIA OCEAN AND BAY CLOSINGS AND ADVISORIES

TOTAL: 1,397, plus 2 permanent, plus 2 extended**

1992 CALIFORNIA OCEAN AND BAY CLOSINGS AND ADVISORIES

TOTAL: at least 609, plus 1 permanent, plus 2 extended (includes San Diego Point Loma outfall incident, but no other San Diego closings or advisories)

1991 CALIFORNIA OCEAN AND BAY CLOSINGS AND ADVISORIES

TOTAL: 745, plus 5 permanent, plus 1 extended

CONNECTICUT

Connecticut has a comprehensive monitoring program for its coastal waters. Standards and guidelines are set by the state, which also analyzes the samples and monitors the three public beaches on Long Island Sound. Municipalities monitor their own waters, following the ocean and bay beachwater-quality monitoring protocol established by the Connecticut Department of Health Services (DOHS) and the Connecticut Department of Environmental Protection (DEP). Costs to municipalities are low because the DOHS tests samples free of charge.

The state's guidelines call for annual sanitary surveys and inspections by local health departments, and recommend weekly sampling of bathing areas. When a single sample result exceeds the standards for bathing-water quality, a resample is taken and a survey conducted to determine if raw or partially treated sewage is contributing to the elevated bacteria levels. Decisions about closure are made with consultation from DOHS.

A number of municipalities have adopted a rainfall threshold. When this threshold is reached, beaches are automatically closed until test results indicate there is no bacterial violation. The municipalities of Darien, Fairfield, Greenwich, Guilford, Old Lyme, Stamford, Stratford, West Haven, and Westport/Weston issue such preemptive closing/advisories.

The summer of 1995 was an exceptionally dry one for the state, and officials cite this as the main reason for the lower number of closings in many towns. For example, in Darien, which issues preemptory advisories based on rainfall, there was no single rainfall approaching the threshold standard of 1"/24 hours. Despite the overall dryness, the number of closings increased statewide because of a large number of closings in Groton due to sewage treatment plant malfunctions in a neighboring town.

Shellfish-bed closings also provide a helpful indicator of the amount of pollution in waters. The town of Waterford has closed all but two of its shellfishing areas in the Niantic River due to high levels of fecal coliform. A major sewer break in a town close to Darien caused the State Department of Aquaculture to close Darien's commercial shellfish beds.

A number of municipalities have adopted a rainfall threshold. When this threshold is reached, beaches are automatically closed until test results indicate there is no bacterial violation.

The town of Guilford, however, has been able to open additional shellfish beds and upgrade existing ones through the efforts of the Guilford Health Department, the Guilford Shellfish Commission, and the Guilford Water Pollution Control Authority. In New London, a Twelve-Year Comprehensive Evaluation of shellfish-growing waters was completed in August of 1994. As a result of the evaluation, sections of the Thames River were upgraded from a "Prohibited" classification to "Conditionally Restricted;" however no areas in New London were upgraded to allow harvesting of shellfish for direct human consumption.

Old Saybrook's 1994 Annual Assessment of its shellfish-growing waters found that certain portions of the coastline could be upgraded to a Conditionally Approved classification, but there are still no "Approved" areas. The Assessment also found two areas of direct sewage discharge, which would lead to a downgrading of the classification of the waters if not abated.

Nonpoint source runoff, sewage treatment plant discharges, waterfowl, and residential septic system failures continue to be the major sources of pollution problems for most municipalities.

Despite repeated requests for information, NRDC has not received a response from Norwalk, so this report may understate the number of closings for Connecticut.

Standards and Testing

Indicator Organisms Enterococcus

Standards An instantaneous level of 61 enterococcus/100 ml and a geometric mean of 33 enterococcus/100 ml.

Testing Methods MF

Monitoring

Testing Frequency Weekly throughout the summer. Guilford: every two weeks May-Sept.

Areas Monitored The protocol requires that all recreational beaches be monitored.

Cost of Annual Monitoring and Public Notification Program Branford: ~\$3,500 (\$1,725 lab fees). Bridgeport: \$7,000-\$8,000. Darien: \$2,000. Fairfield: \$6,000. Greenwich: ~\$3,000. Guilford: 1 staff position. Madison: \$700. Milford: \$5,000-6,000. New Haven: ~\$3,000. New London: \$1,725. Old Lyme: \$4,800. Old Saybrook: \$1,650. State DEP: \$3,000. State DOH: \$21,500 (cost of analyzing samples). Stamford: ~\$5,000. Stratford: (staff time only). Waterford: \$325. West Haven: \$1,500. Westport/ Weston: \$4,200 (including samples).

Closing/Advisory Issuance

Closings or advisories are issued when bacteria levels exceed state standards and in several municipalities when rainfall exceeds local standards.

Causes of Closings/Advisories: Number of Closings/Advisories

High bacteria levels: 110; sewage spill: 45; sewage treatment plant malfunction: 33 +1 extended; waterfowl: 53; construction (flushing storm drains): 7; sewer line infiltrating into storm sewer: 3.

Miles of Ocean and Bay Beach/Miles Monitored

Branford: 5 mi./all (public). Bridgeport: 5 mi./all (public); 1/4 mile on lake/all (private). Darien: ~7 mi./1.5 mi. (public); ~5.5mi./0 (private). Fairfield: 1.1 mi./all (public); 3.5 mi./0 (private). Greenwich: ~2 mi./all (public). Guilford: ~250 ft./all (public); remainder of coastline/0 (private). Groton: 40 mi./all. Madison: 3.5 mi./all (public); 2.5 mi./0 (private). Milford: 7 mi./all (public); 3 mi./0 (private). New Haven: .5 mi./all (public); 1 mi./0 (private). New London: 2 mi./all (public); 5mi./0(private). Old Lyme: 5,000 ft./all (public); 3-4 mi./all (private). Old Saybrook: .5 mi./all (public); 5 mi./all (private). Stamford: ~1.5 mi./all (public); ~1 mi./complaint only (private). Stratford: 2 mi./all (public); 3 mi./0 (private). Waterford: 1,338 ft.(public)/all (at five sampling points). West Haven: 4 mi./all. Westport/Weston: 7 mi./all.

1995 CONNECTICUT OCEAN AND BAY CLOSINGS AND ADVISORIES

Branford

Closed	Open	Beach	Source/Cause
8/7	8/10	Lanphier's Cove	High bacteria levels/ cause unknown
8/7	8/10	Clark Avenue	" "
8/14	8/16	Branford Point	" "
Subtotal: 8			

Greenwich

Closed	Open	Beach	Source/Cause
7/7	7/10	Byram Beach	High bacteria levels
7/14	(51 days)	Byram Beach	Faulty sewage treatment pump station, cracked and broken sewer lines, and a direct discharge into a storm drain system
Subtotal: 3, plus 1 extended			

Groton

Closed	Open	Beach	Source/Cause
6/18	6/21	Noank Dock	High bacteria levels, cause unknown
6/30	7/5	East Shore	" "
6/30	7/5	Kiddie Beach	" "
7/2	7/5	Noank Dock & Crescent Beach & East Shore & Esker Point & Kiddie Beach	Stonington sewage spill
7/21	7/23	Esker Point	High bacteria levels
8/9	8/16	Noank Dock	" "
8/11	8/16	East Shore	" "
8/20	8/23	All Beaches (10)	Stonington sewage spill
8/20	8/27	City beaches (3)	High bacteria levels
8/29	9/15	City beaches (3)	" "
Subtotal: 144			

New London

Closed	Open	Beach	Source/Cause
5/26	6/29	Greens Harbor	Unknown/water fowl
7/21	7/23	Guthrie Beach	Construction, flushing storm drains
7/21	7/26	L&M Beach	" "
8/7	8/11	Greens Harbor	Unknown/water fowl
8/20	8/23	All Beaches (10)	Precautionary, sewage-treatment plant malfunction in neighboring town
8/20	9/4	Greens Harbor	Unknown/water fowl
Subtotal: 90			

Waterford

Closed	Open	Beach	Source/Cause
8/20	8/23	Waterford Town Beach	Mystic sewage treatment plant overflow
Subtotal: 3			

West Haven

Closed	Open	Beach	Source/Cause
7/18	7/21	South Street	Sewer line infiltrating into storm sewer
Subtotal: 4			

TOTAL: at least 251, plus 1 extended

1994 CONNECTICUT OCEAN AND BAY CLOSINGS AND ADVISORIES

TOTAL: at least 156, plus 1 extended

1993 CONNECTICUT OCEAN AND BAY CLOSINGS AND ADVISORIES

TOTAL: at least 174

1992 CONNECTICUT OCEAN AND BAY CLOSINGS AND ADVISORIES

TOTAL: at least 223

1991 CONNECTICUT OCEAN AND BAY CLOSINGS AND ADVISORIES

TOTAL: 293, plus 1 extended

DELAWARE

The Delaware Department of Natural Resources and Environmental Control (DNREC) operates a comprehensive Recreational Water Program. The program has existed since 1989. In addition, the state has sampled swimming water at varying levels of intensity since 1979. The DNREC's Shellfish and Recreational Water Branch issues an annual statistical analysis and report to review the program and the past year's results.

The DNREC has determined that the majority of ocean and bay beaches are not significantly impacted by rainfall. The two exceptions are Rehoboth Beach, affected by the presence of stormwater outfall pipes on the beach, and the Tower Road Rehoboth Bay Beach, significantly affected by rainfall and runoff. Therefore, DNREC has a rainfall standard and it issues preemptory advisories based on rainfall levels. In 1995, the Rehoboth Beach rainfall standard was changed from 3 inches or more of rain within a 24-hour period to 3.5 inches or more of rain within a 24-hour period.

In 1995 the DNREC reduced testing frequency from twice per week to once per week, with follow-up sampling of sites that exceed the standard and after heavy rainfalls. Officials cite fiscal constraints as the major motivation for these reductions, although efforts to concentrate testing on areas with more severe water-quality problems and a lack of variability in the data were also considerations. No changes are planned for 1996.

Rehoboth Bay Beach in the Delaware Seashore State Park has been permanently closed and deleted from the list of monitored beaches. It became cost-ineffective for the Division of Parks and Recreation to operate the Rehoboth Bay site for swimming as the site was under a swimming advisory an inordinate amount of the time because of high bacteria levels, mainly from nonpoint source pollution. The Division no longer posts a lifeguard or regulates it in

In 1995 Delaware reduced testing frequency from twice per week to once per week, with follow-up sampling of sites that exceed the standard and after heavy rainfalls. Officials cite fiscal constraints as the major motivation for these reductions.

any way for swimming, and no longer designates it as a swimming area (the state's three monitoring criteria), so it has been dropped from the monitoring program. Holts Landing was dropped four years ago for the same reason. Both of these marine water sites accounted for all but a handful of the marine water advisories issued since the inception of the program.

According to Shellfish and Recreational Water Branch staff, the water quality of ocean and bay water in Delaware is quite good, yet swimming is discouraged in many rivers. The State's 1994 Delaware Watershed Assessment Report states that municipal point sources, urban runoff, and recreational activities all have a moderate to minor impact on coastal waters.

Standards and Testing

Indicator Organisms Enterococcus

Standards Human-sewage impacted waters: geometric mean of 52 Ent/100 ml. Non-human sewage impacted waters: geometric mean of 156 Ent/100 ml. Rainfall standards: Rehoboth Beach — advisories issued for at least 12 hours upon 3.5" or more of rain in a 24-hour period or less. Tower Road Rehoboth Bay Beach in Delaware Seashore State Park—advisories issued for at least 24 hours upon 2" or more of rain in a 24-hour period.

Testing Methods MF

Monitoring

Testing Frequency Once a week, from May 22 to September 11.

Areas Monitored 10 ocean beaches, 1 Delaware Bay beach, and 1 Rehoboth Bay beach.

Cost of Annual Monitoring and Public Notification Program \$35,000/year

Closing/Advisory Issuance

Advisories are issued by DPH and implemented by recreational water-area administrators. DPH provides an advisory information line during the summer: 1-800-922-WAVE.

Causes of Closings/Advisories: Number of Closings/Advisories

n/a

Miles of Ocean and Bay Beach/Miles Monitored

Ocean: 26 mi./all. Delaware Bay: ~30 mi./5 mi. Rehoboth Bay: 20 mi./1 mi. Ninety-five percent of people's primary contact occurs in monitored areas. Total: 86 miles/32 monitored.

1995 DELAWARE OCEAN AND BAY CLOSINGS AND ADVISORIES
TOTAL: 0

1994 DELAWARE OCEAN AND BAY CLOSINGS AND ADVISORIES
TOTAL: 0

1993 DELAWARE OCEAN AND BAY CLOSINGS AND ADVISORIES
TOTAL: 0

1992 DELAWARE OCEAN AND BAY CLOSINGS AND ADVISORIES
TOTAL: 5

1991 DELAWARE OCEAN AND BAY CLOSINGS AND ADVISORIES
TOTAL: 11

FLORIDA

The state of Florida does not explicitly require any monitoring of ocean and bay coastal waters. The Florida Department of Environmental Protection (DEP)(previously the DER) does have bacteria standards specifically for marine waters designated for swimming, however, the DEP's monitoring is not directed toward swimmer safety at recreational beaches but focuses instead on general environmental monitoring. Nevertheless, several Department of Health and Rehabilitation Services (DHRS) county offices use the DEP standard for their monitoring program of marine beaches.

Of the 34 coastal counties with swimming beaches, only 11 conduct monitoring for swimmer safety. While Broward County (Ft. Lauderdale) and Hillsborough County (Tampa) have regular monitoring programs for beach water, other highly visited counties such as Monroe (Key West) and Dade (Miami) do not. Many key counties with beachwater-quality programs monitor infrequently. For example, Palm Beach monitors only quarterly or semi-annually.

The City of St. Petersburg continues to set the highest standards in the state. In addition to monitoring its beachwater weekly, the City routinely closes its beaches when rainfall exceeds set limits.

The number of closings/advisories in Florida increased significantly in 1995 from 1994. This number is in large part attributable to 145 closings in Dade County due mostly to sewer-line breaks and to a large increase in closings in Okaloosa County due to debris and other pollution caused by Hurricane Opal.

Dade County, which includes Miami and Miami Beach, continues to have no regular monitoring program (except for the enclosed beach areas of Oleta State Park, Matheson, and Homestead Bay Front Park, which are regularly monitored). The county monitors only when problems such as a sewer spill or treatment-plant malfunction is brought to the attention of the Health Department. County officials are working to get funding to monitor beaches on a regular basis, but there is no program as yet.

Like many other states, Florida suffers from severe budget constraints. In 1995 the State of Florida began charging all agencies for the coliform analysis that had previously been provided to the counties free of charge. Consequently, the following counties have recently had to limit or reduce their monitoring programs:

- Most notably, Okaloosa County is dropping its regular monitoring program due to a lack of funding and increase in lab fees. In 1996 it only will sample the waters is an incident such as a known sewer spill or heavy rains occurs.
- In Broward County, mandated lab fees resulted in reduced sampling points. In 1995 the number of beach sampling points was reduced from 12 to seven because the state lab initiated analysis charge. The monthly frequency remained the same.
- In Duval County the coliform bacteria parameter was eliminated from the routine water quality monitoring in July 1995, because of the initiation of state lab charges. Officials

Of the 34 coastal counties with swimming beaches, only 11 conduct monitoring for swimmer safety. For example, Dade County, which includes Miami and Miami Beach, continues to have no regular monitoring program.

expect that coliform analysis should be re-instated in FY 96-97.

- Pasco County changed its monitoring procedures in July of 1995 due to budget cuts. Five samples per bathing area was reduced to one sample for its Gulf bathing area per month. In 1996 the county plans to increase the program to again include five samples per bathing area per month.

Funding concerns are also cited by officials as a major impediment to implementation of monitoring programs in those counties with no monitoring. Dixie County continues to have no program and cites funding as the reason. Brevard County officials cite budget constraints and the fact that ocean water quality has not been a problem. The implementation of Indian River County's plans for a monitoring program remain stalled until funding can be obtained from the state.

Since our last report, the following counties have improved their monitoring programs:

- Citrus County in 1995 extended its monitoring program to year-round rather than just the summer. This will continue for 1996.
- Hernando in 1995 increased the frequency of its monitoring during the swimming season to every 14 days from quarterly.
- The City of St. Petersburg has temporarily added the city of Guilford's public beach to its monitoring locations. The city is experimenting with the use of enterococci as indicator organisms for marine waters, but currently it still uses coliforms.

Monitoring Programs and Closings in Florida During 1995

County	Monitoring Program	Testing Frequency	Miles of Beach/Miles Monitored	Number of Closings/Advisories
Apalachicola	No		100+/none	N/A
Bay	No			N/A
Brevard	No		~ 40 mi. public+ 10 mi. federal (Canaveral National Seashore)	N/A
Broward	Yes	Monthly (at least)	23 mi./7 sites	0
Charlotte	No			N/A
Citrus	Yes	Every 2 weeks	5 mi./2 mi. (public) 5 mi./2 mi. (private)	28
Dade	No (except for Oleta State Park, Homestead Bay-Front Park, and Matheson Hammock Park)	Oleta State Park, etc.—Twice a month; all beaches sampled if there is expected contamination	50 mi./Oleta State Park, <1 mi.	145

Dixie	No		Unknown	N/A
Duval	Yes	Quarterly	15 mi./1 site	0
Escambia	Yes (for bay and bayou only)	3 week sanitary survey then monthly	~100 mi./bays and bayous only	4
Flager	No			NA
Collier	No			NA
Gulf	No			NA
Indian River	No	(only if noticeable problems)	~3 0 mi/ 0	NA
Hernando	No		.5 mi./infrequent grab sampling (public) 20 mi./none	N/A
Hillsborough	Yes	Monthly (at least)	3.5 mi./all	4
Monroe (Key West)	No			N/A
Lee	Yes	Monthly	4.06 mi./2.66 mi. (public) Gulf beach 46/0 (private)	0
Levy	No		25 mi./none	N/A
Manatee	No			N/A
Martin	No		35 mi./none (public)	N/A
Nassau	No			N/A
Okaloosa	Yes	Monthly	~100/all	475
Palm Beach	Yes	Quarterly or semi-annually	47 mi./35 mi. (public)	12
Pasco	Yes	Monthly	3.24 mi./all (public)	98
Pinellas (St. Petersburg)	Yes	Monthly (at least); St. Petersburg: weekly	80 mi./49 sites St. P.: 3 mi./all (public), 0 (private)	64
St. Johns	No		~40 mi./none (public)	N/A
St. Lucie	No			N/A
Santa Rosa	No		9 mi./none	N/A
Sarasota	Yes	Quarterly	7.35 mi./all (public); 35 mi./0 (private)	0
Taylor	No			N/A
Volusia	No		22 mi/ 0 (public)	N/A
Walton	No		~ 30 mi/0 (public)	N/A

Standards and Testing

Indicator Organisms Fecal coliform and total coliform

Standards Geometric means: fecal coliform density shall not exceed an average of 200/100 ml of sample, nor exceed 400/100 ml of sample in 10 percent of the samples, nor exceed 800/100 ml on any one day; and total coliform density shall not exceed an average of 1,000/100 ml in more than 20 percent of the samples examined during any month, not exceed 2,400/100 ml at any time.

Testing Methods MF and MPN

Monitoring

Testing Frequency See chart above

Areas Monitored Broward, Citrus, Duval, Hillsborough, Lee, Okaloosa, Palm Beach, Pasco, Pinellas, and Sarasota

Cost of Annual Monitoring and Public Notification Broward: ~\$2,400. Citrus: \$250. Hernando: \$3,600. Lee: \$2,400. Okaloosa: \$2,500-3,000 (during summer weekly monitoring). Palm Beach: ~\$5,000. Pasco: \$14,980. Sarasota: \$1,100. St. Petersburg: \$10,000.

Closing/Advisory Issuance

Closing/advisory decision discretionary by county.

Causes of Closings/Advisories: Number of Closings/Advisories

Debris and other pollution due to hurricane: 469; Sewer line leak/break: 135; high bacteria levels: 100; stormwater runoff: 67; rain (preemptory): 23; sewer overflows: 12; sanitary sewer overflow: 12; STP malfunction: 12.

Miles of Ocean and Bay Beach/Miles Monitored

See chart above

1995 FLORIDA OCEAN AND BAY CLOSINGS AND ADVISORIES

Citrus County

Closed	Open	Beach	Source/Cause
5/1	5/29	Hunter's Springs, in Crystal River City	Stormwater runoff
Subtotal: 28			

Dade County

Closed	Open	Beach	Source/Cause
6/19	6/20	Surfside & Bal Harbor Beaches	Sewer-line leak in Bal Harbor
6/30	7/4	Matheson Hammock & Homestead Bay Front & Oleta Park	High bacteria levels due to heavy rain and resulting sewer overflows
8/17	8/20	Haulover Beach	Sewer-line break in Bay Harbor
9/1	10/1	Oleta River Park & parts of Haulover & Sunny Isles & Bal Harbor Beaches	Major sewer-line break near Oleta River in N. Dade

Advisories

6/30	Matheson Hammock	High bacteria levels, force main break—untreated sewage spill
8/17	Biscayne Bay	
9/8	Biscayne Bay & Haulover Beach & Sunny Isles	
9/11	Biscayne Bay & Haulover Beach & Sunny Isles	
Subtotal: 145		

Escambia

Closed	Open	Beach	Source/Cause
8/3	8/4	All bays and bayous (2 barrier islands)	Debris and possible high bacteria levels due to Hurricane Erin
10/4	10/5	All bays and bayous (2 barrier islands)	" "
Subtotal: at least 4			

Hillsborough County

Closed	Open	Beach	Source/Cause
July (date not recorded)		Bahia Beach & Days Inn & Picnic Island & Simmons Park	Tampa treatment-plant spill (precautionary)
Subtotal: 4			

Okaloosa County

Closed	Open	Beach	Source/Cause
6/13	6/18	Cinco Bayou & Choctawhatchee Bay	Sewer-line break
10/4	11/4	All surface waters (15 beaches)	Hurricane Opal caused debris, flooded septic systems, and other pollution
Subtotal: 475			

Palm Beach County

Closed	Open	Beach	Source/Cause
10/20	10/26	Phil Foster Park	Precautionary/sanitary sewer overflow due to flooding
10/20	10/26	Du Bois Park	" "
Subtotal: 12			

Pasco County

Closed	Open	Beach	Source/Cause
8/14	9/18	Oelsner Park Beach	High bacteria levels, cause unknown
9/18	10/2	Hudson Beach & Port Richey Recreation Center Beach & Oelsner Park Beach	" "
10/23	11/13	Oelsner Park Beach	" "
Subtotal: 98			

St. Petersburg

Closed	Open	Beach	Source/Cause
1/15	1/16	Maximo	Precautionary: more than .8" rainfall
1/16	1/18	Maximo	" "
1/15	1/18	N. Shore	" " : more than 1"
3/9	3/10	Maximo	" " : more than .8"
3/20	3/21	Maximo	Coliform results ambiguous
3/20	3/21	N. Shore	" "

3/21	3/23	N. Shore	High bacteria levels, stormwater runoff
4/2	4/4	Maximo	Precautionary: more than .8" rainfall
4/6	4/8	Maximo	" "
4/6	4/8	N. Shore	" " : more than 1"
6/3	6/8	Maximo	Rainfall and high bacteria levels: stormwater
6/3	6/8	N. Shore	" "
6/25	6/27	Maximo	" "
6/25	6/27	N. Shore	" "
7/6	7/7	Maximo	Precautionary: rainfall
7/18	7/24	Maximo	Stormwater runoff
7/19	7/20	N. Shore	" "
7/28	7/29	Maximo	Precautionary : rainfall
8/2	8/4	Maximo	Stormwater runoff
8/2	8/7	N. Shore	" "
8/16	8/17	N. Shore	Precautionary: rainfall
8/26	8/28	Maximo	" "
8/26	8/28	N. Shore	Stormwater runoff
8/29	8/30	N. Shore	" "
9/2	9/4	N. Shore	" "
9/7	9/8	N. Shore	" "
9/10	9/11	N. Shore	" "
9/12	9/14	N. Shore	" "
10/7	10/9	Maximo	Precautionary:rainfall
10/19	10/20	Maximo	" "

The state of Georgia does not have a monitoring program designed to protect swimmer's health. Major sources of impairment to estuaries are industrial point and nonpoint sources, municipal sources, and stormwater runoff.

11/9	11/11	Maximo	"	"
Subtotal: 64				

TOTAL: at least 830

1994 FLORIDA OCEAN AND BAY CLOSINGS AND ADVISORIES
TOTAL: at least 215

1993 FLORIDA OCEAN AND BAY CLOSINGS AND ADVISORIES
TOTAL: at least 101, plus 1 extended

1992 FLORIDA OCEAN AND BAY CLOSINGS AND ADVISORIES
TOTAL: 773, plus 1 extended (not counting incidences due to Hurricane Andrew)

1991 FLORIDA OCEAN AND BAY CLOSINGS AND ADVISORIES
TOTAL: 299

GEORGIA

The state of Georgia does not have a monitoring program designed to protect swimmer's health. In 1995 the Georgia Department of Natural Resources initiated a pilot monitoring program to asses trends in water quality. Although the Department has the authority to close beaches, this program was not designed to inform beachgoers of potential hazards.

According to Georgia's 1994 305(b) report, 56 percent of its estuaries do not support designated uses. Major sources of impairment to estuaries are industrial point and nonpoint sources, municipal sources, and stormwater runoff.

Ocean swimming occurs primarily off the state's 13 barrier islands including: Tybee, Jekyll, Sea Island, St. Simon, Sapelo, and Cumberland National Seashore.

In addition to the pilot program, the Georgia Water Quality Control Act of 1964 established water-use criteria, water-quality standards, and a bacteria standard, but these apply only to intracoastal swimming areas and estuarine waters.

Standards and Testing

Indicator Organisms Fecal coliform

Standards 200 fecal coliform/100 ml.

Monitoring

There is no regular monitoring of ocean and bay beaches for swimmer safety. The pilot monitoring project that has been initiated monitors only for trends in water quality. It is not clear whether the pilot monitoring program will continue.

Closing/Advisory Issuance N/A

Miles of Ocean and Bay Beach/Miles Monitored

100 miles of coast. 19 accessible/19 mi. (public).

GUAM

Guam first implemented its monitoring strategy for recreational uses in 1978. The testing standards and the monitoring procedures were based on a territorial code.

In 1994 Guam changed its standard to conform with that recommended by EPA. When the standard is exceeded, the government issues advisories through publication in Guam's only newspaper and through announcements on Guam's broadcast media, warning the public not to swim or fish in the water.

Standards and Testing

Indicator organism Enterococcus

Standards A geometric mean of 35 Enterococci/100 ml.

Testing Methods MF

Monitoring

Testing Frequency Recreational: weekly.

Areas Monitored The Guam EPA monitors 36 recreational stations. Some beaches are not monitored due to lack of access.

Cost of Annual Monitoring and Public Notification Program \$350,000 for entire water-quality program of which approximately \$10,000 is allocated specifically for recreational beach-monitoring program.

Closings and Advisories

Advisories are issued when there is a bacteria violation, but beaches are closed only for special cases.

Causes of Closings/Advisories: Number of Closings/Advisories

Agricultural activity: 2; reconstruction of park shelters: 1 extended.

Miles of Ocean and Bay Beach/Miles Monitored

~75 miles of ocean beach/28 beaches (40 percent)

The Blue Water Annual Report, which Hawaii publishes annually, summarizes the monitoring data and other information on ocean and bay water quality.

1995 GUAM OCEAN AND BAY BEACH CLOSINGS AND ADVISORIES

Closed	Open	Beach	Source/Cause
11/1	12/27	Inarajan Beach	Reconstruction of park shelters
dates not recorded		Tokewan Bay Talafofo	Advisory — Agricultural activity

TOTAL: 2, plus 1 extended

1994 GUAM OCEAN AND BAY BEACH CLOSINGS AND ADVISORIES

TOTAL: 0 Closings, unknown number of Advisories

1993 GUAM OCEAN AND BAY BEACH CLOSINGS AND ADVISORIES

TOTAL: 0

HAWAII

The Clean Water Branch of the Hawaii Department of Health (HDOH) runs a statewide beachwater-quality monitoring program. Hawaii's bacteria standard is one of the strictest in the nation, but the Department does not always close a beach if the standard has been exceeded. The state relies on additional factors, such as the presence of raw sewage, when evaluating whether conditions warrant closing a beach. Beach closings and advisories due to sewage spills are instituted by the respective county agencies. These agencies were issued permits by the State DOH, which require them to post closings and issue press releases if a spill has the potential to affect areas accessible to the public.

All of the islands except for Niihau and Kahoolawe are partially monitored. However, budget cuts over the past years have resulted in a decrease in monitored areas and in frequency. During 1995, sampling was terminated on Kona, Lanai, and Molokai Islands, and in Nawiliwili Bay (Kauai), Kahului Bay (Maui), and Hilo Bay (Hawaii). However, in September 1995 sampling was resumed at all these sites except for Hilo Bay. For the majority of last year, this left only portions of the largest islands of Hawaii, Kauai, Maui, and Oahu monitored.

In 1995 the new State legislature cut by about half the budget for the monitoring program. The program also lost positions as personnel retired, another impediment. State budget shortfalls forced a temporary ban on all travel, effectively canceling water-quality monitoring in areas to which personnel must travel (West Hawaii, Lanai, and Molokai). Additionally, all neighborhood island offshore sampling was temporarily canceled (Nawiliwili Bay, Kahului Bay, and Hilo Bay) because the travel restrictions prevented support personnel from assisting with sampling.

Microbiology sampling was canceled on several occasions to facilitate the state laboratory's move to its new location in Pearl City. Travel restrictions were finally relaxed by the end of June. However, by then, the relocation of the laboratory had disrupted the sampling schedule, nullifying the opportunity to reestablish the sampling that had been canceled earlier in the year. The sampling schedule returned to "normalcy" in September and has remained stable since. Currently, a total of 169 sites are being monitored.

There is a new proposal by the Environmental Planning Office of the DOH to change the indicator organism from enterococcus to *Clostridia Perfringens*. The DOH asserts that this would improve the program because tropical soils such as those in Hawaii, naturally contain fecal indicator bacteria (e.g. *E. coli*). When such bacteria are found in nearshore waters, they may not be indicative of sewage pollution, but rather of contamination from the soil. The change in indicator organism, if implemented, will have an immediate and direct impact on the monitoring locations (more sites), monitoring frequencies (reduced frequency), and

monitoring procedures (possibly may remain the same). Normally, closure advisories are issued when there is the potential of a health risk to the public and are not dependent upon the confirmation of high bacteria levels, however, this may change with the new indicator organism.

The Blue Water Annual Report, which the HDOH publishes annually, summarizes the monitoring data and other information on ocean and bay water quality. The report serves as a good source of public information about which beaches exceeded the state bacteria standard for swimming over the past year.

Standards and Testing

Indicator Organisms Enterococcus; (Fecal coliform and total coliform are tested for informational purposes)

Standards For waters within 1,000 feet of shore: A geometric mean of 7 enterococcus/100 ml in not less than five equally spaced samples at six-day intervals, or unequally spaced at five- to eight-day intervals, provided that the total period covered is between 25 and 30 days.

Testing Methods MF and MPN (rarely)

Monitoring

Testing Frequency Oahu sites: weekly, biweekly, or monthly. Molokai and Lanai sites: quarterly. Maui and Kauai sites: monthly. Hawaii: monthly and biweekly.

Areas Monitored Oahu: 53 sites. Lanai: 2 sites. Molokai: 2 sites. Maui: 37 sites. Kauai: 28 sites. Hawaii: 43 sites. Niihau and Kahoolawe: none. The state has approximately 1,052 miles of tidal shoreline (the main islands—964 mi.) In 1994 approximately 230 miles were monitored, but sampling has been reduced over the past two years and the exact mileage is not known.

Cost of Annual Monitoring and Public Notification Program The monitoring budget as of July 1995 was \$773,000.

Closing/Advisory Issuance

Closings and advisories are issued only in response to sewage spills or other specified pollution events that affect the beaches directly.

Causes of Closings/Advisories: Number of Closings/Advisories

Precautionary due to sewage spills: 13

Miles of Ocean and Bay Beach/Miles Monitored

A general outline of the state's coast comprises 750 statute miles. However, there are only 184.9 miles of sandy shoreline on the six main islands—Hawaii, Maui, Lanai, Molokai, Oahu, and Kauai—and only 24.4 miles are considered safe, clean, accessible, and generally suitable for swimming.

In 1995 the State legislature cut the budget for the monitoring program by about half. Only portions of the largest islands of Hawaii, Kauai, Maui, and Oahu were monitored.

1995 HAWAII OCEAN AND BAY CLOSINGS AND ADVISORIES

Closed	Open	Beach	Source/Cause
3/20	3/25	Lua Landing, Laie	Precautionary—sewage spill
7/26	7/29	Kalapaki Beach, Lihue	Precautionary—discharge of secondary treated sewage
7/29	8/3	Hanamaulu Beach, Hanamaulu	Precautionary—sewage spill

TOTAL: 13

1994 HAWAII OCEAN AND BAY CLOSINGS AND ADVISORIES

TOTAL: 16, plus 1 extended

note: there was an error in the data reported to us last year—the 1 extended closing was really 7/6 to 7/12, not 9/12.

1993 HAWAII OCEAN AND BAY CLOSINGS AND ADVISORIES

TOTAL: 6

1992 HAWAII OCEAN AND BAY CLOSINGS AND ADVISORIES

TOTAL: 29

1991 HAWAII OCEAN AND BAY CLOSINGS AND ADVISORIES

Total: 106

ILLINOIS

The Illinois Department of Public Health adopted a Swimming Pool and Bathing Beach Code in 1990 that codified standards in effect since the mid-1970s. The state code requires that beaches be closed when two consecutive samples violate the standard. Closings and advisories are issued by the Illinois Department of Public Health.

Monitoring procedures of Great Lakes waters are left to the discretion of the two counties with beaches bordering Lake Michigan: Lake County and Cook County.

The Lake County Health Department monitors its nine licensed public beaches. In Cook County there are 37 bathing beaches, and the individual municipalities are in charge of monitoring their own beaches. The Chicago Park District monitors 23 public bathing beaches and the City of Evanston monitors five public bathing beaches and two private beaches.

Officials cite an increase in seagull population as the reason for the increase in closings this year.

One hundred percent of Illinois's Great Lakes waters are threatened, according to Illinois's 1994 305(b) water-quality report. This means that unless action is taken, water quality will decline and no longer support designated uses.

Standards and Testing

Indicator Organisms Fecal and/or total coliform

Standards Fecal coliform count is equal to or greater than 500/100 ml for a single sampling event, *E. Coli* count over 235/100 ml, or fecal coliform count is greater than 200/100 ml on two consecutive samples.

Testing Methods MF or MPN

Monitoring

Testing Frequency Lake: 4 days a week (Thursday-Sunday). Cook: Chicago Park District and City of Evanston: daily. All from June 1 through Labor Day.

Areas Monitored Lake: 9 licensed public beaches. Chicago Park District: public beaches. City of Evanston: 5 public beaches and 2 private (Northwestern University Beach and Village of Kennelworth).

Cost of Annual Monitoring and Public Notification Program

City of Evanston: \$1,150/season (labor only). Lake County: \$20,000. City of Chicago: \$8/sample.

Closing/Advisory Issuance

Closings and advisories are issued by the Illinois Department of Public Health. The state code requires closings after two consecutive samples violate the standard.

Causes of Closings/Advisories: Number of Closings/Advisories

Stormwater runoff: 38; urban stormwater runoff and contamination from gulls: 15; elevated bacteria levels: 2;

Miles of Ocean and Bay or Great Lakes Beach/Miles Monitored

Lake County: 25 miles of Great Lake beach, with less than 2 miles used for beach purposes/all. Chicago: 26 miles/32 sample sites.

1995 ILLINOIS GREAT LAKES CLOSINGS AND ADVISORIES

Lake County

Closed	Open	Beach	Source/Cause
6/1	6/3	Beach Park South	Urban stormwater runoff
6/15	6/17	Waukegan South	Urban storm runoff; gulls—fecal contamination
7/15	7/17	Waukegan South	" "
7/20	7/22	Waukegan South	" "
7/27	7/29	North Point North Marina (1 beach)	Stormwater runoff
8/4	8/6	North Point North Marina	" "

Procedures for monitoring Great Lakes waters are left to the discretion of the two counties that have beaches bordering Lake Michigan: Lake County and Cook County.

8/4	8/6	Park Avenue in Highland Park	" "
8/17	8/19	Park Avenue in Highland Park	" "

Advisories

Closed	Open	Beach	Source/Cause
6/2	6/3	Waukegan South	Urban storm runoff, fecal contamination from gulls
6/8	6/9	Waukegan South	" "
6/10	6/11	Waukegan South	" "
6/17	6/18	Rosewood Beach in Highland Park	Stormwater runoff
6/22	6/23	Waukegan South	Runoff and gulls
6/22	6/23	North Point North Marina	Stormwater runoff
6/22	6/23	Waukegan North	" "
6/29	6/30	Lake Bluff Beach & Rosewood Beach in Highland Park	" "
7/1	7/2	Park Avenue in Highland Park	" "
7/1	7/2	Rosewood Beach in Highland Park	" "
7/2	7/3	Waukegan South	Runoff and gulls
7/3	7/4	Lake Bluff Beach	Stormwater runoff
7/11	7/12	Lake Bluff Beach	" "
7/16	7/17	Illinois State Beach Park North	" "
7/20	7/21	North Point North Marina	" "
7/21	7/22	Park Avenue in Highland Park	" "
7/21	7/22	Rosewood Beach in Highland Park	" "
7/22	7/23	North Point North Marina	" "
7/25	7/26	Lake Bluff Beach	" "
7/30	7/31	Waukegan South	Runoff and gulls
8/4	8/5	Lake Forest Beach	Stormwater runoff

8/5	8/6	Rosewood Beach in Highland Park	" "
8/11	8/12	Illinois State Beach Park South	" "
8/17	8/18	Waukegan South	Runoff and gulls
8/17	8/18	Rosewood Beach in Highland Park	Stormwater runoff
8/18	8/19	Waukegan North	" "
8/20	8/21	Waukegan South	Runoff and gulls
8/20	8/21	Waukegan North	Stormwater runoff
8/20	8/21	Illinois State Beach Park North	" "
8/20	8/21	Illinois State Beach Park South	" "
8/20	8/21	Lake Forest Beach	" "
8/24	8/25	Waukegan South	Runoff and gulls
8/24	8/25	North Point North Marina	Stormwater runoff
8/24	8/25	Waukegan North	" "
8/25	8/26	Lake Forest Beach	" "
8/27	8/28	Waukegan North	" "
9/1	9/2	Illinois State Beach Park North	" "
Subtotal: 53			

City of Evanston

Closed	Open	Beach	Source/Cause
6/22	6/23	Northwestern Beach	Elevated bacteria levels/cause unknown
6/25	6/26	Northwestern Beach	" "
Subtotal: 2			

TOTAL: 55

**1994 ILLINOIS GREAT LAKES CLOSINGS AND ADVISORIES
TOTAL: 36**

**1993 ILLINOIS GREAT LAKES CLOSINGS AND ADVISORIES
TOTAL: 73**

INDIANA

Indiana passed a state rule in 1990 designating a water-quality standard for monitoring Great Lakes waters, but it does not mandate that each county monitor beachwater quality. A local health department does, however, have a statutory obligation to notify the public of a condition that may cause, transmit, or generate disease. Indiana has proposed bathing beach rules, titled Indiana Proposed Rules, for promulgation. The rules would set state standards, monitoring procedures, policy on closings and advisories, and methods of operation. Until the legislature passes these rules, the State Board of Health has encouraged the counties to develop their own programs based on the general guidelines contained in the *Recommended Standards for Bathing Beaches*, written by the Great Lakes-Upper Mississippi River Boards of State Public Health and Environmental Managers, and revised in 1990. Lake County, Porter County, and LaPorte County are the three counties in Indiana with beaches bordering Lake Michigan.

Indiana Dunes National Lakeshore (Lakeshore) monitors all Lakeshore beaches, which span LaPorte and Porter Counties, and five non-national Lakeshore beaches in all three counties as a courtesy to the neighboring municipalities. In 1993, Lakeshore began to gather additional data during the sampling routines, such as water temperature and direction of littoral drift to further improve the collection of data from the *E. coli* monitoring program.

The LaPorte County Health Department enacted a beach testing program using the state standard in 1990. Laporte monitors five public beaches in Michigan City. Both LaPorte Health Department and Lakeshore are responsible for monitoring Washington Park Beach in Michigan City. Lakeshore also tests Mt. Baldy, since it is within the Dunes National Lakeshore Park. This joint monitoring enables retesting when necessary because the Lakeshore labs are open on weekends.

Lake County DOH monitors one beach in the county. Lakeshore monitors the City of Gary. Lake County reported no closings this year, but as a result of pollution, Hammond Lake Front Beach has been closed for the past 20 years.

Porter County does not have a monitoring program for Great Lakes waters, but Lakeshore monitors the five Lakeshore beaches and four non-Lakeshore beaches.

According to Indiana's 1994 305(b) water-quality report, 100 percent of the surveyed Great Lake areas partially support fishing and shellfishing. A fish consumption advisory impairs all of Indiana's Lake Michigan shoreline. The sources of pollution include industrial facilities, municipal/ semipublic wastewater systems, combined sewer overflows, and agricultural nonpoint sources.

Standards and Testing

Indicator Organisms *E. coli*

Testing Methods MF

Standards 200 *E. coli*/100 ml as a geometric mean based on no less than five samples equally spaced over 30 days or more than 400 fecal coliform/100 ml in any single sample.

Monitoring

Testing Frequency Lakeshore monitors beaches weekly and after major storms from Memorial Day to Labor Day. Lake County monitors weekly. LaPorte County's semi-public

beaches are monitored weekly while private beaches are monitored on a complaint or request basis.

Areas Monitored LaPorte County monitors Washington Park, California Ave., and Long Beach Stop 24, Shoreland Hills Stop 31, and Michiana Stop 37. Lakeshore monitors Lake St. in Gary, West Beach, Ogden Dunes, Porter Beach, Dune Acres, Dunes State Park, Kemil Road, Lake Vies, Central Ave, Mt. Baldy, and Washington Park. Lake County monitors Wihala Beach.

Cost of Annual Monitoring and Public Notification Program LaPorte: \$2,000. Lakeshore: \$8,000.

Closings/Advisory Issuance

Beaches are closed and the public is notified when standards are violated or there some or other pollution emergency (such as oil globules), when rainfall is equal to or greater than .5" in a 24-hour period, or medical wastes are washing onto the beaches. Lakeshore has a recorded message that lists all beach closings—219-926-7561.

Causes of Closings/Advisories: Number of Closings/Advisories

Nonurban runoff(fecal contamination from overflow of swampy areas with dense wildlife populations): 8; high bacteria levels/cause unknown: 6.

Miles of Ocean and Bay or Great Lakes Beach/Miles Monitored

La Porte Co: 6.85 mi./all. Lake County: 2 mi./all. Indiana dunes National Seashore: 13.2 mi./12.6 mi(public); 7.7 mi./1/7 mi.(private).

1995 INDIANA GREAT LAKE CLOSINGS AND ADVISORIES

LaPorte County

Closed	Open	Beach	Source/Cause
9/1	9/6	Michigan City California Avenue	Unknown
Subtotal: 5			

Indiana Dunes National Lakeshore

Closed	Open	Beach	Source/Cause
8/4	8/5	West Beach Porter County	Nonurban runoff
8/11	8/12	Porter Beach Porter County	" "
8/11	8/12	Central Avenue Porter County	" "
8/18	8/19	Mount Baldy LaPorte County	" "

Oil and grease are cited as the most common cause of impairment among Louisiana estuaries, followed closely by nutrients and pathogen indicators. Sources of oil and grease contamination in estuaries include petroleum activities, industrial point sources, and spills.

8/25	8/26	Kemil Rd. Beach	High bacteria levels/ cause unknown
6/26	6/27	Dunes State Park W.	Nonurban runoff
7/6	7/7	Dunes State Park E.	" "
7/14	7/15	Dunes State Park E.	" "
7/21	7/22	Dunes State Park E.	" "
Subtotal: 9			

TOTAL: 14

1994 INDIANA GREAT LAKES CLOSINGS AND ADVISORIES
TOTAL: 36

1993 INDIANA GREAT LAKES CLOSINGS AND ADVISORIES
TOTAL: at least 30

LOUISIANA

Louisiana has had no program of monitoring for swimmer safety since its official program was discontinued in 1988. A limited monitoring program targeting potential "hot spots" has been considered for the past few years, but budgetary constraints frustrate its adoption. Any beach closures are issued by the Louisiana Department of Health and Hospitals (LDHH), usually in conjunction with LDEQ.

Louisiana has had a water-quality monitoring program for ocean/bay/estuarine water since 1958. Although previously housed in other agencies, the Louisiana Department of Environmental Quality (LDEQ) has run the program since 1984. Originally the program was established to monitor the impact of sewage discharges on the water but now monitors for effects from agricultural development, other nonpoint source discharges, and for the water quality of lakes.

Louisiana's coastline is primarily marsh and much of the state's 7,656 square miles of estuarine water bodies is largely inaccessible to swimmers. Louisiana's water-quality monitoring program for shellfish beds assesses 4,942 square miles of its estuaries. By state standards for primary contact, 28 percent (or 1,391 square miles) of the assessed area is deemed unsafe for swimming for at least part of the year. Direct discharges, urban runoff, and septic systems are the primary pollution sources.

According to Louisiana's 1994 305(b) report, 72.3 percent of Louisiana's estuaries fully support their designated uses and 27.7 percent partially support their designated uses. Oil and grease are cited as the most common cause of impairment among Louisiana estuaries, followed closely by nutrients and pathogen indicators. Sources of oil and grease contamination in estuaries include petroleum activities (the second leading source overall), industrial point sources, and spills.

Louisiana is involved in estuary and coastal improvement through three federally initiated programs: the Barataria Terrebonne National Estuary Program, the Gulf of Mexico Program, and the Coastal Nonpoint Source Program.

The South Shore beach at Lake Pontchartrain is permanently closed due to municipal point sources, inflow and filtration, and urban runoff/storm sewers.

Standards and Testing

Indicator Organisms Fecal coliform

Standards 200 fecal coliform/100 ml with not more than 10 percent of the samples to exceed 400/100 ml.

Monitoring

There is no regular monitoring of ocean and bay beaches for swimmer safety.

Closing/Advisory Issuance

The South Shore of Lake Ponchartrain is unofficially posted with signs cautioning against swimming.

Miles of Ocean and Bay Beach/Miles Monitored

Coastline ranges from 2,000-3,000 miles, with 7,656 square miles of estuarine water bodies (much of the coastline is inaccessible or unsuitable for swimming because it is marshland).

1995 LOUISIANA OCEAN AND BAY CLOSINGS AND ADVISORIES

TOTAL: 1 permanent

1994 LOUISIANA OCEAN AND BAY CLOSINGS AND ADVISORIES
TOTAL: 1 permanent

1993 LOUISIANA OCEAN AND BAY CLOSINGS AND ADVISORIES
TOTAL: 1 permanent

1992 LOUISIANA OCEAN AND BAY CLOSINGS AND ADVISORIES
TOTAL: 1 permanent

1991 LOUISIANA OCEAN AND BAY CLOSINGS AND ADVISORIES
TOTAL: 1 permanent

MAINE

The Maine Department of Environmental Protection (DEP) does not perform comprehensive testing of beachwater for swimmer safety. In the past, it has selected a few sites to monitor throughout the summer based on potential impacts of pollution. But the DEP did not monitor any sites in 1995. The DEP does not have authority or jurisdiction over beach operation. Whether to issue a closing or advisory when the bacterial standard is exceeded is a discretionary decision made by municipal health departments.

The two areas monitored regularly are the East End Beach in Portland, monitored by the City of Portland, and the Town of Old Orchard Beach, monitored by the Waste Water Treatment Plant (W.W.T.P.) in the Town of Old Orchard.

The Ogunquit Sewer District, which used to monitor the Town of Ogunquit twice a week, dropped its regular program in 1995. It now only monitors if there is a malfunction of a sewage-treatment system or if the effluent is not in compliance.

The Ogunquit Sewer District, which used to monitor the Town of Ogunquit twice a week, dropped its regular program in 1995. It now only monitors if there is a malfunction of a sewage-treatment system or if the effluent is not in compliance.

The city of South Portland did not have a testing program for 1995. However, the Department of Parks and Recreation, working through the Pollution Control Department will start a new monitoring program in the summer of 1996.

The three beaches of Peaks Island in Casco Bay have been permanently closed since 1991. Peaks Island plans to begin testing these beaches in 1997 in hope of reopening them.

According to the state's 1994 305(b) report, water quality overall has improved in Maine, however bacteria from municipal treatment plants and small dischargers continue to contaminate shellfish beds in estuarine waters.

Standards and Testing

Indicator Organisms Enterococcus

Standards Instantaneous level of 94 enterococcus/100 ml with the geometric mean varying according to the number of samples taken (33 enterococcus/100 ml for five samples). Portland: Instantaneous standard of 54 enterococcus/100 ml, and 18 enterococcus/100 ml for five samples. City of Portland issues preemptive rainfall advisories.

Testing Methods MF

Monitoring

Testing Frequency Portland: 3 samples per week during summer. Town of Ogunquit: only in the event of a malfunction of treatment system or if an outfall effluent is not in compliance. Town of Old Orchard Beach: monitored on an as-needed basis depending on W.W.T.P. effluent and other factors.

Areas Monitored East End Beach, Town of Old Orchard Beach, and the Town of Ogunquit.

Cost of Annual Monitoring and Public Notification Program Ogunquit: approximately \$900/year. Old Orchard Beach: \$300-400/year. State: \$1,000.

Closing/Advisory Issuance

Beach administrators make discretionary decisions on whether to close a beach or issue an advisory. Portland employs a three-tiered advisory system when a bacteria standard is exceeded: A green flag posted signifies safe waters, a yellow flag denotes the possibility of high bacteria levels, and a red flag signifies known high bacteria levels.

Causes of Closings/Advisories: Number of Closings/Advisories

Sewer overflows: 10; untreated sewage: 1 permanent.

Miles of Ocean and Bay Beach/Miles Monitored

Ogunquit: approximately 2.5 miles of beach/none on a regular basis. South Portland: .75 miles of beach/all. Old Orchard Beach: 7 miles/4-5 miles monitored.

1995 MAINE OCEAN AND BAY CLOSINGS AND ADVISORIES

Portland

Closed	Open	Beach	Source/Cause
permanent		Peaks Island (3 beaches)	Untreated sewage
dates not provided (officials estimate 10 days)		East End Beach	Sewer overflows

TOTAL: at least 10, plus 3 permanent

1994 MAINE OCEAN AND BAY CLOSINGS AND ADVISORIES

TOTAL: at least 15, plus 3 permanent

1993 MAINE OCEAN AND BAY CLOSINGS AND ADVISORIES

TOTAL: 35, plus 3 permanent

1992 MAINE OCEAN AND BAY CLOSINGS AND ADVISORIES

TOTAL: at least 3 permanent closings

1991 MAINE OCEAN AND BAY CLOSINGS AND ADVISORIES

TOTAL: 47, plus 3 permanent

MARYLAND

The State of Maryland requires that counties monitor all permitted bathing beaches according to state standards. However, the only beaches that must be permitted are those that charge fees for entrance and therefore are "public beaches." The "community beaches," which are smaller and more remote, do not monitor. The Code of Maryland Regulations (COMAR) requires that a preliminary sanitary survey be conducted in order to determine whether a proposed location is safe for use as a public beach. Once a location is approved, and therefore permitted, the monitoring of the beach must be carried out according to the state standards.

Of Maryland's 15 counties bordering the ocean or the Chesapeake Bay, six have no permitted beaches and therefore no required monitoring: Harford, Wiconico, Talbot, Charles, Prince George's, and Dorchester; eight monitor regularly: Anne Arundel, Baltimore, Calvert, Cecil, Kent, Queen Anne's, Worcester, and St. Mary's, which does not permit its beaches but routinely samples the water. Although budget cuts in previous years had eliminated Somerset's program, the county was able to perform limited sampling of known bathing areas in 1995, and hopes to increase monitoring in 1996.

For example, in St. Mary's County, closure is voluntary as the majority of sites are state parks or privately owned communities, which self-regulate use of their beaches. However, in some counties such as Cecil, areas are posted when elevated counts are reported and the county resamples as soon as lab scheduling permits.

Monitoring of Assateague Island National Seashore, which spans the Maryland-Virginia border, is discussed in the Virginia summary.

According to Maryland's 1994 305(b) water-quality report, 100 percent of the state's estuarine waters are impaired or threatened. Ninety-nine percent of its ocean waters, however, are reportedly in good condition.

The decision to issue closings or advisories is discretionary; beaches are not always closed when the bacteria standard is exceeded.

Major sources of beach pollution include agricultural runoff, sanitary sewer overflows, discharge from septic systems, and discharge from boats.

Standards and Testing

Indicator Organisms Fecal coliform

Standards A logarithmic mean of 200 fecal coliform/100 ml, based on a minimum of not less than five samples taken over 30-day period; 10 percent of the samples taken during any 30-day period not to exceed 400/100 ml. When a sanitary survey discloses no significant health hazard, these standards do not apply.

Testing Methods MPN

Monitoring

Testing Frequency Under COMAR, permitted beaches must be tested at least monthly. Queen Anne's County monitors weekly, as do several areas in Anne Arundel. The beach at Ocean City is monitored monthly from the inlet to the Delaware state line. Assateague Island is monitored monthly from the inlet to Chincoteague.

Areas Monitored Anne Arundel (including the city of Annapolis), Baltimore, Calvert, Cecil, Kent, Queen Anne's, St. Mary's, and Worcester counties.

Cost of Annual Monitoring and Public Notification Program Anne Arundel: \$127,917. Baltimore: not determined. Calvert: \$1,000. Cecil: ~\$15,000. Kent: varies. Queen Anne's: \$40/sample. St. Mary's: varies. Somerset: \$1,000 for current minimal effort (does not include lab costs—lab service provided by State Dept. of Health Lab). Worcester: ~\$500-700 (+lab costs incurred by state not county).

Closing/Advisory Issuance

The decision to issue closings or advisories is discretionary; beaches are not always closed when the bacteria standard is exceeded. Cecil, Queen Anne's, and St. Mary's counties advise bathers to beware of swimming following heavy rainfall. Anne Arundel operates a Recreational Water Quality hotline from Memorial Day to Labor Day, which includes weekly sample results and notification of waterway closings.

Causes of Closings: Number of Closings

Agricultural runoff: 135; stormwater runoff: 33; sewage discharge: 32; nonpoint source: 3 extended.

Miles of Ocean and Bay Beach/Miles Monitored

Anne Arundel: 435 mi./80 percent monitored during swimming season, 10 percent the rest of the year. Baltimore County: <1 mi./<1 mi. Calvert: 26 mi./8 beaches (5 mi.). Cecil: 200 mi. (most are not used for swimming)/10 beach areas, each ~100 yards long (~1,000 yards). Kent: 2 mi./all (public); 268 mi./13 sites plus other requests (private). Somerset: 4 beaches approx. 1 mile/limited. St. Mary's: 400 miles of shoreline/16 beach sites, 2 bordering the Chesapeake Bay.

Queen Anne's: 2 miles. Worcester: 30 miles of ocean beach, ~200 ft. of bay./monitors from the Delaware line to Chincoteague, VA (public).

1995 MARYLAND OCEAN AND BAY CLOSINGS AND ADVISORIES

Anne Arundel County

Closed	Open	Beach	Source/Cause
3/25	extended (through 1995)	Marley Creek	Nonpoint source
5/19	" "	Rock Creek (only 3 areas)	" "
6/3	" "	Furnace Creek	" "
6/6	6/15	Aberdeen Creek	Utility-line sewage discharge
12/3	12/26	Mill Creek	Utility pumping-station sewage discharge

Subtotal: 32, plus 3 extended

Cecil County

Closed	Open	Beach	Source/Cause
6/27	6/28	Carpenters Point, in Perryville	Stormwater runoff
7/17	7/31	Elk Neck State Park, in North East	" "
8/17	8/21	Holloway Beach, in Charlestown	" "
8/17	8/21	Charlestown Manor Area	" "
ongoing		Countywide	A standing rainfall advisory warns against swimming after heavy rains

Subtotal: 23

Queen Anne's County

Closed	Open	Beach	Source/Cause
6/16	6/26	Camp Wright, in Chesapeake Bay	Runoff—rain
6/16	7/7	Conquest Beach	Agricultural runoff
6/16	7/28	Beach Harbor	" "
6/30	7/29	Russian Embassy (A)	" "
7/7	8/4	Duck Neck Campground	Agricultural runoff (tidal marsh)

8/4	8/18	Russian Embassy (A)	Agricultural runoff
8/11	8/18	Russian Embassy (B)	" "
8/11	8/18	Beach Harbor	" "
8/11	8/18	Duck Neck Campground	" "
8/25	9/8	Beach Harbor	" "
8/25	9/1	Duck Neck Campground	" "
9/8	9/9	Duck Neck Campground	" "
Subtotal: 145			

TOTAL: 200

1994 MARYLAND OCEAN AND BAY CLOSINGS AND ADVISORIES

TOTAL: at least 82, plus 3 permanent

1993 MARYLAND OCEAN AND BAY CLOSINGS AND ADVISORIES

TOTAL: at least 106, plus 3 permanent and 1 extended

1992 MARYLAND OCEAN AND BAY CLOSINGS AND ADVISORIES

TOTAL: at least 6, plus 3 permanent and 2 extended

1991 MARYLAND OCEAN AND BAY CLOSINGS AND ADVISORIES

TOTAL: at least 24, plus 3 permanent and 2 extended

MASSACHUSETTS

The Commonwealth of Massachusetts does not have a comprehensive monitoring program for its coastal waters. Municipalities within the Commonwealth determine their own standards, testing, and closure practices and do not report results to the state. A majority of coastal communities have a regular monitoring program, though some, including Martha's Vineyard, Newbury, and Newburyport appear not to have any regularly scheduled program. An antiquated Department of Public Health code exists, which contains a total coliform standard, but it is largely ignored by the municipalities. Some boards of health along the South Shore, including the town of Hull and the City of Quincy, participate in an informal information sharing network regarding beachwater monitoring.

The Metropolitan District Commission (MDC), which encompasses four counties in the Boston area, is the only areawide, inter-municipal monitoring program in Massachusetts. The MDC has chosen to adopt, in addition to the fecal coliform standard, an enterococcus standard, the indicator organism currently recommended by EPA for monitoring beaches. The program covers the MDC-owned beaches in Boston, Lynn, Nahant, Winthrop, Quincy, and Hull. The major sources of pollution in the area are CSOs, contaminated storm drains, and urban stormwater runoff.

Massachusetts is home to many popular summer vacations spots. Crane Beach in Ipswich receives around 150,000 visitors each year, primarily during the summer. The Trustees of Reservations serves as the beach administrator and monitors water quality throughout the summer. Also, the popular Cape Cod National Seashore is located in Barnstable County. Despite the numerous visitors and swimmers in this area, officials feel a bathing water monitoring program is unnecessary because the seashore borders on open ocean. The area of Martha's Vineyard in Edgartown is not regularly monitored. Conditions on the beaches and water are monitored by visual and sensory means only, even though pathogens are not detectable by these methods. One advisory was issued at a local beach last season because a large number of jellyfish were in the water.

The Barnstable County Health Department analyzes weekly water samples submitted by municipal health agents from 30 sites. Each town is responsible for issuing its own closings and advisories based on the analysis of samples by the county. Most of the towns state that if there is one high result the town will immediately resample, and it is only if this result is high (a couple of days later) that the beach will be closed. In 1995 the county found bacteriological exceedences for 24 coastal and bay beaches, but only two beaches were closed.

The following changes are being planned for 1996:

- The town of Dartmouth is planning to initiate a post-precipitation monitoring regime in 1996 to determine precipitation levels and their correlation with bacterial levels.
- The town of Quincy is considering adding one sampling location in 1996, based on resident request. They will also start requiring the lab to report exceedences in more detail (this will require additional costs for analysis).
- The MDC, City of Quincy, and Massachusetts Water Resources Authority are planning to sample three beaches five times per week in 1996, in addition to regular sampling once per week to obtain better rainfall correlations.
- The State Department of Public Health is convening a task-force to review standards and make recommendations for change.

Sewage-treatment plant discharges, combined sewer overflows, boating wastes, and urban runoff are major contributors to beach water pollution in Massachusetts. There are

The popular Cape Cod National Seashore is located in Barnstable County. Despite the numerous visitors and swimmers in this area, officials feel a bathing water monitoring program is unnecessary.

Sewage-treatment plant discharges, combined sewer overflows, boating wastes, and urban runoff are major contributors to beachwater pollution in Massachusetts.

numerous combined sewer systems in Massachusetts, 35 in New Bedford alone. These combined sewers discharge approximately 23 million gallons of raw sewage per overflow, annually releasing 1.1 billion gallons of raw sewage, which mixes with polluted stormwater and industrial wastes in waters such as the Inner Harbor, adjacent to Buzzards Bay.

Shellfish bed closures can also indicate polluted waters. Shellfish beds in Cohasset Harbor were recently closed because of high bacteria counts. These counts were well below swimming standards, however. Edgartown also has occasional shellfish-bed closings due to natural coliform from swans, geese, ducks, and other waterfowl congregating in large numbers, coupled with the warm temperatures of summer.

Despite repeated requests for information, NRDC received no response from: Salem, Nahant, Weymouth, Mattapoisett, Newburyport, Plymouth, and Provincetown, so this report may understate the number of closings/advisories in Massachusetts.

Standards and Testing

Indicator Organisms *Enterococcus*, fecal coliform, and total coliform

Standards Department of Public Health: 1,000 total coliform/100 ml "shall be considered as a guide requiring additional investigation, survey or special analysis as may be necessary." The MDC may close a beach after a 50-percent exceedance for all samples at a particular beach for both fecal and enterococcus, based on 200 fecal coliform/100 ml and 104 enterococcus/100 ml. Crane Beach and the boards of health along the South Shore (Quincy, Hull) test for an instantaneous level of 200 fecal coliform/100 ml. Barnstable County tests for 200 fecal coliform/100 ml or 1,000 total coliform/100 ml; some Barnstable municipalities test for enterococcus as well.

Testing Methods MF and MPN

Monitoring

Testing Frequency Weekly: Duxbury, MDC (some harbor beaches twice a week), Quincy, Hull, Gloucester, Lynn, New Bedford, Beverly, Rockport, Scituate, Swampscott, and Weymouth. In 1993, Nahant and Mattapoisett also tested weekly, although despite requests NRDC has received no 1995 information.

Biweekly: Crane Beach, Salem, Marblehead, Wareham, Winthrop, Nantucket, and Dartmouth.

Sites in Barnstable County are monitored weekly or biweekly.

Monthly: Harwich

Areas Monitored Barnstable County (selected municipalities), Beverly, Boston Metropolitan Area (BMA), Cohasset, Crane Beach Reservation, Dartmouth, Duxbury, Gloucester, Harwich, Hull, Lynn, Manchester, Mattapoisett, Marblehead, Nahant, Nantucket, New Bedford, Quincy, Rockport, Salem, Swampscott, Wareham, and Weymouth.

Cost of Annual Monitoring and Public Notification Program Barnstable County: \$4,000 (analysis service to towns). Town of Cohasset: \$600. Crane Beach: \$250. Town of Dartmouth: ~\$2,000. City of Duxbury: \$1,500. Gloucester: ~\$2,000. Town of Harwich: staff time only—\$1,600. Hingham: \$1,000. Town of Hull: \$500. Lynn: \$10,000. MDC: \$20,000. Town of Manchester: \$800-\$1,000. City of Quincy: \$2,400. Nantucket: <\$400. New Bedford: \$5,000. Town of Scituate: ~\$1,000. Swampscott: \$10,000. (In 1993, Nahant: \$10,000.)

Closing/Advisory Issuance

All municipalities contacted report that they issue closings whenever bacteria standards are exceeded. However, towns in Barnstable County close only after the result of a resampling is also high.

Causes of Closings/Advisories: Number of Closings/Advisories

Sewer overflows: 35; high bacteria levels (cause unknown): 33+1p; stormwater runoff: 23; boating waste: 22; CSO: 10; suspected waterfowl: 7; STP malfunction: 2.

Miles of Ocean and Bay Beach/Miles Monitored

Cape Cod National Seashore: 40 miles/none. Cohasset: <1 mi./all (public); 1 mi./25 mi. (private). Crane Beach: 7 miles/all. Metropolitan District Commission: ~20 mi. at 15 coastal beaches/all. City of Hingham: 21 mi./5 mi. (public). Harwich: 5.5/all. Town of Hull: 10 miles/all. City of Quincy: ~20 mi./14 sampling locations, covers most public areas and private deeded areas. Town of Duxbury: 37 miles/4.5-5 mi. Nantucket: 9 mi./all (public); 46 mi./none (private). New Bedford: 1 mile/all. Town of Edgartown: ~15mi./none (public); ~40 mi./none (private). Manchester: 3.5 mi./5 (public). Scituate: 17 mi. Winthrop: 4-5 mi./~3 (public). Revere: 1 mi./all.

1995 MASSACHUSETTS OCEAN AND BAY CLOSINGS AND ADVISORIES

Barnstable County

Closed	Open	Beach	Source/Cause
Three weeks (dates not recorded)		Prince's Cove in town of Barnstable	Boating waste led to high bacteria levels
7/27	8/3*	Woodneck Beach in Falmouth	High bacteria levels—suspected waterfowl and other animals
Subtotal: 28			

*open date was not recorded—officials estimate the closure to be a week.

Manchester

Closed	Open	Beach	Source/Cause
8/9	8/10	West Manchester	High bacteria levels— suspected boat discharge
Subtotal: 1			

Metropolitan District Commission

Closed	Open	Beach	Source/Cause
6/7	6/8	Kings Beach	Combined sewer overflow
6/7	6/8	Lynn Beach	" "
6/7	6/8	Short Beach	Storm drains and urban stormwater runoff
6/21	6/22	Kings Beach	Combined sewer overflow
6/21	6/22	Lynn Beach	" "
6/28	6/29	Constitution Beach	Storm drains and runoff
7/5	7/6	Kings Beach	Combined sewer overflow
7/5	7/6	Lynn Beach	" "
7/19	7/20	Wollaston Beach	Storm drains and runoff
7/26	7/27	Kings Beach	Combined sewer overflow
7/26	7/27	Lynn Beach	" "
7/26	7/27	Constitution Beach	Storm drains and runoff
7/28	7/29	Kings Beach	Combined sewer overflow
7/28	7/29	Lynn Beach	" "
8/2	8/3	Wollaston Beach	Storm drains and runoff
8/5	8/6	Wollaston Beach	" "
8/5	8/6	Constitution Beach	" "
8/9	8/10	Wollaston Beach	" "
8/10	8/11	Tenean Beach	" "
Subtotal:		19	

Quincy

Closed	Open	Beach	Source/Cause
7/13	7/14	Edgewater, in Houghs Neck	High bacteria levels/ cause unkown
7/13	7/14	Parkhurst, in Houghs Neck	" "
7/13	7/14	Orchard, in Squantum	" "

7/20	7/21	Avalon & Mound in Quincy Pnt; & Broady in Germantown & Post Island in Adam's Shore	Stormwater runoff after .25" rainfall during previous 24 hours (high bacteria levels)
7/20	7/28	Chicatabot, in Merrymount	Presumed stormwater runoff
7/27	7/28	Broady, in Germantown & Rhoda and Parkhurst, in Houghs Neck & Nickerson, in Squantum	High bacteria levels/ cause unknown
7/27	8/3	Edgewater, in Houghs Neck & Post Island, in Adam's Shore	" "
8/3	8/4	Nickerson, in Squantum	" "
8/9	8/11	Avalon, in Quincy Point	High bacteria levels—presumed stormwater runoff after .72" rainfall previous 24 hours
8/17	8/18	Rhoda, in Hough's Neck	High bacteria levels/ cause unknown
8/24	8/25	Mound, in Quincy Point	" "
8/31	9/1	Rhoda, in Hough's Neck & Orchard, in Squantum	" "
8/31	9/7	Parkhurst, in Hough's Neck	" "
Subtotal:		47	

Salem

Closed	Open	Beach	Source/Cause
permanent (since last year)		Salem Beach	High bacteria levels/cause unknown
Subtotal:		1 permanent	

Swampscott

Closed	Open	Beach	Source/Cause
6/14	7/19	Swampscott Kings Beach	Sewer overflow
Subtotal:		35	

Winthrop

Closed	Open	Beach	Source/Cause
Date not recorded		Grandview Beach & Donovan's Beach	High bacteria levels, (suspected treatment-plant malfunction in neighboring town)
Subtotal:		2	

TOTAL: at least 132, plus 1 permanent

1994 MASSACHUSETTS OCEAN AND BAY CLOSINGS AND ADVISORIES
TOTAL: at least 58, plus 1 extended

1993 MASSACHUSETTS OCEAN AND BAY CLOSINGS AND ADVISORIES
TOTAL: at least 61

1992 MASSACHUSETTS OCEAN AND BAY CLOSINGS AND ADVISORIES
TOTAL: at least 60

1991 MASSACHUSETTS OCEAN AND BAY CLOSINGS AND ADVISORIES
TOTAL: at least 59

MICHIGAN

The State of Michigan has recommended Bathing Beach guidelines, but these are not requirements for a mandatory bathing beachwater-quality monitoring program. Of the 41 counties that border the Great Lakes, eight counties actively monitor their beaches and three have very limited monitoring programs. Although the other counties do not have official programs, several monitor coastal waters on a complaint basis.

Alpena County has had a beachwater-quality program in the past, but the state started charging for laboratory tests in 1994 and the county program did not have enough funds to test regularly. The same remained true for 1995, but the county hopes to reinstate the program in 1996.

Chippewa County currently monitors only on a complaint basis but plans to begin a monitoring program with the help of a local university in 1996. The program will consist of internships and special projects, whereby students would do most of the sampling and fieldwork.

The state testing criteria changed in 1995 from coliform to *E. coli*, with three samples required for every sampling event. Bay and Charlevoix counties increased their testing frequency with the use of the new standard.

According to Michigan's 1994 305(b) water-quality report none of Michigan's Great Lakes waters fully support their designated use. Leading sources of pollution in Michigan include unspecified nonpoint sources, agriculture, municipal and industrial discharges, combined sewers, and atmospheric deposition.

Standard and Testing

Indicator Organism *E. Coli*

Standards 130 organisms per 100 ml, based on a series of five or more samples taken over a period of 30 days. The acceptable water quality standard for total body contact is 300 fecal coliform/100 ml for a single sampling event.

Testing methods MF

Monitoring

Testing Frequency see chart

Areas Monitored see chart (number of beaches)

Cost of Annual Monitoring and Public Notification Program Macomb: \$36,000. Charlevoix: \$7,000. Wayne: \$11,500. Berrien: \$1,000. Emmet: \$1,200. Allegan: \$4,000.

Closing/Advisory Issuance

The health department notifies beach administrators whenever the bacteria standards are exceeded, and administrators close the beaches to the public at their discretion.

Causes of Closings/Advisories: Number of Closings/Advisories

Illicit storm sewer connections & malfunctioning septic: 68 +2 extended; CSO: 28+1 extended.

Miles of Ocean and Bay Beach/Miles Monitored

3,288/~36

MONITORING PROGRAMS AND CLOSINGS/ADVISORIES IN MICHIGAN DURING 1995

County	Monitoring Program	Testing Frequency	Miles of Beach/ Miles Monitored	Number of Closings/ Advisories
Alger	No	Complaint basis		n/a
Alcona	No			n/a
Allegan	Yes	Weekly		0
Alpena	No			n/a
Antrim	Yes	Bimonthly	.5 mi./all	0
Bay	Yes	Twice weekly		0
Berrien	Yes	5 samples in June	2 mi./1 mi.	0
Cass	No			n/a
Charlevoix	Yes	Weekly	3 mi./all	0
Cheboygan	Yes	Twice annually	5 mi./25 mi.	0
Chippewa	No	Complaint basis		1
Delta	No			n/a

Of the 41 counties that border the Great Lakes, eight counties actively monitor their beaches and three have very limited monitoring programs.

Emmet	Yes	Weekly	12 mi./2 mi.	0
Grand Traverse	No	Complaint basis		n/a
Huron	No		<1 mi./all	n/a
Iosco	No			n/a
Luce Makhac	No	Complaint basis		n/a
Macomb	Yes	Twice weekly	2 mi./all	68
Manistee	No			n/a
Marquette	No			n/a
Mason	No			n/a
Menominee	No			n/a
Monroe	No			n/a
Muskegon	No	Complaint basis	20 mi./none	n/a
Ottawa	No			n/a
Sanilac	No			n/a
Schoolcraft	No	Complaint basis		n/a
St. Clair	Yes	Weekly	<1 mi./all	0
Van Buren	No	Complaint basis		n/a
Wayne	Yes	Weekly	25 mi./all	28 + 1 extended

1995 MICHIGAN GREAT LAKES BEACH CLOSINGS AND ADVISORIES

Macomb County

Closed	Open	Beach	Source/Cause
7/7	7/8	Metropolitan Beach in Metro Park	Combined sewer overflow, illicit storm sewer connections, malfunctioning on site septic systems
6/30	7/2	Memorial Park in City of St. Clair Shores	" "
7/18	7/19	Memorial Park	" "
8/4	9/3	Memorial Park	" "

6/30	7/3	Civic Center in City of St. Clair Shores	" "
7/7	7/12	Civic Center	" "
8/4	8/7	" "	" "
8/11	8/15	" "	" "
8/19	8/20	" "	" "
8/22	9/3	" "	" "

Subtotal: 68, plus 2 extended

Wayne County

Closed	Open	Beach	Source/Cause
7/17	9/4	Pier Park in Grosse Pte. Farms	CSO
7/17	8/14	Crescent Sail Yacht Club in Grosse Pte. Farms	" "

Subtotal: 28 plus 1 extended

TOTAL: 96, plus 3 extended

1994 MICHIGAN GREAT LAKES BEACH CLOSINGS AND ADVISORIES

TOTAL: 26, plus 3 extended, plus 2 permanent

1993 MICHIGAN GREAT LAKES BEACH CLOSINGS AND ADVISORIES

TOTAL: n/a

MINNESOTA

Minnesota has only three counties that border a Great Lake. Of the three, only St. Louis County has a permitted public-bathing beach. The St. Louis County Health Department monitors Park Point Recreation Area Beach on Lake Superior according to the recommendations in *The 10 State Recommended Standards for Bathing Beaches* (Report of the Committee of the Great Lakes-Upper Mississippi River, Board of State Public Health and Environmental Managers).

According to the Minnesota Department of Natural Resources, there are no operational public beaches in Cook County or Lake County on Lake Superior, so neither of these counties has a beachwater-quality monitoring program.

In 1995, the Western Lake Superior Sanitary District was granted a variance for the next five years, on their waste-water treatment plant's NPDES permit. The Minnesota Pollution Control Agency does not expect to apply variances to any other waste-water treatment plants in Minnesota.

Standards and Testing:

Indicator Organisms Fecal coliform

Standards Geometric mean of 200 fecal coliform/100 ml for samples collected on five different days within a 30-day period, or when any single sample exceeds 1,000 fecal coliform/100 ml.

Testing Methods MF

Monitoring

Testing Frequency weekly

Areas Monitored Park Point Beach on Lake Superior

Closing/Advisory Issuance

The St. Louis Health Department issues closings/advisories in cases of marine debris, medical waste, or other pollutants. In such cases, the public is notified via media and posted signs. Rainfall has a small effect on Lake Superior.

1995 MINNESOTA GREAT LAKES CLOSINGS AND ADVISORIES

TOTAL: 0

1994 MINNESOTA GREAT LAKES CLOSINGS AND ADVISORIES

TOTAL: 0

1993 MINNESOTA GREAT LAKES CLOSINGS AND ADVISORIES

TOTAL: 0

MISSISSIPPI

The State of Mississippi has no program for monitoring ocean and bay beaches for swimmer safety. During the summer of 1989, the last year the Mississippi Department of Environmental Quality (MDEQ) regularly monitored recreational beach waters, the geometric averages exceeded the standard at eight of 11 sites. The geometric average for all 11 stations that summer was 334 fecal coliform/100 ml, well above the state's standard. In addition, a 1990 water-quality report revealed that the Mississippi Sound did not meet MDEQ's bacteria standards in Pascagoula Bay and that the rest of the coastal waters met the standard in only limited areas.

One hundred percent of Mississippi's coastal waters are either impaired (88 percent) or threatened (12 percent) according to the state's 1994 305(b) report. The report also states that elevated fecal coliform levels along the Mississippi Gulf Coast continue to be a serious water-quality concern in the state. Population growth and overloaded sewage treatment plants, nonpoint source pollution, and stormwater runoff are the major sources of impairment of coastal waters.

Given this data, it is hard to understand why Mississippi fails to conduct a water-quality monitoring program to protect swimmers' health. Officials at MDEQ cite budgetary constraints, insufficient data collection, and a lack of similar programs in Mississippi's sister states as reasons why the program was discontinued.

One hundred percent of Mississippi's coastal waters are either impaired (88 percent) or threatened (12 percent) according to the state's 1994 305(b) report.

Standards and Testing

Indicator Organisms Fecal coliform

Standards Geometric mean of 200 fecal coliform/100 ml.

Monitoring

There is no regular monitoring of ocean and bay beaches for swimmer safety.

Closing/Advisory Issuance:

Not applicable

Miles of Ocean and Bay Beach/Miles Monitored

~245 miles of coastline/none

NEW HAMPSHIRE

New Hampshire has a statewide monitoring system in place for its public beaches. The New Hampshire Department of Environmental Services (NHDES) monitors coastal waters to determine the suitability of beaches for swimming. While freshwater inland beaches are sampled as often as weekly, monitoring of coastal waters is infrequent. NHDES officials monitor public beaches at least once annually, with follow-up sampling if the bacterial standard is exceeded or if complaints are received. The NHDES monitors a total of 180 public beaches, eight of which are ocean beaches, and performs one to two sampling visits each year, collecting three to six samples at each beach.

The DES now also inspects the bathing facilities, checks more closely for swimmers' itch problems and has been experimenting with methyl anthranilate as a control mechanism for birds. (The DES is sponsoring a test program to reduce the pollution caused by geese and waterfowl. The program includes spraying the roosting areas with high concentrations of methyl anthranilate, a compound used to flavor such consumer products as grape Kool-Aid and bubble gum, which has shown promise as a non-toxic duck repellent.)

In 1995, six freshwater public swimming beaches were posted (advisory) or closed for a total of 95 days because of high bacteria levels due mainly to geese, duck, and seagull populations and stormwater runoff.

Through a joint effort involving NHDES, the Department of Health and Human Services (DHHS), and the New Hampshire Fish and Game Department (NHFG), the state's estuaries are monitored to determine if shellfish can be harvested.

The DES Subsurface Systems Bureau is also involved in a long-term, comprehensive study of the causes of high bacteria levels in shellfish beds. While failed or malfunctioning septic systems are often suspected to be the culprit, sewage treatment plants, urban and agricultural runoff, boats, and wildlife continue to be potential sources of high bacteria levels for shellfish beds, where the bacteria is concentrated by the organisms through filtration.

Officials monitor public beaches at least once annually, with follow-up sampling if the bacterial standard is exceeded or if complaints are received.

Standards and Testing

Indicator Organisms Enterococcus—marine water (*E. coli*—freshwater)

Standards An instantaneous level of 104 enterococcus/100 ml or a geometric mean of 35 enterococcus/100 ml for 3 samples over 60 days.
(Freshwater public beaches—88 *E. coli* in any one sample or geometric mean of 47 *E. coli*; 3 samples/60 days.)

Testing Methods MF

Monitoring

Testing Frequency Three samples are taken at each beach at least once during the summer, with additional follow-up sampling if the bacteria standard is exceeded, or if there are requests or complaints.

Areas Monitored Public beaches are monitored.

Cost of Annual Monitoring and Public Notification Program ~\$5,000-\$7,000 per summer for testing of both freshwater and marine beaches (this does not include the costs for samples). (Coastal beaches are a minor part of the entire beach program—there are six coastal beaches vs. 170 public freshwater.)

Closing/Advisory Issuance

When a high bacteria level is recorded, follow-up sampling is used to determine whether a closure or advisory will be issued.

Miles of Ocean and Bay Beach/Miles Monitored

New Hampshire has 18 miles of open ocean coastline (if Great Bay and Piscatagua River are included, the coastline would measure 100 miles long), of which approximately 3.5 miles are monitored public beaches, including Wallis Sands (600 ft.), Jenness Beach (300 ft.), North Hampton Beach (1.5 mi.), Hampton Beach (1.5 mi.), Town Beach, Rye (300 ft.). The remaining miles of coast are rocky or private residences. Public freshwater surface area is about 172,000 acres. All public bathing beaches are monitored.

1995 NEW HAMPSHIRE OCEAN AND BAY CLOSINGS AND ADVISORIES

Total: 0

1994 NEW HAMPSHIRE OCEAN AND BAY CLOSINGS AND ADVISORIES
TOTAL: 0

1993 NEW HAMPSHIRE OCEAN AND BAY CLOSINGS AND ADVISORIES
TOTAL: 0

1992 NEW HAMPSHIRE OCEAN AND BAY CLOSINGS AND ADVISORIES
TOTAL: 0

1991 NEW HAMPSHIRE OCEAN AND BAY CLOSINGS AND ADVISORIES
TOTAL: 1 extended
(this was caused by an outfall, which has been eliminated)

NEW JERSEY

New Jersey is the only state to have a statewide mandatory beach protection program that includes a bacteria standard, a testing protocol, and mandatory closure requirements whenever the bacteria standard is exceeded. Since 1986 the New Jersey Department of Health, the New Jersey Department of Environmental Protection, and local environmental health agencies have jointly run the Cooperative Coastal Monitoring Program, sampling over 320 beach sites each week.

In 1995, 180 ocean stations and 142 bay stations were tested for compliance with the fecal coliform standard. Eighteen ocean stations and nine bay stations were also monitored with an alternative indicator, enterococci. Since the N.J. standard is fecal coliform, the enterococci tests are not used for bathing restrictions, although they do help determine if a pollution source is nearby. The DEP has found that the geometric mean of the two standards is usually very close; therefore it did not use an alternative indicator in 1995. The state is hoping to use those funds for more investigative testing.

New Jersey officials do not rely solely on coliform levels to determine closings. They also monitor using aerial surveillance to look for illegal discharges or other visible water-quality problems. Furthermore, to determine what conditions exist at the time of the standard's exceedance, sanitary surveys are conducted each time a high bacteria level is recorded.

Preemptive closings/advisories based on threshold levels of rainfall have been adopted by one recreational bay beach, L Street Beach at Shark River in Belmar. According to DEP, this policy could be adopted at any beach at the discretion of the public health officer with sufficient documentation of the relationship of rainfall to ambient bacteria concentrations.

New Jersey is home to a number of popular destinations for beach vacationers including The Wildwoods, Cape May, Atlantic City, Ocean City, and Long Beach.

New Jersey cites nonpoint source pollution/stormwater runoff as the principal source of contaminants in its water. Seventy-three percent of its coastal waters are reported to be in good condition and 27 percent are impaired, according to the state's 1994 305(b) water-quality report.

Standards and Testing

Indicator Organisms Fecal coliform and experimental testing for enterococcus

Standards Two consecutive single sample concentrations of 200 fecal coliform/100 ml. Ambient monitoring standard for enterococcus (not used for closing decisions) is 35 enterococcus/100 ml.

Testing Methods MF and MPN

Monitoring

Testing Frequency Weekly samples are taken during summer.

Areas Monitored All marine recreational ocean and bay beaches are monitored.

Cost of Annual Monitoring and Public Notification Program \$200,000 for the state's administration of the program and an additional \$200,000 total for the local health agencies that participate in the program.

New Jersey is the only state to have a statewide mandatory beach protection program that includes a bacteria standard, a testing protocol, and mandatory closure requirements whenever the bacteria standard is exceeded.

Closing/Advisory Issuance

New Jersey law mandates that beaches be closed when the bacteria standard is exceeded. From Memorial Day to Labor Day a beach information line is in service: 1-800-648-SAND.

Causes of Closings/Advisories: Number of Closings/Advisories

High bacteria (suspected stormwater runoff): 55; rain (precautionary): 26; sewer main break: 3; rain: 2.

Miles of Ocean and Bay Beach/Miles Monitored

127 ocean coastline (the entire Atlantic Coast from Sandy Hook to Cape May)/all monitored.

1995 NEW JERSEY OCEAN AND BAY CLOSINGS AND ADVISORIES**Ocean Beaches**

Closed	Open	Beach	Source/Cause
5/31	6/1	Missouri Beach, in Atlantic City	High bacteria levels/cause unknown—probably a discharge from stormwater system
6/13	6/14	Michigan Beach, in Atlantic City	" "
7/19	7/20	Forget Me Not, in Wildwood Crest	High bacteria levels—rain
8/9	8/10	Brown Avenue, in Spring Lake	" "
SUBTOTAL: 4			

Bay Beaches

Closed	Open	Beach	Source/Cause
6/1	6/2	Beachway in Keansburg	High bacteria levels
6/8	6/11	Yacht Club in Cape May City	" "
6/26	6/30	L Street in Belmar	Rain (Precautionary)
6/29	6/30	Yacht Club in Cape May City	High bacteria levels
6/30	7/3	L Street in Belmar	Rain (Precautionary)
7/13	7/14	GW Yacht Club in Wildwood Crest	High bacteria levels

7/7	7/19	L Street in Belmar	Rain (Precautionary)
7/19	7/20	Beachway in Keansburg & Hancock Ave in Seaside Hts & River Ave in Point Pleasant & West Beach in Pine Beach & Beachwood Bch in Beachwood	High bacteria levels
7/20	7/21	Hancock Ave. in Seaside Hts & River Ave. in Point Pleasant & Beachwood Bch & Yacht Club in Cape May City	" "
7/20	7/27	L Street in Belmar	Rain (Precautionary)
7/21	7/26	Hancock Ave in Seaside Hts	High bacteria levels
7/25	7/26	Rec Center in Highlands	Precautionary—sewer-main break on Waterwitch Ave.
7/25	7/26	Wildwood Ave in Ocean Gate	" "
7/25	7/26	Long Point Beach in Island Hieghts	High bacteria levels
7/26	7/27	West Beach in Pine Beach	" "
7/26	7/27	Rec Center in Highlands	Precautionary—sewer-main break on Waterwitch Ave.
7/27	7/28	Yacht Club in Sea Isle & Yacht Club in Stone Harbor	High bacteria levels
7/28	7/29	L Street in Belmar	Rain (precautionary)
7/28	7/29	Money Island in Dover Twp.	High bacteria levels
8/8	8/10	L Street in Belmar	High bacteria levels—rain
8/8	8/9	16 th street in Surf City & Windward B. in Brick & Maxon Ave in Pt. Pleas. Boro & River Ave. in Pt. Pleas. Boro & Bay Beach in Barnegat	High bacteria levels
8/9	8/10	Rec. Center in Highlands & Beachwood B. in Beachwood & Avon Road in Pine Beach & Hancock in Seaside Heights & Parkertown in Little Egg Harbor & Windward B. in Brick & Jennifer Lane in Stafford	" "
8/10	8/11	Beachwood B. in Beachwood & Avon Road in Pine Beach & Hancock in Seaside Hts & Windward Beach in Brick	" "

Timely and effective public notification continues to be problematic for New York City. The City's rainfall advisory notification program for public beaches consists of a single press release at the beginning to the summer to warn against swimming at certain beaches after heavy rainfalls.

8/14	8/15	Windard Beach in Brick	"	"
8/18	8/19	Shelter Cove in Dover Twp. & Money Island in Dover Twp.	"	"
8/24	8/26	WW Gables Y.C. in Wildwood Crest	"	"
8/30	9/1	L Street in Belmar & Hancock in Seaside Hts.	"	"
9/9	9/10	Greater WW Y.C. in Wildwood Crest	"	"
SUBTOTAL: 82				

TOTAL: 86

1994 NEW JERSEY OCEAN AND BAY CLOSINGS AND ADVISORIES
TOTAL: 238

1993 NEW JERSEY OCEAN AND BAY CLOSINGS AND ADVISORIES
TOTAL: 88

1992 NEW JERSEY OCEAN AND BAY CLOSINGS AND ADVISORIES
TOTAL: 112

1991 NEW JERSEY OCEAN AND BAY CLOSINGS AND ADVISORIES
TOTAL: 108

NEW YORK

New York State does not require that counties monitor swimming beaches. All New York coastal counties and New York City conduct regular bacterial testing and monitoring of ocean and bay beaches. But only five of the 10 counties bordering the Great Lakes have beach-monitoring programs.

The state's county health departments are responsible for making sanitary surveys of all beaches, and it is then at their discretion whether to monitor beaches or not, and how often to monitor. The New York Sanitary Code for "Bathing Beaches," enacted in 1988, includes a bacteria standard and mandatory closure requirements whenever the bacteria standard is exceeded or there is evidence of sewage and wastewater discharges in the bathing area.

The frequency of monitoring varies among counties. In addition, New York City, Nassau, Monroe, Erie, and Suffolk County Health Departments issue periodic bathing-beach advisories after significant rainfall events, notifying the public of potential for decreased water quality, and Westchester County continues to utilize a preemptive closure policy for bathing beaches located in Mamaroneck harbor.

Timely and effective public notification continues to be problematic for New York City. The City's rainfall advisory notification program for public beaches consists of a single press release at the beginning to the summer to warn against swimming at certain beaches after heavy rainfalls. In 1995 and in years past, an advisory was issued just before Memorial Day weekend warning against swimming at Bronx private beaches for 48 hours following a rainfall of .2 inches in 2 hours and against swimming at South and Midland beaches in Staten Island and Manhattan Beach in Brooklyn for 12 hours following rains greater than 1/2 inches.

But there is no follow-up advisory to let the public know when these standards have been exceeded. In 1996 this advisory was issued during the last week in May.

Of the ten counties bordering the Great Lakes five counties, Chautauqua, Erie, Monroe, Niagara, and Oswego, have beachwater-monitoring programs, while Jefferson, St. Lawrence County, and Wayne County do not. Cayuga and Orleans Counties reported no permitted beaches.

Monroe County tests every day, but results are not available for 24-48 hours. Therefore, beaches are preemptively closed, using an operating criteria model. Monroe may modify its operating criteria in 1996, pending further analysis of 1995 data.

The Erie County Health Department has added Lake Erie Beach to its program, however sampling frequency was decreased from four to three for each sampling point because of decreased staff.

Chautauqua County increased the frequency of monitoring of the beach that it closed during 1995 to several times a week while investigating possible sources. Officials expect to monitor that beach more frequently than others in 1996.

According to the *New York Harbor Water Quality Survey* of 1993, 70-80 percent of New York City's 6,000 miles of sewer system are combined with stormwater pipes, which can discharge a mixture of rainfall runoff and raw sewage into area waterways during and immediately after precipitation.

According to the state's 1994 305(b) Water Quality Report, 17 percent of estuaries (including New York Harbor) do not support designated uses and 31 percent only partially support designated uses. Only 2 percent of the state's ocean waters do not support designated uses. Eighty-five percent of the state's Great Lakes waters are reported as only partially supporting designated uses.

Standards and Testing

Indicator Organisms Fecal coliform and total coliform

Standards Marine waters: The state code offers counties a choice between two bacteria standards—a geometric mean of 2,400 total coliform/100 ml for five samples in 30 days with not more than 20 percent of the samples exceeding 5,000 total coliform/100 ml; or an instantaneous level of 1,000 fecal coliform/100 ml and a geometric mean of 200 fecal coliform/100 ml for five samples.

Great Lakes: a logarithmic mean of 2,400 total coliform/100 ml for a series of five or more samples in any 30-day period. Monroe County: a logarithmic mean greater than or equal to 400 fecal coliform/100ml.

Testing Methods MF and MPN

Monitoring

Testing Frequency Nassau, Westchester, and Niagara counties, and New York City test beaches weekly. Monroe County tests every day. Suffolk County samples half of the 150 permitted beaches weekly and the other half (those on the open waters of Long Island Sound and the Atlantic Ocean) less frequently. Chautauqua County tests weekly, biweekly, or monthly depending on beach attendance. Oswego tests twice a year (in July and August).

Areas Monitored All permitted beaches in Nassau, Suffolk, Westchester, Monroe, Oswego, Erie, Niagara, Chautauqua Counties, and New York City are monitored.

Cost of Annual Monitoring and Public Notification Program Chautauqua: \$6,500. Erie: \$10,250. Nassau: \$100,000. New York City: \$100,000. Niagara: \$5,000. Monroe: ~\$22,000. Oswego: \$500. Suffolk: \$150,000-200,000. Westchester: \$50,000.

Closing/Advisory Issuance

All counties close beaches when standards are exceeded. The preemptive closings policy based on rainfall levels is in effect in Westchester County (for beaches in Mamaroneck Harbor) and Monroe County. Nassau and Suffolk Counties issue periodic bathing-beach advisories after significant rainfall events. New York City designates beaches as approved or disapproved at the beginning of the beach season. In addition, a standing rainfall advisory is in effect. However, New York City does not post signs at public beaches or publicize the advisory at times when the rainfall standard is exceeded.

Causes of Closings/Advisories: Number of Closings/Advisories

High bacteria (suspected waterfowl): 145; stormwater runoff and sewer overflow: 63; rain (high bacteria): 32; high bacteria(cause unknown): 28 + 1 extended; sewage overflow: 8; diesel fuel spill: 5; excessive algae: 2; poor water clarity: 2; overflow bypass from STP: 1 extended; Precautionary (rainfall): 1.

Miles of Ocean and Bay Beach/Miles Monitored

Chautauqua County: 1 mi./all (public); 40 mi./0 (private). Erie: 30 mi./all (public); 8 mi./all (private). Monroe: 30 miles of Lake Ontario shoreline/all (.25 mi. at Ontario Beach, 2 mi. at Aamitin Beach State Park, 1 mi. at Durand) (public); 30 mi./selected locations all along the Lakeshore are monitored weekly (private). Westchester: 10 miles of beaches on Long Island Sound/all monitored. Suffolk: 15 mi. (beachfront, county has several hundred miles of shoreline)/all. Nassau: 15 mi./all. New York City: 16 miles/all.

1995 NEW YORK OCEAN, BAY, AND GREAT LAKES BEACH CLOSINGS AND ADVISORIES

Chautauqua County

Closed	Open	Beach	Source/Cause
7/4	9/4	Wright Park, in Dunkirk	36" overflow bypass from city of Dunkirk STP and high levels of bacteria in a creek feeding a beach area
7/4	9/4	Village of Silver Creek Beach	High levels of bacteria in creek that feeds a beach area
SUBTOTAL: 2 extended			

Monroe County

Closed	Open	Beach	Source/Cause
7/1	7/2	Ontario Beach	Excessive algae
7/3	7/4	" "	" "
7/8	8/3	" "	Excessive algae and poor water clarity
8/12	8/14	" "	High bacteria levels
8/22	8/23	" "	Poor water clarity
8/24	8/26	" "	High bacteria levels
8/30	8/31	" "	Poor water clarity
9/1	9/2	" "	Precautionary—if rainfall total is between .7-1.5 inches the beach is closed for 24 hours
Subtotal: 35			

New York City

Closed	Open	Beach	Source/Cause
7/20	7/27	Midland Beach in Staten Island	Heavy rainfall caused stormwater runoff and sewer overflows
7/24	8/2	5 Bronx private beaches: Trinity Danish Young People Society; D.A. Beach Club; Golden Beach Club; Whitecross Fishing Club; Skyler Hill	" "
7/24	8/4	Manhem Beach Club (also a Bronx private beach)	" "
Subtotal: 63			

Nassau County

Closed	Open	Beach	Source/Cause
8/3	8/3	Morgan Beach, in Glen Cove. Sea Cliff, in Seacliff. Tappen Beach, in Glen Head. Bar Beach, in Port Washington. Hempstead Harbour Port Beach, in Port Washington (5)	Diesel fuel spill
Subtotal: 5			

Suffolk County

Closed	Open	Beach	Source/Cause
6/16	6/26	Knollwood Beach	Elevated coliform levels (suspected wildlife and fowl as cause)
6/19	7/11	Gold Star Battalion	" "
6/19	7/24	Venetian Shores	" "
6/19	7/11	Tanner Park	" "
6/26	7/3	Centerport Yacht Club	" "
6/26	9/5	Scudder Park	" "
7/3	7/11	West Islip	" "
7/3	7/7	Benjamins	" "
7/28	8/23	Tanner Park	" "
8/7	8/18	Gold Star Battalion	" "
Subtotal:		145 + 1 extended	

Westchester County

Closed	Open	Beach	Source/Cause
6/12	6/13	Mamaroneck Beach Yacht CC	Elevated bacteria levels — rainfall
6/13	6/14	Shores Acres Club	" "
6/14	6/15	Harbor Island & Beach Point	" "
6/22	6/23	Mamaroneck Beach Yacht CC & Shore Acres Club & Harbour Island & Beach Point	" "
6/27	6/28	Mamaroneck Beach Yacht CC & Shore Acres Club & Harbour Island & Beach Point	" "
7/8	7/10	Mamaroneck Beach Yacht CC & Shore Acres Club & Harbour Island & Beach Point	Sewage overflow from county trunk line into bathing waters
7/11	7/12	Mamaroneck Beach Yacht CC & Shore Acres Club & Harbour Island & Beach Point	Rainfall-related elevated bacteria levels
7/18	7/20	Mamaroneck Beach Yacht CC & Shore Acres Club & Harbour Island & Beach Point	" "

7/24	7/25	Mamaroneck Beach Yacht CC & Shore Acres Club & Harbour Island & Beach Point	" "
8/5	8/6	Mamaroneck Beach Yacht CC & Shore Acres Club & Harbour Island & Beach Point	" "

Subtotal: 40

TOTAL: 283, plus 3 extended**1994 NEW YORK OCEAN, BAY AND GREAT LAKES CLOSINGS AND ADVISORIES****TOTAL: 227, plus 1 extended, plus 24 days of restricted use****1993 NEW YORK OCEAN, BAY AND GREAT LAKES CLOSINGS AND ADVISORIES****TOTAL: at least 212 closings/advisories, plus 1 extended****1992 NEW YORK OCEAN AND BAY CLOSINGS AND ADVISORIES****TOTAL: at least 93 closings, plus 1 extended; 706 advisories****NORTH CAROLINA**

There is no regular water-quality monitoring of ocean and bay recreational beaches for swimmer safety in North Carolina. State of North Carolina Department of Environment, Health and Natural Resources (DEHNR) claims that intensive beach monitoring is not needed for North Carolina beaches. County Health Departments are responsible for beach closures and advisories. Department of Environmental Management officials state that state and federal budget constraints prevents monitoring in 1995 as in years past.

During 1995, a section of the Neuse River was closed for about two weeks. Officials do not monitor the water, but large fish-kills revealed a severe problem and prompted officials to close the river to all fishing and water contact recreation. While certain officials cite the cause of the kills to be a toxic algae, known as *pfisteria*, which is generated by nutrient overload, there is also evidence that sewage and runoff from the towns of Raleigh and Durham are causing pollution problems in the river.

Most of North Carolina's beaches are located on barrier islands where urban development is sparse, but these beaches are threatened by pollution from agricultural, septic system, and development runoff to estuarine and bay waters, particularly in the southern region of the state. Cape Hatteras National Seashore and Cape Lookout National Seashore are barrier-island regions between the sounds and the Atlantic.

According to North Carolina's 1994 305(b) report, 90 percent of the estuaries and sounds in North Carolina fully support their designated use, 3 percent are threatened, and 7 percent partially support their designated use. Nonpoint source pollution including agriculture, urban runoff, and septic tanks are thought to account for 83 percent of the total impaired acreage.

Standards and Testing**Indicator Organisms** Fecal coliform

During 1995, a section of the Neuse River was closed for about two weeks. Large fish-kills revealed a severe problem and prompted officials to close the river to all fishing and water contact recreation.

Standards 200 fecal coliform/100 ml, with 10 percent of the samples not to exceed 400/100 ml

Testing Methods MF

Monitoring

There is no regular monitoring of ocean and bay beaches for swimmer safety.

Closing/Advisory Issuance

N/A

Miles of Ocean and Bay Beach/Miles Monitored

320 miles of ocean shoreline/none monitored regularly.

1995 NORTH CAROLINA OCEAN AND BAY CLOSINGS AND ADVISORIES

Closed	Open	Beach	Source/Cause
October(2 weeks)		Neuse River(south of New Bern) (two beaches)	Toxins emitted by microorganisms in the water

TOTAL: 28

OHIO

In 1993, the Ohio Department of Health established a state-wide Bathing Beach Sampling Program, a joint effort with the Ohio Department of Health (DOH), the Ohio Department of Natural Resources, and the local health departments that have bathing beaches in their jurisdictions. The Ohio DOH is the principal monitoring agency, responsible for taking, testing, and analyzing the samples. It monitors 33 public beaches along Lake Erie. (There are many private beaches along the 262-mile shoreline that are not monitored by the state.) If the state standard for safe bathing water is violated, the Ohio DOH contacts the local DOH and recommends posting an advisory or closing. Whether to issue an advisory or closing based on this information is then up to the local DOH. The Ohio DOH cannot enforce a closing, nor is it notified as to the outcome. Therefore, a beach is not always closed when it exceeds the bacterial standard.

Erie County is unique in that it runs its own monitoring program, and some other counties assist the DOH with monitoring of their waters. Cuyahoga County initiated a new program in May 1993 to assist the public bathing-beach operator in determining the suitability of a bathing beach and to provide explanations of the factors affecting such suitability. In April of 1994, the City of Lorain's Board of Health adopted a Public Bathing Beach Program, based on the Ohio DOH 1993 Bathing Beach Sampling Program and undertook its own testing for two beaches.

According to public officials, the County of Sandusky supports no bathing beaches because its coastline is marshy, so there is no water-quality monitoring program in that county.

In 1995, the Ohio DOH took 485 samples and reported 67 standard violations for Lake Erie coastal waters. The counties responded with 10 closings and 57 advisories.

Standards and Testing

Indicator Organisms Fecal coliform (regulations allow for *E. Coli* or enterococcus to be used). The Ohio DOH is considering switching its primary testing from fecal coliform to *E. Coli* in 1996. A task force consisting of Ohio DOH members and a group from the University of Toledo has been assembled in Lucas County to evaluate the merits of such a change.

Standards Geometric mean of 200 fecal coliform/100 ml based on the most recent five sample days or all samples taken within a 30-day period or 10 percent of all samples in last 30 days not to exceed 400 fecal coliform/100 ml or the geometric mean of the last five samples must be less than 126 *E. coli*/100ml or the geometric mean of the last five samples must be less than 33 enterococci/100 ml.

Testing Method MF

Monitoring

Testing Frequency Weekly, from the week of May 24 through the week of August 30. Private beaches are either monitored on a request basis or not at all. City of Lorain: daily.

Areas Monitored Samples taken along the Lucas and Ottawa County shorelines are collected by the Ohio DOH NW District Office staff, and samples taken along the Lorain, Cuyahoga, Lake, and Ashtabula County shorelines are collected by Ohio DOH NE District Office staff. Ashtabula: 5 beaches. Cuyahoga: 5 beaches. Erie: 19 beaches. Lake: 6 beaches. Lorain: 2 beaches. Lucas: 3 beaches. Ottawa: 10 beaches. Erie County Health Department samples at 19 points.

Cost of Annual Monitoring and Public Notification Program State: \$17,000 (\$7,000 to test samples and \$10,000 for two district sanitarians). Cuyahoga County: \$8,000. Erie County: \$2,500. Ottawa County: \$890.

Closing/Advisory Issuance

Ohio beaches are not always closed nor advisories issued when the standard is exceeded, and depending upon the county, it can take from 24 hours to five days from the date of test to the date of public notification. In most of the counties, advisories are issued rather than closings when any action is taken.

Causes of Closings/Advisories: Number of Closings/Advisories

High bacterial levels/cause unknown: 57; stormwater runoff: 10.

Miles of Ocean and Bay Beach/Miles Monitored

262 miles of Lake Erie shoreline/at least 22 miles.

1995 OHIO GREAT LAKE BEACH CLOSINGS AND ADVISORIES

Lake County

Closed	Open	Beach	Source/Cause
6/26	7/6	Fairport Harbor Beach	Stormwater runoff

Subtotal: 10

Erie County

Advisories

Closed	Open	Beach	Source/Cause
6/20	6/27	Edison Creek in Vermilion	High bacteria levels/cause unknown
7/18	7/25	Darby Creek in Vermilion	" "
7/31	8/29	Edison Creek in Vermilion	" "
8/22	8/29	Huron River in East Huron	" "
8/22	8/29	Vermilion River East in Vermilion	" "

Subtotal: 57

TOTAL: 67

1994 OHIO GREAT LAKE BEACH CLOSINGS AND ADVISORIES

TOTAL: 96

1993 OHIO GREAT LAKE BEACH CLOSINGS AND ADVISORIES

TOTAL: 0

OREGON

There is no regular water quality monitoring of ocean and bay recreational beaches for swimming or for other water contact sports in Oregon.

However, Oregon does monitor water quality for shellfish-growing areas. The 1994 305(b) report states eight shellfish growing areas were closed for a total of 322 days from October 1991 through September 1993. Sewage overflows during heavy rainfall and nonpoint source runoff were the major sources of pollution.

There are no planned changes for 1996, however, the Oregon Health Division has proposed new ambient water bacteria standards for dischargers.

Standards and Testing

Indicator Organisms Fecal coliform

Standards Geometric mean of 200 fecal coliform/100 ml (10 percent in any month not to exceed 400/100 ml).

Monitoring

There is no regular water-quality monitoring of ocean and bay beaches for swimming or for other water contact sports.

Closing/Advisory Issuance

The Oregon Health Division "would close specific areas if local spills or releases warrant closure/or advisories...Sewage spills on a beach are posted."

Causes of Closings/Advisories: Number of Closings/Advisories

n/a

Miles of Ocean and Bay Beach/Miles Monitored

Oregon has about 300 miles of coastal frontage, all of which is public, and much of which is accessible and suitable for bathing or other recreational uses if water and ambient temperatures permit. There are about 65 designated public parks on the Oregon coast, none are monitored.

PENNSYLVANIA

The Pennsylvania Public Swimming & Bathing Places State Code, which was last revised in 1984, contains a comprehensive and well enforced state code for bathing beaches. In May 1993, the Department of Environmental Resources (now the Department of Conservation and Natural Resources/DCNR) approved the Presque Isle State Park (PISP) monitoring/standard protocol. Pennsylvania's program, however, has not yet been amended to comply with the EPA recommendations.

The 40 miles of Lake Erie shoreline in Pennsylvania are located in Erie County. The beach areas consist of one public (permitted) beach, approximately 20 private (unpermitted) beaches, and PISP. The DCNR owns and monitors the 18 beaches on the seven miles of beach on PISP. In 1995, student intern teams and lifeguards were trained by the Erie County Department of Health and park officials to collect water samples for DCNR lab analysis.

The permitted bathing beach is Freeport Beach in the township of Northeast. The Borough of Northeast holds the permit, performs its own monitoring, and has its own lifeguards. The town sends the results of its monitoring to the Erie County DOH.

The remaining beaches on the 40-mile stretch of Lake Erie are private and unpermitted; they do not have to comply with state regulations. Until 1993, the Erie County DOH sampled these private/unpermitted beaches periodically in order to gather background information on hot spots and bacterial counts and to check for any problems. The county is unable to reinstitute this program due to budget constraints.

Much of the fecal coliform affecting PISP beaches is transported into Lake Erie by stormwater. A number of recommendations by PISP officials have been suggested for controlling and/or predicting health risks in Presque Isle bathing waters that originate from point and/or non-point sources west of Presque Isle.

As a result of DCNR studies in the early 1990s, Erie County issues preemptive closings based on weather conditions. For example, high fecal coliform counts result when intense, sudden rainstorms follow long, hot, dry spells.

In 1995, student intern teams and lifeguards were trained by the Erie County Department of Health and park officials to collect water samples for lab analysis.

Standards and Testing

Indicator Organisms Fecal coliform

Standards A geometric mean no greater than 200 fecal coliform per 100 ml, based on five days; or any fecal coliform greater than 1,000 per 100 ml.

Testing Methods MF

Monitoring

Testing Frequency Erie County monitors weekly and PISP monitors twice weekly, from the week before Memorial Day through the end of September.

Areas Monitored Erie: 18 permitted beaches on PISP, 1 permitted beach in the township of Northeast.

Cost of Annual Monitoring and Public Notification Program Erie: ~\$20,000 (this figure for 1994 is larger than routine costs because of grant used to study fecal coliform and nonpoint sources).

Closing/Advisory Issuance

PISP may close beaches due to high waves or following intense rains. In the event of an exceedence, notification is given to appropriate officials and the media, warnings are posted on park entrance signs, and lifeguards continue to watch over beaches to stop people from entering the water.

Causes of Closings: Number of Closings

Heavy rainfall/urban stormwater runoff: 5

Miles of Ocean and Bay Beach/Miles Monitored

Erie: 7 miles/all. PISP: 5 miles/all.

1995 PENNSYLVANIA GREAT LAKES CLOSINGS AND ADVISORIES

Presque Isle State Park

Closed	Open	Beach	Source/Cause
7/25	7/25	Beach 10 & Short Jetty I East & Barracks	Heavy rainfall/urban stormwater runoff
8/8	8/8	Beach 6 & Beach 9	" "
8/22	8/22	Beach 1 & I West & I West Extension	Precautionary

8/23	8/23	Beach 1	" "
Subtotal: 10			

TOTAL: 10

1994 PENNSYLVANIA GREAT LAKES CLOSINGS AND ADVISORIES
TOTAL: 14

1993 PENNSYLVANIA GREAT LAKES CLOSINGS AND ADVISORIES
TOTAL: 19

PUERTO RICO

The Territory of Puerto Rico has a limited monitoring program in place for its coastal waters that does not appear to be designed for swimmer safety. The Puerto Rico Water Quality Standards Regulation, which specifies the monitoring policies for the Commonwealth, was last revised in 1990. The Environmental Quality Board (EQB) monitors all beaches, including those designated as Special Bathing Zones (SBZ) by the Puerto Rico Planning Board. However, test results are often not completed for two to three weeks, making them essentially useless for providing timely warnings to swimmers. The EQB plans in 1997 to use enterococcus rather than the current fecal coliform as an indicator.

According to Puerto Rico's 1994 305(b) Water Quality Report, of 549.9 shore miles assessed by the Commonwealth, 57.7 miles were found not to support swimming use (either partially or entirely) and an additional 114.9 miles were found to be threatened—that is, if further corrective action is not taken, swimming use will be impaired. Industrial and municipal point sources, urban runoff, and storm sewers are the main sources of impairment of the waters.

Test results are often not completed for two to three weeks, making them essentially useless for providing timely warnings to swimmers.

Standards and Testing

Indicator Organisms Fecal coliform

Standards Geometric mean of at least five samples shall not exceed 200 fecal coliform/100 ml, and not more than 20 percent of the samples shall exceed 400/100 ml.

Testing Methods MF

Monitoring

Testing Frequency The tourist zone (Condado, Ocean Park, Isla Verde): monthly. The 55 special bathing zones: every other month. Other coastal stations are monitored six times a year or on a yearly basis for metals.

Areas Monitored The entire island—100 stations.

Cost of Annual Monitoring and Public Notification Program \$50,000-\$75,000

When the standard is violated, confirmation of high bacteria levels can delay closing for more than a week. The monitoring protocol requires two sets of sequential re-samples and a sanitary survey.

Closing/Advisory Issuance

No closings/advisories program has been established for bacterial violations. Closings are issued as a result of an oil spill.

Causes of Closings/Advisories: Number of Closings/Advisories

N/A

Miles of Ocean and Bay Beach/Miles Monitored

549.9 miles (includes the principal offshore islands Mona, Vieques, and Culebra)/202.6 miles.

1995 PUERTO RICO OCEAN AND BAY CLOSINGS AND ADVISORIES

TOTAL: 0

1994 PUERTO RICO OCEAN AND BAY CLOSINGS AND ADVISORIES

TOTAL: 1 extended

1993 PUERTO RICO OCEAN AND BAY CLOSINGS AND ADVISORIES

TOTAL: 0

RHODE ISLAND

Since 1991, Rhode Island's Department of Health (DOH) and Department of Environmental Management (DEM) have conducted a joint monitoring program. In order to outline specific areas of responsibility of the DOH and the DEM in monitoring, licensing, and closing of bathing area waters in the state, the two departments established a memorandum of agreement. The Department of Health has the authority to close beaches in Rhode Island, along with municipalities for town beaches, based upon recommendations made by RIDEM.

At least one sample is collected from each beach at least once a year or near the beginning of the bathing season. Those beaches that show high bacteria levels in the preliminary samples or that may be potentially polluted from sewage outfalls are monitored throughout the summer, weekly, or bimonthly by the DEM.

When the standard is violated, confirmation of high bacteria levels can delay closing for more than a week. The monitoring protocol requires two sets of sequential re-samples (processed using the slower most probable number laboratory technique) and a sanitary survey. Once closed, a beach is subject to thorough investigation, and only after five consecutive safe samples is the beach reopened. Beaches are not generally closed for short-term increases in coliform.

The most popular beaches are in areas generally not affected by wastewater treatment facilities (though there is one combined sewer system in Narragansett Bay). When sewage releases are anticipated due to overcapacity, either DEM or DOH must provide affected towns with a 24-hour warning. The protocol then calls for the town to close the beach upon notification. Sewage treatment plants are the most significant cause of high bacteria levels that limit fish harvests (31 percent of estuaries are harvest-limited). Boating waste also adds to the pollution of waters.

Standards and Testing

Indicator Organisms Fecal coliform and total coliform

Standards An instantaneous level and a geometric mean of 50 fecal coliform/100 ml with not more than 10 percent of the samples to exceed 500 fecal coliform/100 ml; and an instantaneous level and a geometric mean of 700 total coliform/100 ml with not more than 10 percent to exceed 2,300 total coliform/100 ml.

Testing Methods MPN

Monitoring

Testing Frequency Rhode Island beaches tested at beginning of summer [plus continued summer-long testing continued at designated beaches*]: Berrington Town Beach*, Bristol Town, Charlestown, Jamestown-Mackerel Cove, Little Compton Town Beach, Middletown 2nd and 3rd beaches, Narragansett (Roger Wheeler, Scarborough Beach, Narragansett Beach), Newport (Kings Point Park*, Fort Adams State Park, Easton), North Kingstown (Wickford), Portsmouth (Sandy Point Beach), Island Park Beach, South Kingstown (E. Matunuck), Tiverton (Grinnell's Beach, Fogland Beach), Town of Warren (Town Beach*), Town of Warwick (Goddard Park Beach*, Buttonwoods City Park Beach*, Conanicut Point Beach*), Westerley (Misquamicut).

Areas Monitored All beaches, particularly in the upper Narragansett Bay, are sampled at the beginning of every swimming season. Beaches showing high bacteria levels or determined to be impacted by pollution are monitored throughout the summer.

Cost of Annual Monitoring and Public Notification Program Not available.

Closing/Advisory Issuance

After a high bacteria level is recorded, two confirmatory sequential samples are taken, the results of which will affect discretionary closing decisions. If a direct source is identified, the beach will be closed without waiting for confirmation.

Miles of Ocean and Bay Beach/Miles Monitored

400 miles of shoreline/all beaches are monitored between bathing beach and shellfish program (please see *Testing Frequency* for bathing beaches).

1995 RHODE ISLAND OCEAN AND BAY CLOSINGS AND ADVISORIES

Total: 0

1994 RHODE ISLAND OCEAN AND BAY CLOSINGS AND ADVISORIES

TOTAL: 0

1993 RHODE ISLAND OCEAN AND BAY CLOSINGS AND ADVISORIES

TOTAL: 0

1992 RHODE ISLAND OCEAN AND BAY CLOSINGS AND ADVISORIES
TOTAL: 0

1991 RHODE ISLAND OCEAN AND BAY CLOSINGS AND ADVISORIES
TOTAL: 0

SOUTH CAROLINA

There is no regular monitoring of ocean and bay recreational beaches for swimmer safety in South Carolina. There are, however, closings of shellfish harvesting areas due to sanitary sewer overflows and excessive stormwater runoff.

According to the state's 1994 305(b) report, 75 percent of estuaries have good water quality. Unsuitable water quality is responsible for shellfish harvesting prohibitions in 2 percent of the state's coastal shellfish waters. Another 11 percent of shellfish waters are closed as a precaution due to potential pollution from nearby marinas or point source discharges.

Standards and Testing

Indicator Organisms Fecal coliform

Standards Fecal coliform not to exceed a geometric mean of 200/100 ml, based on five consecutive samples during any 30-day period; nor shall more than 10 percent of the total samples during any 30-day period exceed 400/100ml.

Monitoring

There is no regular monitoring of ocean and bay beaches.

Closing/Advisory Issuance

Closings issued on an emergency basis only.

Miles of Ocean and Bay Beach/Miles Monitored

Not reported

TEXAS

There is no statewide water-quality monitoring program specifically for swimmer safety in Texas. However, the Texas Department of Health (Shellfish Sanitation), Texas Natural Resource Conservation Commission, and Texas Parks and Wildlife all monitor the Gulf of Mexico for various aspects of water quality.

Corpus Christi's water-quality monitoring programs encompasses some but not all recreational beaches. The Water Quality Program in Galveston County has expanded to cover all surface waters within the geographic area of Galveston County. The geographic boundaries of League City and the city of Friendswood, which include a portion of Harris County, are covered in this program as well.

The Galveston Bay Plan was completed by the Galveston Bay National Estuary Program in 1994. The Galveston Bay National Estuary Program incorporates various federal, state,

and local water-quality monitoring programs. (The Texas Natural Resources Conservation Commission (TNRCC) is the lead agency.) In 1992, Corpus Christi Bay was also designated as a National Estuary Program. These programs coordinate and share the water-quality data already being collected by the various monitoring agencies around Galveston Bay in an effort to avoid duplication of work and to free up personnel for monitoring other areas of the bay. However, the plan is not designed to assess daily conditions at swimming beaches, since this would require more frequent sampling than available resources allow.

Virtually all of the Texas coast is bordered by a barrier island system that separates the Gulf of Mexico from the bays. Although fishing activity is heavy in the bay systems, most of the tourist type of swimming occurs on the Gulf beaches. The sewage treatment plants (STPs) that have outfalls into the estuarine environment dump into the bays, or tributaries of the bays, where little swimming occurs. There are few, if any, combined sewer and stormwater systems, although at times, the STPs can have a bypass.

Rainfall runoff and STP bypass can adversely affect the bays and molluscan shellfish harvesting areas. For example, during 1994, a portion of Lavaca Bay in Calhoun County was closed to crab and shellfish consumption due to high levels of mercury from industrial pollution. Also, Matagorda Bay and bay systems in Matagorda County are temporarily closed to shellfishing from time to time by the Texas Department of Health due to stormwater runoff and high coliform levels.

Major sources of pollution of Texas waters include oil spills, stormwater, discharge from wastewater treatment plants, sanitary sewer overflows, and private on-site sewage facilities.

In 1995, EPA approved the TNRCC application to designate Clear Lake in Galveston County as a "zero discharge zone" for boat sewage. Clear Lake is the first tidally influenced water body in the state of Texas to be a "zero discharge zone."

Standards and Testing

Indicator Organisms Fecal coliform

Standards TNRCC standard: Geometric mean of 200 fecal coliform/100 ml with not more than 10 percent of the samples to exceed 400 fecal coliform/100 ml. Corpus Christi: Geometric mean of 100 fecal coliform/100 ml.

Testing Methods MPN; Corpus Christi: MF

Monitoring

Testing Frequency Corpus Christi tests 13 sites monthly. Galveston County tests 10 sites along the Gulf of Mexico monthly on a rotational basis. (In 1995 Galveston County added a site in the Texas City dike and moved some of the Bay and inland waterway sites.)

Areas Monitored Corpus Christi and Galveston County are monitored.

Cost of Annual Monitoring and Public Notification Program The Galveston County Health District Water Pollution Section has an entire budget of \$180,000. Approximately one-half to two-thirds of the budget is appropriated toward all water-quality monitoring, including recreational beaches.

In 1995, EPA approved the application to designate Clear Lake in Galveston County as a "zero discharge zone" for boat sewage. Clear Lake is the first tidally influenced water body in the state of Texas to be a "zero discharge zone."

Sewage discharges are frequent and result from both mechanical breakdowns and unpermitted discharges. Wastes from marine vessels are another significant source of impaired water quality.

Closing/Advisory Issuance

Issuance of closures/advisories is discretionary. The Texas Health Department is responsible for issuing closings or advisories, while local authorities often coordinate the closings.

Miles of Ocean and Bay Beach/Miles Monitored

Texas has 624 miles of coastline on the Gulf of Mexico, about 480 miles of which are of beach. Galveston County: 65 mi./35 mi. (public); amount of private beach is unknown, but the General Land Office reported 387 miles of shoreline within the Galveston Bay system.

1995 TEXAS OCEAN AND BAY CLOSINGS AND ADVISORIES

Total: 0

1994 TEXAS OCEAN AND BAY CLOSINGS AND ADVISORIES
TOTAL: 0

1993 TEXAS OCEAN AND BAY CLOSINGS AND ADVISORIES
TOTAL: 42

1992 TEXAS OCEAN AND BAY CLOSINGS AND ADVISORIES
TOTAL: 1 CLOSING/ADVISORY (MEDICAL WASTE ON BEACH)

1991 TEXAS OCEAN AND BAY CLOSINGS AND ADVISORIES
TOTAL: 0

VIRGIN ISLANDS

The Virgin Islands Rules and Regulations (VIR&R) contain the Virgin Islands' water-quality standards for monitoring beach-water quality. The Water Pollution Control program under the Department of Planning and Natural Resources of the Department of Environmental Protection currently monitors all public beaches, but only on a quarterly basis.

According to the Virgin Islands' 1992 305(b) water-quality report, conventional pollutants pose the greatest threat to marine and estuarine environments. Sewage discharges are frequent and result from both mechanical breakdowns and unpermitted discharges. Wastes from marine vessels are another significant source of impaired water quality. Water-quality standards for fecal coliform are often exceeded where there are large numbers of live-aboard vessels and low flushing rates of water.

The U.S. Virgin Islands consists of three main islands: St. Croix, St. Thomas, and St. John, and over 50 smaller islands and cays. The six most intensively used beaches in the Virgin Islands are Salt River, Cramer Park, Coki Point, Magens Bay, Lindberg Bay, and Trunk Bay.

Standards and Testing

Indicator Organisms Fecal Coliform

Standards Geometric mean of 200 fecal coliform/100 ml based on a median of five consecutive sample days.

Testing Methods MF and MPN (determined by the labs)

Monitoring

Testing Frequency Quarterly

Areas Monitored Sampling is done on all of the islands. St. Croix: 64 stations. St. Thomas: 57 stations. St. John: 19 stations.

Cost of Annual Monitoring and Public Notification Program \$20,000

Closing/Advisory Issuance

Closings are enforced by the Division of Environmental Enforcement (DEE). Closings are published in the local newspaper and announced in the public within 24 hours after a beach has been found to be contaminated.

Causes of Closings/Advisories: Number of Closings/Advisories

Sanitary sewer overflows, sewage treatment plant malfunctions, runoff (after hurricane): 26.

Miles of Ocean and Bay Beach/Miles Monitored

St. Croix: 76.45 mi./64 mi. monitored. St. Thomas: 54.74 mi./57 mi. monitored. St. John: 51.049 mi./19 mi. monitored.

1995 VIRGIN ISLANDS BEACH AND BAY CLOSINGS AND ADVISORIES

Closed	Open	Beach	Source/Cause
9/17	10/7	Magen's Bay (Northern side of St. Thomas)	(Advisory) Sanitary sewer overflow, stp malfunction, runoff (after Hurricane Marilyn).
dates not recorded (5 days)		a number of beach areas	" "

TOTAL: 26

1994 VIRGIN ISLANDS BEACH AND BAY CLOSINGS AND ADVISORIES
TOTAL: 0

1993 VIRGIN ISLANDS BEACH AND BAY CLOSINGS AND ADVISORIES
TOTAL: 0

VIRGINIA

Beach-monitoring activities in Virginia continue to be the responsibility of local health departments. The state has approximately 24 miles of public beaches. Just under 8.5 miles are ocean beaches; the remainder are located on the shores of the Chesapeake Bay. The

Although Virginia does not have a state-level program designed for monitoring the ocean and bay beaches for swimmer safety, both Norfolk and Virginia Beach have local monitoring programs. Accomac and Portsmouth have no program, and the Three Rivers Health District monitors Mathews, Gloucester, Middlesex, and Essex counties on a complaint basis only.

There is no beachwater monitoring system for the mile-long, limited public beach located in the city of Hampton, but the Division of Shellfish Sanitation monitors the waters and reports any unusual results.

Major sources of pollution for Hampton include shipping and boating in the bay and stormwater runoff; for Virginia Beach, point sources from on-site wastewater systems in the Sandbridge area, and nonpoint source runoff from development along the oceanfront (hotels, etc); for Norfolk, gasoline and petroleum products, and sewage overflows

Assateague Island is a 37.8-mile island along the Maryland-Virginia Atlantic coast. The U.S. National Park Service (USNPS) manages the Maryland portion of the island, except for the 1.9 mile Maryland-owned Assateague State Park. The U.S. Fish and Wildlife Service manages the Virginia portion as the Chincoteague National Wildlife Refuge. However, the USNPS operates beach recreation within portions of the refuge. Because of concerns in the late 1980s over beach closings elsewhere along the mid-Atlantic coast, the USNPS undertook a two-year pilot project in 1991 to test surf-water quality using EPA's recommended bacterial indicator, enterococcus, and a weekly sampling design. According to the USNPS, this pilot surf water testing project showed that "contamination of Assateague Island surf waters is a legitimate concern." Since then, the National Park Service has implemented a management program for Assateague Island National Seashore. The current program monitors surf-water quality using the EPA's recommended bacterial indicator, enterococcus, and a stringent sampling design. In 1995 there were five sampling sites.

localities of Norfolk and Virginia Beach account for about 63 percent of the public beach shoreline.

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Standards and Testing

Indicator Organisms Fecal coliform; Assateague Island: enterococcus and fecal coliform

Standards Geometric mean of 200 fecal coliform/100 ml for two or more samples over a 30-day period, or a fecal coliform bacteria level of 1,000/100 ml at any time.

Assateague Island: Geometric mean of a minimum of five samples taken within a 30-day period equaling 35 enterococcus/100 ml; and an instantaneous level of 104 enterococcus/100 ml at "guarded beaches," and an instantaneous level of 158 enterococcus/100 ml at "unguarded beaches."

Testing Methods Virginia Beach: MPN; Norfolk: MPN and MF; Assateague Island: MF and MPN

Monitoring

Testing Frequency Virginia Beach: monthly during the swimming season. Norfolk: biweekly during the swimming season. Assateague Island: weekly for enterococcus, monthly for fecal coliform.

Areas Monitored Virginia Beach, Norfolk, Assateague Island National Seashore, and beach recreation areas in Chincoteague National Wildlife Refuge. The Mathews County Health Department, as part of the Three Rivers Health district, monitors Mathews, Gloucester, Middlesex, and Essex Counties on a complaint basis only.

Cost of Annual Monitoring and Public Notification Program Assateague Island National Seashore: \$20,000. Norfolk: \$4,500. Virginia Beach: 1 full time employee.

Closing/Advisory Issuance

Local officials have discretion as to whether to post beaches.

Miles Of Ocean and Bay Beach/Miles Monitored

Assateague Island has 37 miles ocean beach (approx. 4 miles of heavily used recreational beach). Hampton: 1 mi./0 (public). City of Norfolk has 141 miles of shoreline used for recreation (boating, water skiing, etc.)/12 mi. (for swimming). Virginia Beach: 28 mi./all (public); 10 mi./under federal control.

1995 VIRGINIA OCEAN AND BAY CLOSINGS AND ADVISORIES

Total: 0

1994 VIRGINIA OCEAN AND BAY CLOSINGS AND ADVISORIES

TOTAL: 0

1993 VIRGINIA OCEAN AND BAY CLOSINGS AND ADVISORIES

TOTAL: 0

1992 VIRGINIA OCEAN AND BAY CLOSINGS AND ADVISORIES

TOTAL: 0

1991 VIRGINIA OCEAN AND BAY CLOSINGS AND ADVISORIES

TOTAL: 2 (Assateague Island)

WASHINGTON

There is no monitoring of ocean and bay coastal waters specifically to protect swimmer safety in Washington. Under the State's Clean Water Act, primary recreational contact with water is afforded the same protection as shellfish harvest uses. The State Department of Health (WDOH) routinely monitors commercial and recreational shellfish and shellfish growing waters. In May of 1994, the WDOH officially classified 70 of 142 recreational shellfish beaches within or adjacent to commercial shellfish areas or within close proximity to point or nonpoint pollution sources. Thirty-seven Puget Sound shellfish beaches were classified closed, and four were classified conditional (open, but subject to temporary closings). Classification notices were posted at these beaches and information was distributed to the public.

In 1995 1,060 acres of commercial shellfish-growing waters were downgraded or otherwise restricted. No upgrades were reported. For recreational shellfish closures, procedures are managed by three joint plans of operation between state and local health agencies as required by state regulation. These vary depending on local health-agency participation. All include public notification, beach posting, and ongoing monitoring and corrective action.

State budget cuts have significantly reduced the state's ability to respond to water-quality problems. The Department of Ecology, the State's water regulatory agency, eliminated the shellfish unit directed at addressing restoration and protection of shellfish beds. The directors were eliminated or reassigned.

State budget cuts have significantly reduced the state's ability to respond to water-quality problems. The Department of Ecology, the State's water regulatory agency, eliminated the shellfish unit directed at addressing restoration and protection of shellfish beds.

The State Department of Ecology samples monthly for fecal coliform bacteria at nine sites in Puget Sound. The department states the leading cause of water pollution is failing onsite septic systems followed closely by animal wastes resulting from poor animal-keeping procedures and discharges into streams and rivers.

Though water temperature may prohibit swimming for a great part of the year, monitoring to prevent public health risks to primary contact users, including windsurfers, SCUBA divers, kayakers, and boaters would be helpful.

Standards and Testing

Indicator Organisms Fecal coliform

Standards Geometric mean of 14 fecal coliform/100 ml, in addition no more than 10 percent of individual samples to exceed 43 fecal coliform/100 ml.

Monitoring

There is no regular monitoring of ocean and bay beaches for swimming.

Closing/Advisory Issuance

n/a

Miles of Ocean and Bay Beach/Miles Monitored

not reported

WISCONSIN

Wisconsin does not have a statewide mandatory monitoring program for its 1,017 miles of Great Lakes waters. However in 1990 the State Division of Health developed a "Model Ordinance for Public Beaches," to provide local governments with the language and standards recommended by the Division of Health for maintaining public beaches. Local governments may adopt the model in whole, in part, or not at all. The model closely follows the recommendations of the Great Lakes-Upper Mississippi River Board of Sanitary Engineers and of the EPA.

Of the 15 counties that border on a Great Lake, only three have a comprehensive monitoring program based on the model: Racine, Kenosha, and Milwaukee. Six of the counties have a limited program and six counties have no monitoring program.

According to the 1994 305(b) report, Wisconsin's Great Lake's shoreline only partially supports fish consumption use and fish consumption advisories are posted throughout the Great Lakes. Bacteria from urban runoff also impair swimming along 60 miles of shoreline.

Despite repeated requests for information, the counties of Oconto and Iron have not responded. Milwaukee confirmed their program but failed to provide information on closures. Therefore this report may understate the number of closings/advisories for 1995.

Standards and Testing

Indicator Organisms Fecal coliform and *E. Coli*

Standards Beach water fecal coliform density from the last five successive samples collected on five different days within a 30-day period shall not exceed a geometric mean of 200/100 ml nor shall fecal coliform density of any sample exceed 1,000/100 ml.

Method MF

Monitoring Programs and Closings in Wisconsin During 1995

County/ Great Lake	Monitoring Program	Number of Beaches	Testing Frequency	Closings/ Advisories
Ashland/Superior	Yes	5 beaches	2 beaches: bimonthly during swimming season; 3 beaches: none	0
Bayfield/Superior	No	5 beaches		n/a
Brown/Michigan	No	1 beach in City of Green Bay		1 permanently closed (since the mid-'40s)
Door/Michigan	Yes	15 beaches	Nicolet Bay only: weekly	0
Douglas/Superior	The county has a monitoring program for five beaches that are not on Lake Superior. There are no official swimming beaches in Douglas county on Lake Superior, so it is not included in the program.			
Iron/Superior	No			n/a
Kenosha/Michigan	Yes	5 beaches	4 times a week (summer)	63
Kewaunee/Michigan	No	4 beaches		n/a
Manitowoc/ Michigan	Yes	5 beaches	Once a week during swimming season	0
Marinette/Michigan	No	1 beach		n/a
Milwaukee/ Michigan	Yes	8 beaches (4 in the city of Milwaukee)	Whitefish and Village of Shorewood HD: (Klode Park & Atwater) weekly. City of Milwaukee HD: twice a week.	No response
Oconto/Michigan	No			n/a
Ozaukee/Michigan	Yes	1 beach	Monthly during the summer	0
Racine/Michigan	Yes	2 official bathing beaches; 4 sites	Twice weekly	51 +1 extended

Of the 15 counties that border on a Great Lake, only three have a comprehensive monitoring program based on the model: Racine, Kenosha, and Milwaukee.

		used as testing sites only	
Sheboygan/Michigan	Yes	3 unofficial beaches, including a state park	State Park: monthly

Monitoring

Testing Frequency Please see chart above.

Areas Monitored Please see chart above.

Cost of Annual Monitoring and Public Notification Program Kenosha County: \$3,000. Milwaukee County: \$3,000-\$4,000. Racine County: \$15,000. Manitowoc: \$400-\$500. Brown County: \$1,130.

Closing/Advisory Issuance

Beaches are posted and notice of closings/advisories are put in local newspapers and announced on local radio stations. Of the three counties, only Milwaukee County issues closings/advisories based on rainfall.

Causes of Closings: Number of Closings

High bacteria levels (cause unknown): 114 + 1 extended.

Miles of Ocean and Bay Beach/Miles Monitored

Kenosha County: 12.2 mi. of Lakeshore of which 2.8 mi. are beach/1.7 mi. Manitowoc County: 3 mi. beach/1.5 mi. Racine City: less than .5 mi. of beach/all. Milwaukee County: 5 mi. of beach/all.

1995 WISCONSIN OCEAN AND BAY CLOSINGS AND ADVISORIES

Kenosha County

Closed	Open	Beach	Source/Cause
7/30	8/5	Simmons	High bacteria levels/cause unknown
8/7	8/26	" "	" "
7/6	7/10	Eichelman	" "
8/4	8/12	" "	" "
8/13	8/14	" "	" "
6/27	7/1	Southport	" "

7/7	7/18	" "	" "
7/26	8/5	" "	" "
Subtotal: 63			

Racine

Closed	Open	Beach	Source/Cause
6/28	7/5	North Beach	High bacteria levels/cause unknown
7/26	9/18	North Beach	" "
6/28	7/4	Zoo Beach	" "
7/23	7/28	Zoo Beach	" "
8/3	8/15	Zoo Beach	" "
8/17	9/7	Zoo Beach	" "
Subtotal: 51, plus 1 extended			

TOTAL: at least 114, plus 1 extended*

1994 WISCONSIN GREAT LAKES CLOSINGS AND ADVISORIES
TOTAL: 148

1993 WISCONSIN GREAT LAKES CLOSINGS AND ADVISORIES
TOTAL: 94

* Despite repeated requests for information, Milwaukee, Oconto County and Iron County failed to provide information on closures. Therefore this report may understate the number of 1995 closings/advisories.

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