
FOURTEENTH ANNUAL REPORT

Our nation is blessed with nearly 23,000 miles of ocean shoreline (excluding Alaska), more than 5,500 miles of Great Lakes shoreline,¹ and 300,000 miles of rivers (many of which eventually empty into oceans and bays).² Beaches are one of America's favorite vacation destinations. More than 180 million Americans visit coastal and Great Lakes counties and their beaches each year,³ generating tens of billions of dollars in sales of goods and services and supporting tens of millions of jobs. According to the April 2004 Preliminary Report by the U.S. Commission on Ocean Policy, "[coastal] tourism and recreation constitute some of the fastest growing business sectors—enriching economies and supporting jobs in communities virtually everywhere along the coasts of the continental United States, southeast Alaska, Hawaii, and our island territories and commonwealths."

While America's waters are cleaner now than they were 30 years ago when rivers were burning and lakes were dying, U.S. coastal waters are generally in fair to poor condition.⁴ National water-quality monitoring data reported by the states in the year 2000, the most recent national picture available from the Environmental Protection Agency (EPA), show that approximately 45 percent of waters assessed by the states are not clean enough to support basic uses such as fishing or swimming; i.e., they do not meet water quality standards.⁵ To make matters worse, our towns and our states do not necessarily protect us from swimming-associated diseases, such as gastroenteritis, hepatitis, salmonellosis, and other infections and viruses.

America's beachgoers should feel confident that a visit to the beach will not be followed by a visit to the doctor. We need to know that the waters in which we swim, surf, and dive are safe. At a minimum, this means that recreational waters must be regularly tested, and the results must be measured against effective health standards. When waters do not meet these standards, the public needs to be promptly and clearly notified.

To spotlight this issue, every summer for the past 14 years the Natural Resources Defense Council (NRDC) has undertaken a study of beach closings/advisories and beachwater monitoring and public-notification programs in coastal and Great Lakes states. National and local policymakers, reporters, and activists have come to rely on NRDC's *Testing the Waters* reports for reliable, up-to-date information. Our work has triggered significant expansion of beachwater monitoring programs across the United States and new and emerging laws—particularly the federal BEACH Act of 2000, which is better protecting the health of beachgoers. At least 12 states initiated or expanded monitoring programs between the time NRDC began the report in 1991 and the passage of the BEACH Act (**Alabama, California, Florida, Georgia, Iowa, Maine, Massachusetts, Mississippi, North Carolina, Ohio, South Carolina, and Texas**). As a result of federal grants now available to states through the BEACH Act, virtually every coastal and Great Lakes state is in the process of either initiating or expanding monitoring and public notification programs.

While beaches are better monitored than in the past, that monitoring reveals the extent to which sources of beachwater pollution remain unaddressed. Closings and advisories continue to rise while the sources of that pollution are usually not even identified, much less controlled. NRDC is issuing this report—the 14th annual *Testing the Waters*—as a reminder of how unchecked pollution continues to lower Americans' quality of life and threatens public health. This year, as in past years, we found that water pollution continues to degrade the quality and health of many of our nation's ocean, bay, Great Lakes, and other freshwater beaches. Too often, rainwater turns to ruinous water as it washes untreated sewage and other contaminants into our oceans, bays, and lakes. Significant stretches of coastline are subject to closings or swimming advisories during the year. We hope this report spurs Congress, the Environmental Protection Agency (EPA), states, and localities to improve prevention and control over the sources of coastal pollution and to close remaining gaps in monitoring and public notification at our nation's beaches.

At least 12 states initiated or expanded monitoring programs between the time NRDC began reporting in 1991 and the passage of the BEACH Act of 2000.

THIS YEAR'S FINDINGS

Sources of Information

For the past six years, our research for *Testing the Waters* has been based largely on the EPA's annual Beaches Environmental Assessment, Closure and Health (BEACH) Program survey, supplemented by information collected directly by NRDC. This year, the EPA replaced its BEACH survey with a new electronic reporting system designed to meet the reporting requirements associated with the federal BEACH Act grants made to all 35 coastal and Great Lakes states and territories.

The EPA's electronic reporting system was supposed to collect the same level of detailed information that had been collected via the BEACH survey. However, due to technical and other errors, the EPA provided limited data for just 13 states (**Illinois, Massachusetts, Michigan, Minnesota, Mississippi, New Hampshire, New York, North Carolina, Rhode Island, South Carolina, Virginia, Washington, and Wisconsin**). To supplement these data, NRDC made requests and received partial data directly from an additional 12 states (**Alabama, California, Connecticut, Delaware, Florida, Georgia, Indiana, Maryland, New Jersey, Ohio, Oregon, and Texas**) and three territories (**Guam, the Northern Mariana Islands, and the U.S. Virgin Islands**). Four other states (**Hawaii, Louisiana, Maine, and Pennsylvania**) reported no closings/advisories in 2003 but provided some program information to NRDC via phone and email messages. The EPA provided limited information regarding the status of bacterial standards in **Puerto Rico**, but the island provided no updated information for 2003. NRDC's report includes no information on **Alaska**, which has no beach monitoring program, and **American Samoa**, which did not respond to repeated requests.

Below are the major findings of this report regarding 2003 beach closings and advisories, their causes, the sources of pollution, associated health risks, and economic impacts, along with recommendations for improving beachwater quality and protecting swimmers' health.

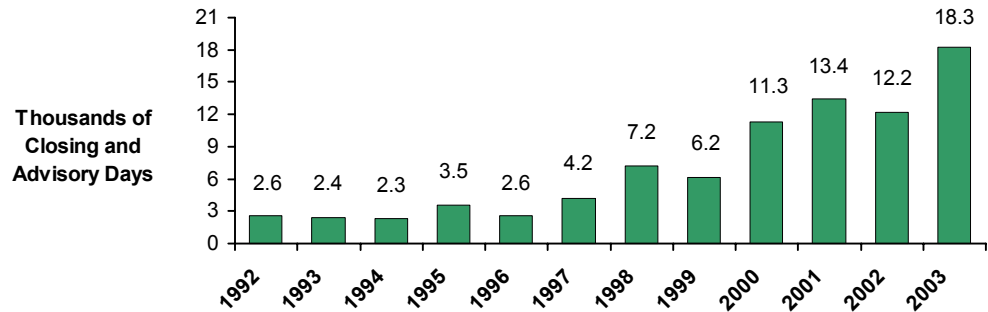
During 2003, there were at least 18,284 days of closings and advisories at U.S. ocean, bay, Great Lakes, and some freshwater beaches.

Beach Closings/Advisories and Pollution Sources

- During 2003, at U.S. ocean, bay, Great Lakes, and some freshwater beaches, there were at least 18,284 days of closings and advisories, 64 extended closings and advisories (7 to 13 consecutive weeks), and 60 permanent closings and advisories (more than 13 consecutive weeks). Including extended days, the total comes to more than 22,201 beach closing and advisory days.
- Since 1992, there have been more than 89,296 days of closings and advisories and 333 extended closings and advisories (seven to 13 consecutive weeks). (See Figure 1 on page vi and Table 2 on page xii.)
- The number of beach closing and advisory days increased 51 percent in 2003 (6,206 days) from the previous year (see Figure 1). The major factors leading to the increase in 2003 appear to be a greater number of monitored beaches, more frequent monitoring, wider use of BEACH Act required indicator organism and numeric standards, and heavy rainfall in some areas.
- The continued high level of closings/advisories is an indication that new and more frequent monitoring continues to reveal serious water pollution at our nation's coastal, bay, Great Lakes, and some inland freshwater beaches. Figure 2 (page vii) shows that 16,120 (88 percent) of the 2003 beach closings and advisories were issued because water quality monitoring showed that bacteria levels exceeded health and safety standards (one percentage point higher than last year).

Figure 1
Total Closing/Advisory Days, 1992–2003 (excluding extended and permanent)

Note: Because of inconsistencies in monitoring and closing/advisory practices among states and the different levels of data submission over time, it is difficult to make comparisons between states or to assess trends based on the closing/advisory data.



The high level of closings/advisories indicates that new and more frequent monitoring continues to reveal serious water pollution at our beaches.

- Major causes of beach closings and advisories in 2003 were as follows (see Figure 2):
 - 88 percent were based on monitoring that detected bacteria levels exceeding beachwater quality standards;
 - 6 percent were precautionary, due to rainfall known to carry pollution to swimming waters;
 - 4 percent were in response to known pollution events, such as sewage treatment plant failure or breaks in sewage pipes (in other words, localities did not wait for monitoring results in deciding whether to close beaches or issue advisories);
 - 2 percent were due to other causes, such as dredging and algal blooms.
- Major pollution sources listed as responsible for 2003 beach closings and advisories include the following (the total is greater than 18,284 and 100 percent because more than one source may have contributed to a given closing or advisory; see Figure 3):
 - Unknown sources of pollution caused 12,505 closing/advisory days (68 percent of this year’s total), plus 15 extended and 13 permanent closings or advisories.⁶ (Sewage or stormwater discharges usually cause elevated bacteria levels, but efforts to determine the causes of increased bacteria levels have not kept pace with new or more frequent monitoring practices);
 - Polluted runoff and stormwater caused or contributed to 2,616 closing/advisory days (14 percent of this year’s total or 24 percent of the total excluding closing/advisory days with no contamination source information), plus 2 extended and 17 permanent closings or advisories;
 - Sewage spills and overflows caused or contributed to 1,820 closing/advisory days (10 percent of this year’s total or 17 percent of the total excluding closing/advisory days with no contamination source information), plus 6 permanent closings or advisories (includes combined sewer overflows, sanitary sewer overflows, breaks or blockages in sewer lines, and faulty septic systems);
 - Elevated bacteria levels from miscellaneous sources (boat discharges, wildlife, etc.) accounted for 268 closing/advisory days (1 percent of this year’s total or 2 percent of the total excluding closing/advisory days with no contamination source information), plus 1 extended and 1 permanent closing or advisory;
 - Preemptive rainfall advisories (usually due to polluted stormwater or sewage overflows) accounted for 1,142 closing/advisory days (6 percent of this year’s total).

Figure 2
Reported Causes of Closings/Advisories, 1998–2003

Key: (A) Based on monitoring that detected bacteria levels exceeding standards. (B) In response to known pollution event without relying on monitoring. (C) Precautionary due to rain known to carry pollution to swimming waters. (D) Other reason.

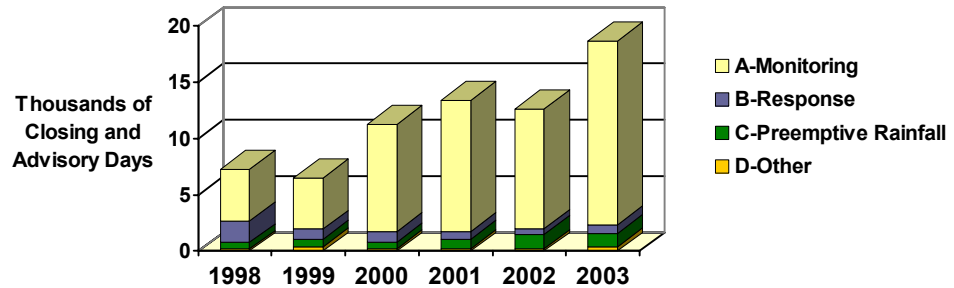
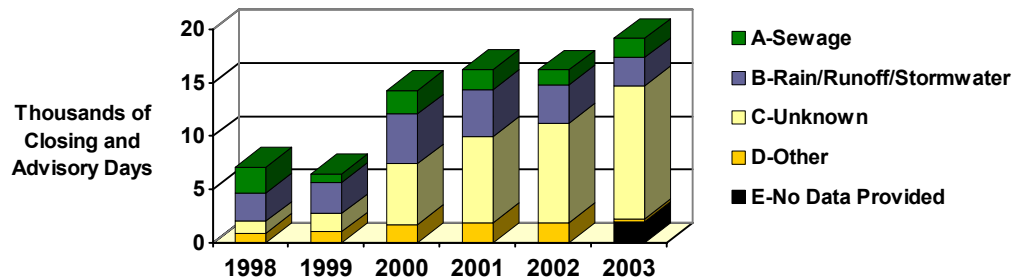


Figure 3
Sources of Pollution that Caused Closings/Advisories, 1998–2003

(Totals shown are greater than annual totals because more than one pollution source may have contributed to each closing/advisory)

Key: (A) Sewage spills and overflows. (B) Polluted runoff, stormwater, or preemptive due to rain. (C) Unknown. (D) Other reasons. (E) No data provided by the EPA or the state agency.



- Almost every coastal and Great Lakes state reported having at least one beach where stormwater, runoff, and/or sewage is a known source of pollution at or near bathing waters. The EPA did not provide updated information for the 2003 swim season. Based on information for the 2002 swim season, stormwater and runoff are potential problems at more than half (1,383) of all reported beaches with information on pollution sources, and 49 percent (1,152) report sewage as a pollution source. **New Jersey, Michigan, Florida, New York, California, and Massachusetts** have the most reported beaches with stormwater and runoff pollution sources; **Michigan, Massachusetts, California, Florida, New York, and Connecticut** have the most reported beaches with sewage pollution sources.

Table 1
Number of Reported Beaches per State with Stormwater, Runoff, and/or Sewage Pollution Sources (based on 2002 beach season data)

State/Territory	Total Reported Beaches ^(a)	Beaches with Insufficient Pollution Source Information ^(b)	Stormwater or Runoff Pollution Sources		Sewage Pollution Sources	
			Beaches	Percent ^(c)	Beaches	Percent ^(c)
Alabama	11	0	4	36%	6	55%
California	299	96	113	56%	119	59%
Connecticut	104	0	59	57%	81	78%
Delaware	18	0	0	0%	1	6%
Florida	266	38	142	62%	117	51%
Georgia	6	1	4	80%	3	60%
Guam	42	0	39	93%	33	79%
Hawaii	87	4	83	100%	13	16%
Illinois	43	24	16	84%	12	63%
Indiana	45	12	29	88%	24	73%
Louisiana	4	0	0	0%	4	100%
Maine	7	0	6	86%	6	86%
Maryland	39	1	11	29%	14	37%
Massachusetts	247	16	110	48%	134	58%
Michigan	264	20	145	59%	137	56%
Minnesota	22	1	12	57%	17	81%
Mississippi	4	0	4	100%	4	100%
New Hampshire	173	143	4	13%	1	3%
New Jersey	240	1	169	71%	3	1%
New York	380	5	135	36%	88	23%
North Carolina	20	0	20	100%	20	100%
Northern Mariana Islands	3	0	3	100%	3	100%
Ohio	63	12	45	88%	39	76%
Pennsylvania	15	0	4	27%	5	33%
Puerto Rico	24	2	3	14%	17	77%
Rhode Island	128	0	25	20%	20	16%
South Carolina	26	1	12	48%	22	88%
Texas	30	0	23	77%	21	70%
Virgin Islands	62	0	44	71%	53	85%
Virginia	15	1	7	50%	11	79%
Washington	64	0	39	61%	38	59%
Wisconsin	61	0	40	66%	40	66%

(a) Responding agencies do not necessarily report all beaches within their jurisdiction.

(b) These beaches indicated that they did not know or failed to respond to a question concerning whether there were pollution sources in the vicinity of or that might affect the beach.

(c) Percent of all reported beaches with information on pollution sources.

Health Risks

- Because pathogens in sewage-contaminated waters can cause a wide range of diseases—including ear, nose, and throat problems, gastroenteritis, dysentery, hepatitis, and respiratory illness—beachwater pollution threatens the public's health. The consequences of these swimming-associated illnesses can be greater for children, elderly people, and those with weakened immune systems.
- Pollution contributed to the contamination of popular beaches. In 2003, sewage contamination from spills, stormdrains, runoff, or leaky septic systems was reported in such popular vacation destinations as San Diego, **California**; Biloxi, **Mississippi**; Myrtle Beach, **South Carolina**; and St. Croix and St. Thomas, **U.S. Virgin Islands**. Aside from the disease-causing organisms present in sewage, its high nutrient content acts as fertilizer that can spur massive blooms of microscopic organisms. In some cases, exposure to these organisms can cause illness through contact or ingestion.

- Toxic outbreaks of such organisms as *Pfiesteria piscicida*, which was discovered in North Carolina in 1991, have been found in recent years to be associated with fish kills in North Carolina coastal and estuarine waters. This organism contains a neurotoxin that may affect fishermen, swimmers, and other recreational users of nearshore marine and riverine waters. Exposure to *Pfiesteria piscicida* blooms may result in short-term memory loss, dizziness, muscle aches, peripheral tingling, vomiting, and abdominal pain. Several leading scientists believe that the number and frequency of outbreaks such as these toxic blooms are increasing around the world and that these blooms may be attributed in part to coastal pollution. Red-tide algal blooms may also contain organisms that cause respiratory illnesses. No closings or advisories due to red tides were reported in 2003. However, they continue to be a problem particularly along the Gulf of Mexico coastline. The Mote Marine Laboratory in Sarasota, Florida, for example, reports moderate to high bloom with fish kills and respiratory irritation between February and October 2003 from Tarpon Springs to Marco Island, and between January and February 2004 from Indian Rocks Beach to Englewood.⁷

Inconsistent Monitoring

- With grants provided to coastal states and territories through the federal BEACH Act, 28 percent more coastal and Great Lakes beaches were regularly monitored in 2003 (3,106) than in 2002 (2,429). In total, 56 percent of beaches reported to the EPA were regularly monitored in 2003.
- With federal BEACH Act grant money, the state of **Louisiana**, which has consistently earned NRDC's "beach bum" status for its lack of any regular monitoring of beachwater for swimmer safety, began a preliminary monitoring program in April 2004. **Oregon**, also a consistent "beach bum," began its monitoring program in 2003. The state of **Washington**, which except for five local agencies has had no regular monitoring program for swimmer safety, began monitoring 34 beaches once a week in 2003.⁸
- In 2003, 17 states and the **Northern Mariana Islands** increased the number of coastal beaches monitored. Eleven of these states monitor all or most of their coastal beaches at least once a week (**Illinois, Indiana, Massachusetts, Michigan, Minnesota, New Hampshire, New York, Oregon, Virginia, Washington, and Wisconsin**). The remaining six states monitor a portion of their beaches at least once a week (**Alabama, Georgia, Maine, Maryland, Rhode Island, and Texas**).
- In 2003, the number of coastal beaches monitored remained constant in 11 states. Ten of these states and **Guam** monitor all or most of their coastal beaches at least once a week (**California, Connecticut, Delaware, Florida, Mississippi, New Jersey, North Carolina, Ohio, Pennsylvania, and South Carolina**). **Hawaii** monitors a portion of its beaches at least once a week.
- In 2003, two U.S. territories did not provide updated coastal beach monitoring information. In 2002, **Puerto Rico** monitored a portion of its coastal beaches at least once a week. The **Virgin Islands** monitors beaches every three months.
- In 2003, for the first full year, **Florida** increased monitoring at more than 300 sites in 34 coastal counties from once every two weeks to once a week.

Inconsistent Standards

- The federal BEACH Act of 2000 required that coastal and Great Lakes states adopt the EPA published standards, or standards equally protective of public health, by April 2004. The EPA's published standards include a geometric mean value for multiple samples taken over 30 days, and an instantaneous, single sample value. Some state and local agencies measure both the geometric mean and the single sample when taking beachwater samples, and issue beach closings or advisories if either standard is exceeded; others measure the

geometric mean or the single sample but not both. Based on state level information provided by the EPA supplemented with state and local level information collected by NRDC:

- Eight states and **Guam** have adopted the EPA standards for all coastal waters. Most local agencies in **Connecticut, Florida, and Guam** report using both the geometric mean and single sample to determine beach closings/advisories. Most state or local agencies in **Alabama, Delaware, Indiana, and New Jersey** and most agencies contacted in **Virginia** and **Texas** use either the geometric mean or single sample to determine beach closings/advisories but not both.
- Five states and **Puerto Rico** have adopted the EPA standards for some of their coastal waters. Most local agencies in **California** use both the geometric mean and single sample to determine beach closings/advisories. **North Carolina** uses both the geometric mean and single sample for all Atlantic Ocean and other priority beaches. State and local agencies in **Hawaii, Maine, and Ohio** use either the geometric mean or the single sample but not both. **Puerto Rico** did not provide information on closing/advisory determination practices.
- Ten states and the **Northern Mariana Islands** have adopted the EPA standards, but it is not clear whether they apply to all coastal waters. Most local agencies in **Georgia, Maryland, Massachusetts, and Minnesota** use both the geometric mean and single sample to determine closings/advisories. Local agencies in the **Northern Mariana Islands, Rhode Island, South Carolina, Washington, and Wisconsin** use either one to determine beach closings/advisories but not both. NRDC obtained information for 6 of 15 local agencies in **New York**, half of which use either the geometric mean or single sample to determine beach closings/advisories but not both, including New York City. Information on closing/advisory determination practices is incomplete for **Louisiana**.
- Two states, **Michigan** and **Oregon**, have adopted the EPA's less stringent "moderate full body contact" standards rather than the EPA's "designated beach area" standards. Most local agencies in Michigan report using both the geometric mean and single sample to determine beach closings/advisories, while Oregon uses only the single sample.
- According to the EPA, **New Hampshire** adopted the EPA standards for all coastal waters, but the state calculates its geometric mean based on three samples over 60 days rather than the recommended five samples over 30 days. Furthermore, the state uses the single sample when determining closings/advisories, not the geometric mean. **Illinois** has adopted only the EPA's single sample standard. **Pennsylvania** and the **Virgin Islands** are in the process of adopting the EPA's standards. **Mississippi** has not yet adopted any of the EPA standards.

Economic Effects

- Water pollution has a significant economic effect on coastal states. Failing to invest in clean water costs coastal states jobs, job productivity, tourism and property-tax dollars, and economic growth.
- Polluted waters also cause economic losses both from swimming-related illnesses and from beachgoers' lost use of the beach.
- Beaches are the top vacation destination in the country. Coastal tourism, dependent in part on clean beaches, generates substantial revenues for state and local governments. According to the April 2004 *Preliminary Report of the U.S. Commission on Ocean Policy*, ocean-related tourism and recreation contributed roughly \$58 billion and 1.5 million jobs to the U.S. economy in 2000. "Tourism and recreation constitute by far the fastest growing sector of the ocean economy."⁹
- Until sources of beachwater pollution are eliminated, monitoring is the best way to protect swimmers from polluted water. Given the large number of people using beaches and the substantial income from coastal tourism, the cost of monitoring programs is reasonable.

RECOMMENDATIONS

- Controls on all sources of beachwater pollution should be tightened. Controls on sewage overflows, urban stormwater, and other sources of polluted runoff are particularly critical. State and EPA controls of these discharges must be strengthened and enforced.
- Congress should fully fund implementation of the federal BEACH Act of 2000.
- The EPA should promptly and effectively implement and enforce the BEACH Act to ensure comprehensive state and local monitoring of beachwater quality and prompt public notification when bacterial standards are exceeded. The EPA should set beachwater standards to protect the public from the full range of waterborne pathogens.
- State and local governments should make preventing beachwater pollution a priority. They should also adopt monitoring and closure programs that adequately protect the public and do sanitary surveys to identify and remedy the sources of beachwater pollution.
- State and local governments should issue preemptive advisories where a correlation between rainfall and elevated bacteria levels exists or when sewer overflows or other catastrophic events jeopardize beachwater safety.
- A portion of the revenues generated by tourism should be allocated to monitoring and prevention programs to ensure that swimming in coastal waters does not jeopardize the health of beachgoers.
- Individuals can also help clean up beach pollution. Simple measures such as conserving water, redirecting runoff, using natural fertilizers like compost for gardens, maintaining septic systems, and properly disposing of animal waste, litter, household toxics, and used motor oil can reduce the amount of pollution in coastal waters.

Notes

¹ When used in this report, the term coastal includes the Great Lakes shoreline.

² The EPA, Office of Water, *National Water Quality Inventory: 1998 Report to Congress*, EPA 841-S-00-001, June 2000.

³ *America's Living Oceans: Charting a Course for Sea Change*, Pew Oceans Commission, May 2003, p. v.

⁴ The EPA, *National Coastal Condition Report*, September 2001, p. xv.

⁵ Statement of G. Tracy Mehan, III, assistant administrator for water, The EPA, before the Committee on Environment and Public Works, U.S. Senate, Oct. 8, 2002. The U.S. Environmental Protection Agency's most recent national compilation of Clean Water Act 305(b) state reports is for reporting year 2000, available at: www.epa.gov/305b.

⁶ While no information was provided on sources of contamination in 2003 for closings/advisories in Guam and Florida, the EPA's Region IX and Florida Department of Health officials told NRDC that all of Guam's and most of Florida's closings/advisories were due to high bacteria levels from unknown sources of contamination. See Guam and Florida state summaries for more information.

⁷ More information available at: <http://www.mote.org/~mhenry/rtchron.phtml>, July 8, 2004.

⁸ Lynn Snyder, Washington Department of Ecology, personal communication, July 7, 2004.

⁹ *Preliminary Report of the U.S. Commission on Ocean Policy, Governor's Draft*, Washington, D.C., April 2004, pp. 2,7, available at: <http://www.ocean.commission.gov>.