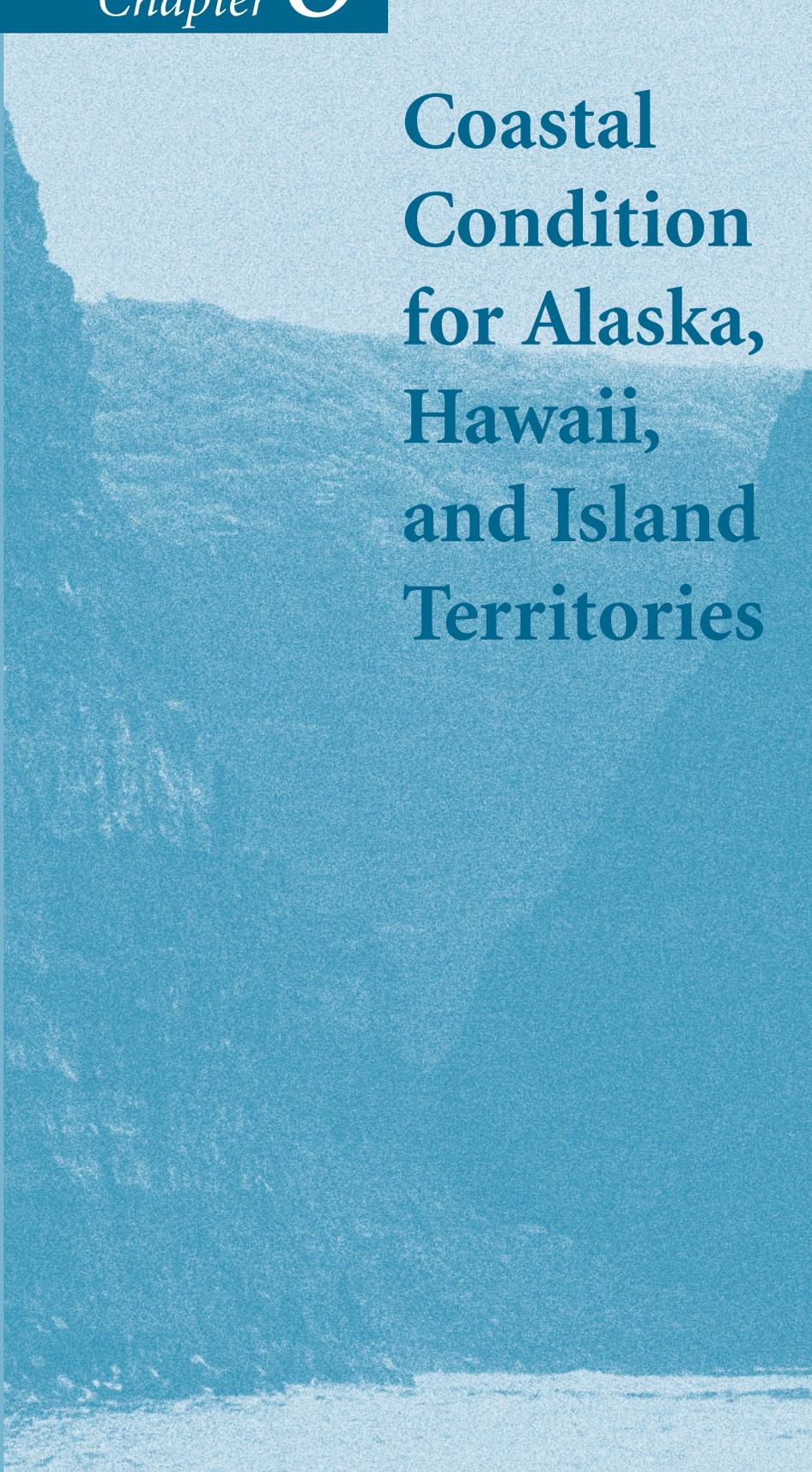


Chapter 8

**Coastal
Condition
for Alaska,
Hawaii,
and Island
Territories**



Chapter 8

Coastal Condition for Alaska, Hawaii, and Island Territories



The dazzling peaks off the island of Kahoolawe are just one of the many types of coastlines throughout Hawaii. Shorelines range from white sandy beaches on Oahu to the tallest sea cliffs in the world on Molokai. Each island offers its own unique habitat for marine life (Photo: Marc Hodges).

Monitoring of coastal resources in Alaska, Hawaii, and the island territories (e.g., Guam, Puerto Rico, U.S. Virgin Islands) is largely nonexistent. Although EPA Regions 2 (Puerto Rico and the U.S. Virgin Islands), 9 (Hawaii and Pacific Islands), and 10 (Alaska) and the attendant state resource agencies conduct some water quality monitoring, no consistent programs covering all coastal resources exist. Efforts through EPA's Coastal 2000 Program are intended to fill this void for Alaska, Hawaii, and Puerto Rico. No plans exist for the development of coastal monitoring efforts in the Pacific Islands (beyond Hawaii). This chapter examines the available information for these areas.

Alaska

The surface area of the coastal resources of Alaska dwarfs the coastal resources that exist in the remaining 49 states. The total surface area of estuarine resources for the continental United States is 33,211 square miles; for Alaska, it is 97,838 square miles. Unfortunately, most monitoring strategies have excluded Alaska because of the logistical problems in implementing a monitoring program there. However, no estimate of U.S. coastal condition can be complete without information concerning Alaska.

The vast majority of Alaska's coastal resources are presumed to be in relatively pristine condition due to Alaska's size, sparse population, and general remoteness. However, the past 20 years have seen a general increase in Alaskan populations in coastal areas, and several environmental accidents have occurred in coastal regions (e.g., the *Exxon Valdez* oil spill). Water quality has been found to be impaired in coastal areas surrounding port facilities along Prince William Sound, seafood processing facilities in the Aleutian Islands, and cruise ship docking facilities and corridors near Juneau and along the southeastern coastline. At present, the Alaska Department of Environmental Conservation assesses less than 1% of its total coastal resources. Of the assessed resources, 99% are impaired for one or more uses. No consistent information is available for the remaining estuarine resources.

In 2002, EPA's Office of Research and Development, Region 10, and Alaska's

Causes of Impairment for Alaska's 1998 303(d) Listed Waters

- Debris
- Dissolved oxygen
- Fecal coliform
- Metals
- Petroleum products
- Phosphorus
- Sediment
- Turbidity
- Residue
- Seafood residue
- Toxic and other deleterious substances

Alaska did not report any fish consumption advisories in 1999 or beach closings in 1998.

Department of Environmental Conservation will initiate a comprehensive pilot monitoring program to examine water quality, sediment quality, and condition of biotic resources in the coastal ecosystems of south-central Alaska. The Alaska-National Coastal Assessment Program will sample approximately 70 locations throughout the south-central region (Figure 8-1). Information from this survey should be available in 2003.

For its 1998 305(b) report, Alaska assessed 237 (1%) of its 33,257 estuarine square miles. Alaska reports on an Overall Use Support classification only, and 235 square miles (99% of assessed waters) are impaired for Overall Use Support. It should be noted that Alaska's assessment data are biased toward those waters with known impairments. Efforts are under way to assess other waters across the state. Alaska has 43 coastal 1998 303(d) listed waters.

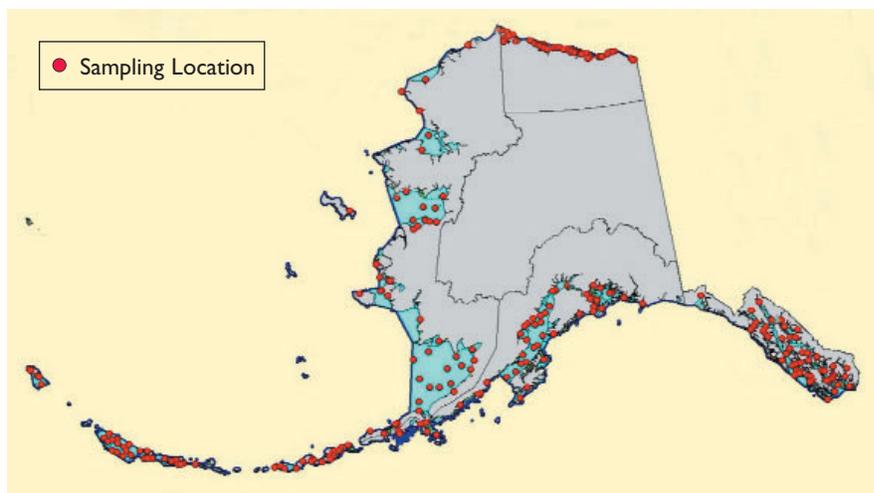


Figure 8-1. Proposed Coastal 2000 sampling design for Alaska.

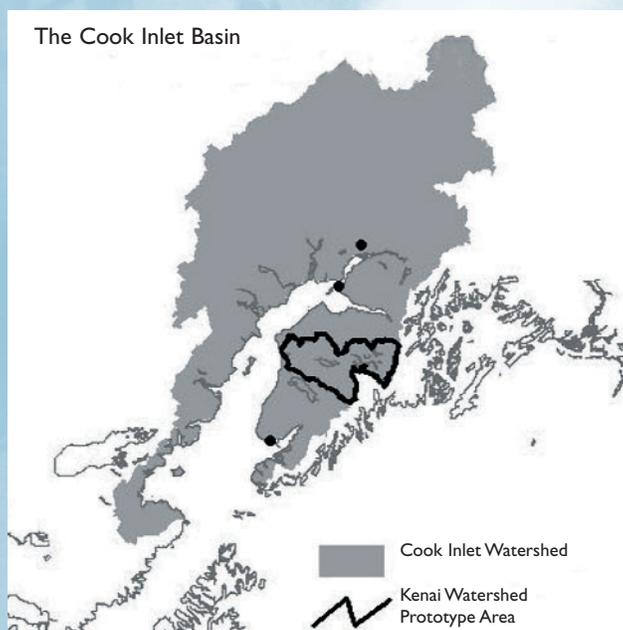
Cook Inlet Information Management & Monitoring System



Cook Inlet Information Management & Monitoring System (CIIMMS) is an Internet-based clearinghouse of data pertaining to the Cook Inlet watershed. Funded by the *Exxon Valdez* Oil Spill Trustee Council, the project seeks to provide stakeholders and decision makers with access to a broad range of data pertaining to the ecological health and management of the Cook Inlet Watershed.

Environmental management on an ecosystem or watershed level requires information on a range of topics covering a relatively large area. CIIMMS seeks to foster greater integration and coordination of projects within the Cook Inlet watershed by connecting decision makers with data relevant to management and recovery of Cook Inlet habitats and resources. The CIIMMS database is available on the Internet at

<http://info.dec.state.ak.us/ciimms>.



Cook Inlet, Alaska

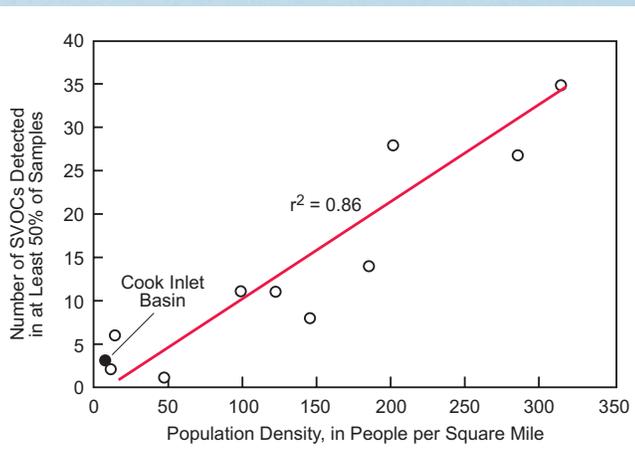
U.S. Geological Survey assessed the condition of waters composing the Cook Inlet watershed as part of the National Water Quality Assessment (NAWQA) Program. Work began on Cook Inlet in 1997 and is scheduled to continue until 2002. The Cook Inlet watershed is more than 38,610 square miles and has a human population of approximately 347,000, with 254,000 being concentrated in the Municipality of Anchorage. The watershed includes Anchorage, the Matanuska-Susitna Valley, part of Denali National Park, and sections of the Kenai Peninsula. The well-known salmon runs in this area make it a popular location for recreational fishing. The Kenai River, for example, experienced an estimated 321,000 angler-days in 1997. Water quality was generally good but did suffer in several highly populated locations.



Slimy sculpin (*Cottus cognatus*)

Species assayed for presence of organic contaminants and trace elements.

Tests for organic compounds showed very low contamination throughout the watershed with several notable exceptions within Anchorage. Of 32 organochlorine pesticides assayed, only 3 were detected: dieldrin, DDE (a metabolic product of DDT), and hexachlorobenzene. Only hexachlorobenzene exceeded minimum reporting limits. However, Chester Creek in Anchorage, Alaska, showed concentrations of PAHs, phenols, and phthalates that were nearly 50 times greater than the national median. In all, 24 organic contaminants, including PCBs, were detected in the tissue of sculpins from Chester Creek. The results place Chester Creek in the highest 25% of stations tested nationally for organic compounds. Throughout the Cook Inlet basin, the number of organic contaminants detected at each location correlated strongly with human population density ($r^2=0.86$).



Comparison of population density and semivolatile organic compounds (SVOC) detections among selected NAWQA study units.

Hawaii

Hawaii does not have a comprehensive coastal monitoring program. Some monitoring is done on the islands of Oahu and Hawaii and some monitoring is planned for Hawaiian coral reefs, but no comprehensive programs are currently operating. Most monitoring efforts in Hawaii have been targeted to specific problem areas—nonpoint source runoff, offshore discharges, or specific bays. For example, Kaneohe Bay is rather heavily studied in comparison to other Hawaiian coastal resources; however, there is still not enough data to determine the spatial extent of its problems. Another example is Mamala Bay, where an intensive examination of the public wastewater outfalls from Oahu into the bay showed that the areas adjacent to the discharges were not statistically different from reference areas. However, no comprehensive spatial examination of Mamala Bay was conducted so that these findings could be placed in a regional or statewide context. The Coastal 2000 efforts in Hawaii in 2001 will examine the coastal resources throughout the island chain (main islands only) and examine the condition of Mamala Bay, its inland estuarine resources, and the nearshore effects of these inland features on Mamala Bay's ecological condition.

In 2001, the Coastal 2000 effort will be undertaken by EPA's Office of Research and Development, Region 9, the University of Hawaii, and state and local resource agencies in Hawaii. This effort will be the first comprehensive survey of the ecological conditions of the coastal resources of Hawaii.

The survey will examine water quality, sediment quality, and biotic condition at 50 locations throughout the primary island chain (Figure 8-2). Information from this survey should be available in 2003.

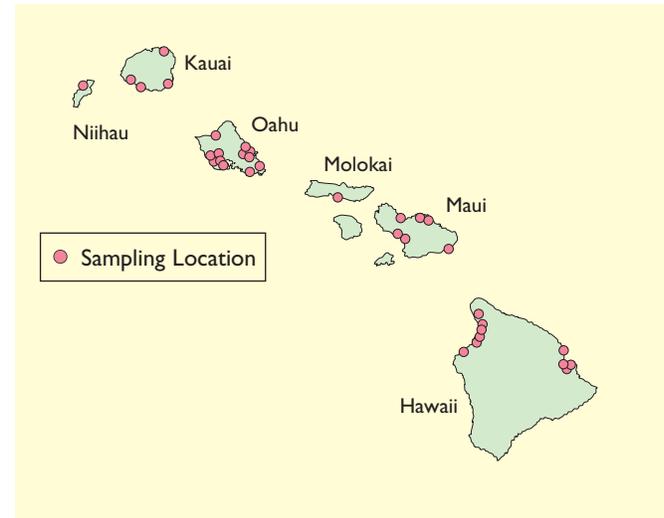


Figure 8-2. Proposed Coastal 2000 sampling design for Hawaii.

The state of Hawaii assessed 54.8 square miles of estuaries (100%) and 884 (84%) of its 1,052 miles of shoreline for its 1998 305(b) report. Of the assessed estuaries, 43% fully support their designated uses, 1% are threatened for one or more uses, and 56% are impaired by some form of pollution or habitat degradation (Figure 8-3).

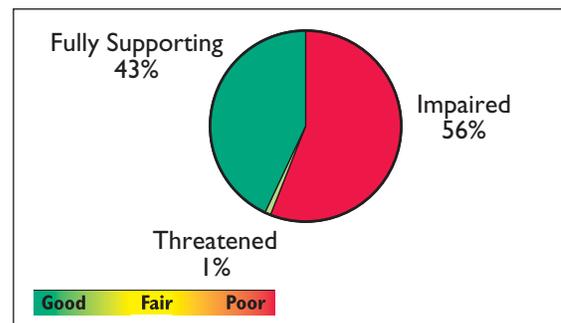


Figure 8-3. Water quality in assessed estuaries in Hawaii (U.S. EPA).

Of assessed shoreline, 89% fully supports its designated uses, 1% is threatened for one or more uses, and 10% is impaired by some form of pollution or habitat degradation (Figure 8-4). Hawaii did not report on individual use support.

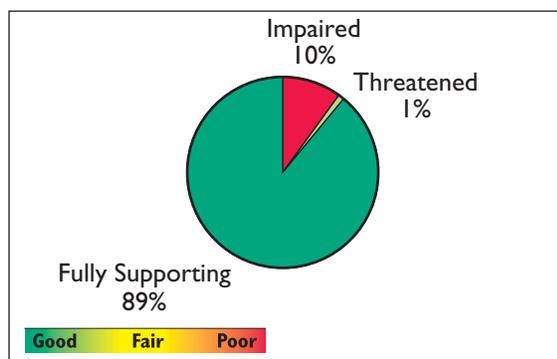


Figure 8-4. Water quality for assessed shoreline in Hawaii (U.S. EPA).

Hawaii has 18 waters that are listed as impaired under Section 303(d) of the Clean Water Act. The percentage of listed waters impaired by each of the major pollutant categories is shown in Figure 8-5.

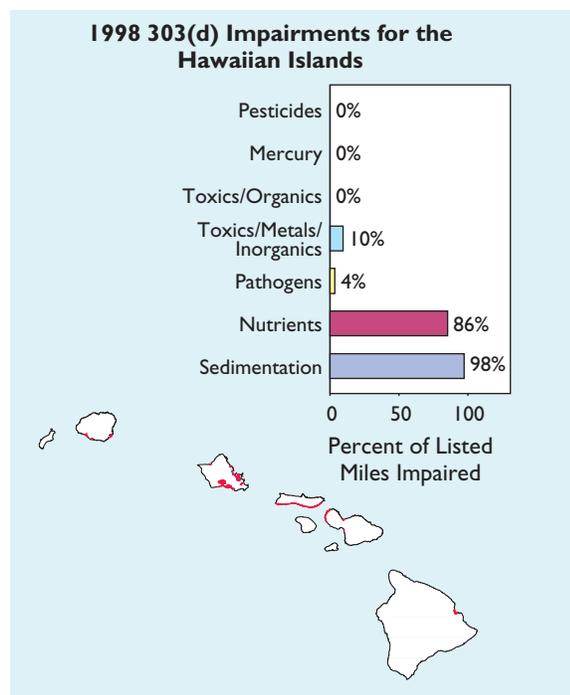


Figure 8-5. 1998 303(d) listed waters in Hawaii and the percentage of miles impaired by the major pollutant categories (note that a listing may be impaired by multiple pollutants) (U.S. EPA).

Hawaii and American Samoa each had one active fish consumption advisory for estuarine waters in 2000. Pearl Harbor in Hawaii was listed for PCBs, and Inner Pago Pago Harbor in American Samoa was listed for chromium, copper, DDT, lead, mercury, PCBs, and zinc in 2000. Both of these advisories warned of contaminant levels in all species of fish and shellfish within the designated waterbodies.



Hawaii is the only state that continues to grow geographically each year. Here, a spectacular display of molten lava pouring into the ocean off the southern coast of the Big Island (Photo: Susan Scott).

Puerto Rico

No consistent monitoring program for coastal resources exists for Puerto Rico. A National Estuary Program, the San Juan Bay Estuary Program (SJBEP), was established in 1992. Some monitoring with regard to water quality and tissue residue burdens has been completed by Region 2, SJBEP, and the Caribbean Environmental Protection Division, although these surveys focus almost exclusively on the San Juan area. The primary environmental concerns for coastal regions in Puerto Rico include pathogens, toxic contaminants, nutrient addition, and habitat loss.

In 2000, EPA’s Office of Research and Development, Office of Water, and Region 2 initiated a comprehensive survey of Puerto Rico’s estuarine ecosystems to examine water quality, sediment quality, and biotic condition. The survey consists of 50 locations throughout the estuaries of Puerto Rico (Figure 8-6). Information from this survey will be available in 2002.

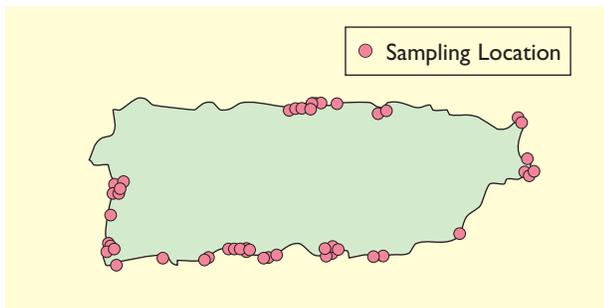


Figure 8-6. Coastal 2000 sampling design for Puerto Rico.

Puerto Rico assessed 175.4 square miles of estuaries and 550 miles of shoreline (100%) for its 1998 305(b) reports. Of estuarine square miles, 15% fully support their designated uses, 84% are threatened for one or more uses, and 1% are impaired by some form of pollution or habitat degradation (Figure 8-7). Of ocean shoreline, 60% fully support its designated uses, 33% is threatened for one or more uses, and 7% is impaired by some form of pollution or habitat degradation (Figure 8-8). Individual use support for assessed shoreline in Puerto Rico is shown in Figure 8-9.

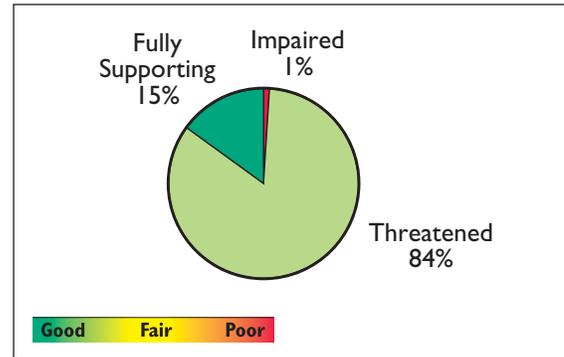


Figure 8-7. Water quality in assessed estuaries in Puerto Rico (U.S. EPA).

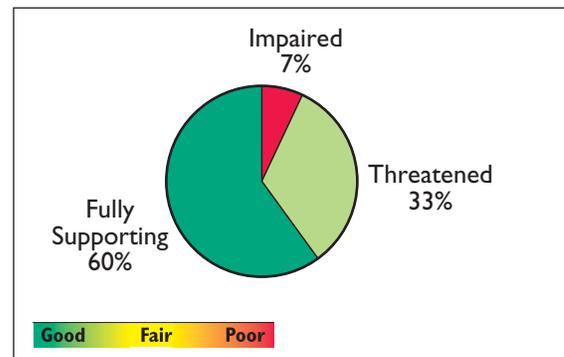


Figure 8-8. Water quality for assessed shoreline in Puerto Rico (U.S. EPA).

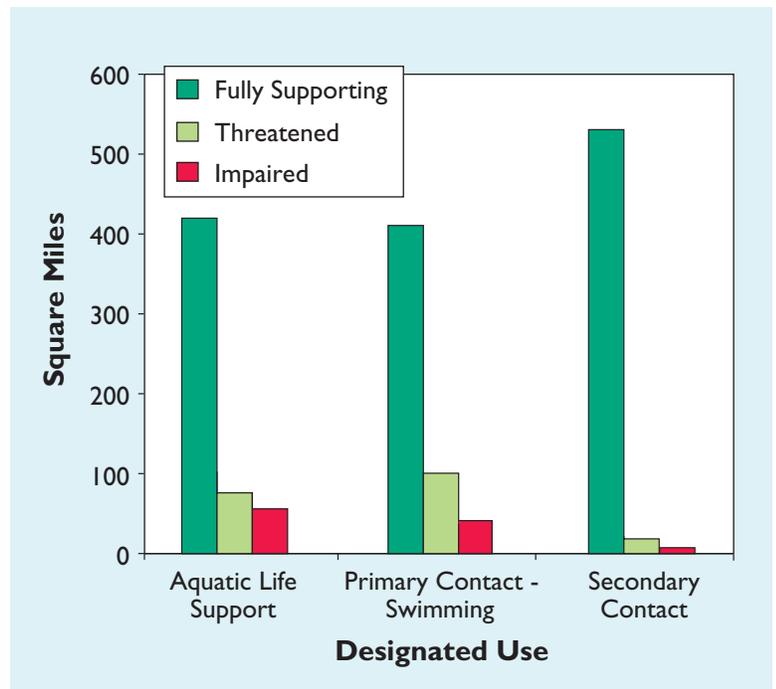


Figure 8-9. Individual use support for assessed shoreline in Puerto Rico (U.S. EPA).

Other Island Systems

No consistent coastal monitoring programs exist for Guam, the U.S. Virgin Islands, the Northern Mariana Islands, or American Samoa. At present, no plans exist for the development of coastal monitoring systems for these territories.

The U.S. Virgin Islands assessed 727 (79%) of its 921 estuarine square miles and 173 miles (100%) of coastal shoreline for its 1998 305(b) reports. Of its estuarine waters, 73% fully support their designated uses, 27% are threatened for one or more uses, and 0.1% are impaired by some form of pollution or habitat degradation (Figure 8-10). Of its shoreline miles, 73% fully support their designated uses, 21% are threatened for one or more uses, and 6% are impaired by some form of pollution or habitat degradation (Figure 8-11). Individual use support for assessed U.S. Virgin Island shoreline is shown in Figure 8-12.

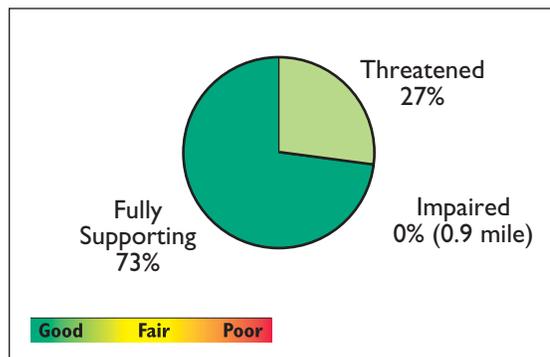


Figure 8-10. Water quality in assessed estuaries in the U.S. Virgin Islands (U.S. EPA).

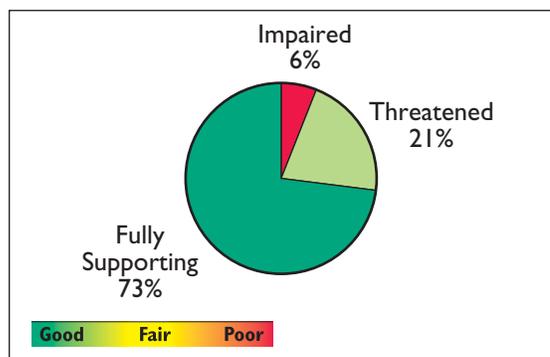


Figure 8-11. Water quality for assessed shoreline miles in the U.S. Virgin Islands (U.S. EPA).

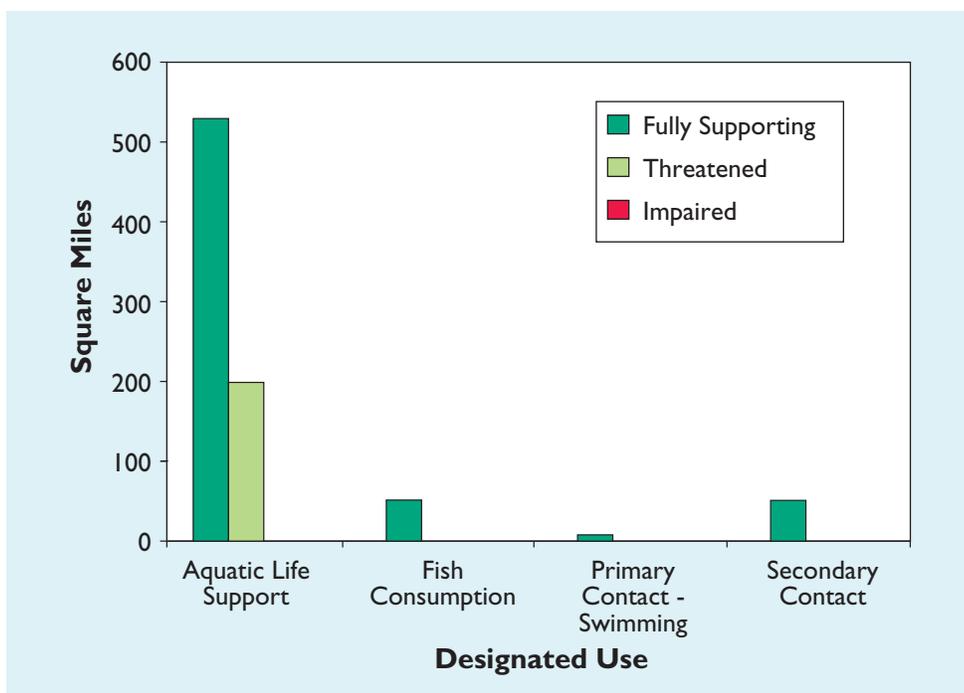


Figure 8-12. Individual use support for assessed estuaries in the Virgin Islands (U.S. EPA).

The U.S. Virgin Islands has nine waters listed as impaired under Section 303(d) of the Clean Water Act.

Guam assessed 14 miles (12%) of its 117 miles of ocean shoreline waters for its 1998 305(b) report. All 14 miles of assessed waters are impaired for swimming.

Guam and the U.S. Virgin Islands reported on beach closings for EPA's BEACH Watch Program. In Guam, information was reported for 35 beaches, and all but one had a monitoring program in place in 1999 to test water quality. There were no beach closings in Guam in 1999. Information on 27 beaches on St. Croix in the U.S. Virgin Islands was reported to EPA, and each of the 27 beaches was closed at least once in 1999.

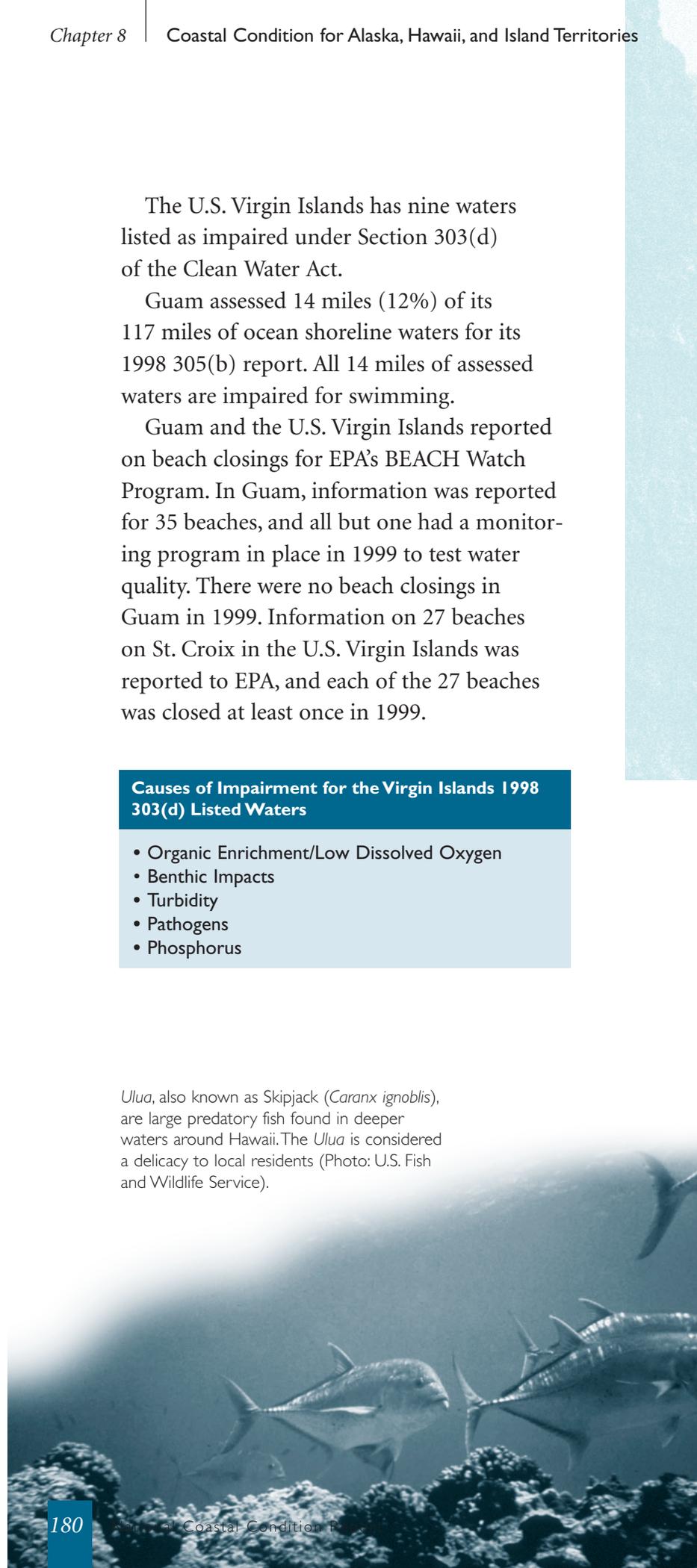
Causes of Impairment for the Virgin Islands 1998 303(d) Listed Waters

- Organic Enrichment/Low Dissolved Oxygen
- Benthic Impacts
- Turbidity
- Pathogens
- Phosphorus

Ulua, also known as Skipjack (*Caranx ignobilis*), are large predatory fish found in deeper waters around Hawaii. The *Ulua* is considered a delicacy to local residents (Photo: U.S. Fish and Wildlife Service).

Summary

Ecological conditions of the coastal resources in Alaska, Hawaii, Puerto Rico, and the U.S. Virgin Islands are largely unknown. Alaska assesses less than 1% of its coastal estuaries and shoreline. Hawaii's 305(b) data suggest that 56% of Hawaii's estuarine area is impaired by some form of pollution or habitat degradation, while only 10% of its coastal shoreline is impaired. Hawaii's sampling effort in estuaries is focused on known areas of concern, so it is difficult to interpret these results. Surveys planned for 2001 will provide a less biased view of estuarine condition. Hawaii's 1998 303(d) data suggest that the primary causes of estuarine impairment are increased concentrations of total suspended solids and nutrients. Coastal resources in Puerto Rico are believed to be in good condition but are threatened to become impaired, based on Puerto Rico's 305(b) data. The 305(b) information for the U.S. Virgin Islands suggests that its estuarine and coastal resources are in good condition.



Kaneohe Bay, Hawaii – A Coastal Intensive Research Site

Kaneohe Bay, characterized as “one of the most intensively studied coral reef systems in the world,” is located on the windward coast of Oahu, Hawaii. The Bay is also one of the most oligotrophic embayments in the United States, and land use in the watershed ranges from urban to agricultural, presenting a variety of effects on the water quality of the Bay. Kaneohe Bay is protected from the ocean by a barrier coral reef, which, together with the patch reefs inside the Bay, provide habitat and shelter to coral reef fishes, invertebrates, algae, and seagrasses.

A long-term project to monitor water quality and sediment processes in Kaneohe Bay was initiated in 1998. This project is part of the nationwide Coastal Intensive Site Network (CISNet) program, a cooperative effort funded by EPA, NOAA, and the National Aeronautics and Space Administration (NASA). CISNet was



Kaneohe Bay, Oahu, Hawaii (Photo: Frank Stanton)

designed to research the ecological responses to anthropogenic stresses in coastal environments, to examine the relationships between changes in environmental stressors, and to provide intensively monitored sites for development and evaluation of change in coastal systems.

The specific focus of the Kaneohe Bay CISNet project is to examine the linkages between watershed land use patterns and events and the responses of the Kaneohe estuarine/coral reef ecosystem. Another important goal of the project is to serve as a central clearinghouse for environmental data related to Kaneohe Bay and to begin other projects that might make use of these data sets.

Recently collected data on water column and sediment parameters, such as chlorophyll and nutrient profiles, are available on the Internet: www.hawaii.edu/cisnet.

Marine Alien Species Workshop in Hawaii

Recent investigations of the introduction of nonnative marine species indicate that up to 20% of all marine organisms found within the harbors of the main Hawaiian Islands are alien species. To raise the level of understanding about the impact of these marine alien species in Hawaii and provide a forum for the discussion of control and management methods, the U.S. Fish and Wildlife Service led a workshop on May 18, 2001, in Honolulu. The workshop brought together federal and state agency representatives, local conservation groups, and academics. A follow-up meeting was held on October 5, 2001.

The workshop and accompanying literature included information on the following: lists of established marine alien species of fish, invertebrates, and algae in Hawaii's waters; habitat types most frequently invaded; avenues of introduction; likely future marine alien invaders; impacts that established alien species have on native ecosystems; potential control methods for established marine aliens; and interdiction methods to minimize further introductions. More detailed information and wet-lab samples will be provided for selected species.

Results of the workshop will be made available in booklet and CD-ROM formats. The booklet and CD-ROM are intended to be evolving documents that will be revised periodically to reflect updated information about current alien species as well as information about as-yet unintroduced species. Also, the following guidebook was completed using grants from the Packard Foundation, U.S. Fish and Wildlife Service, and the National Marine Fisheries Service to the B.P. Bishop Museum and the University of Hawaii: "A Guide of Introduced Marine Species in Hawaii," edited by L.G. Eldredge and C.M. Smith. Bishop Museum Technical Report 21, August 2001.

For more information, contact Kevin Foster, Marine Alien Species Coordinator, U.S. Fish and Wildlife Service Pacific Islands Region, (808) 541-3441.