United States
Environmental Protection
Agency

Office of Water
(WH - 556 F)

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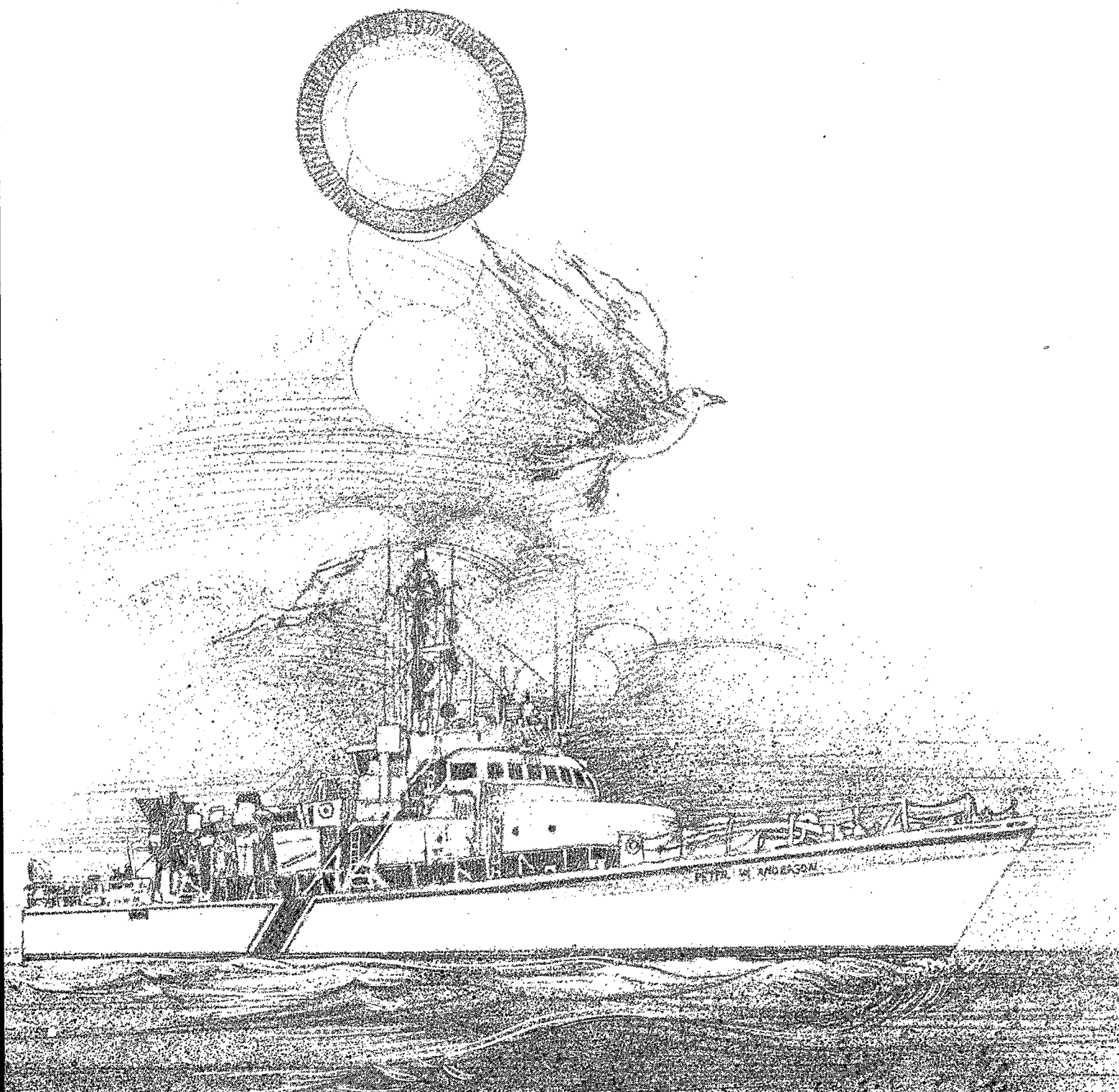
EPA

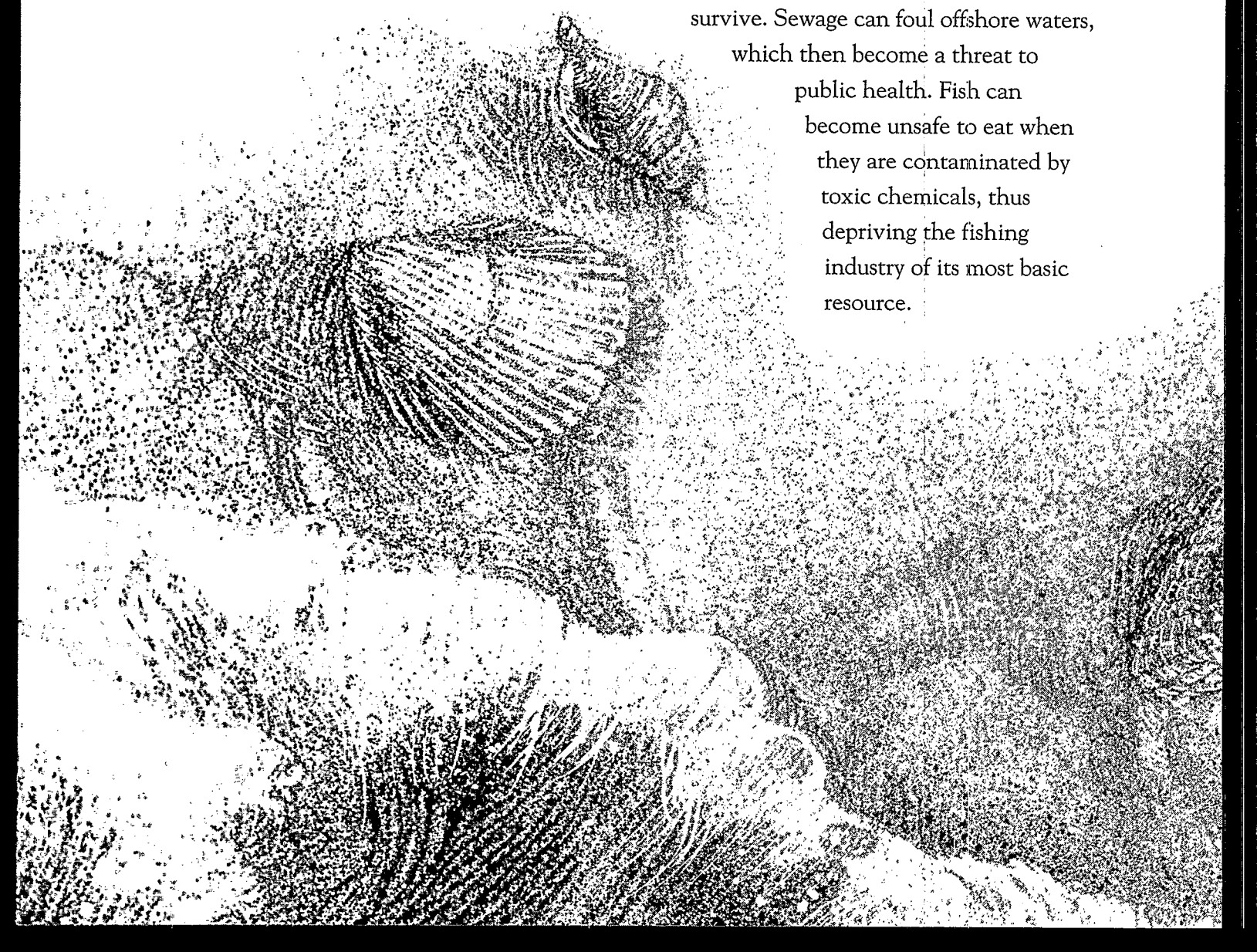
The O.S.V. ANDERSON

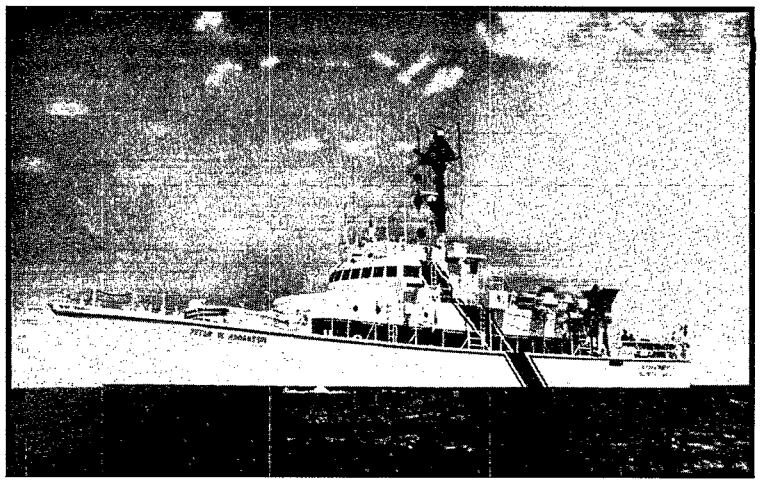
Working to Protect Our Oceans and Coasts



Our oceans, beaches, and estuaries are beautiful resources that support many living creatures and activities. We rely on coastal and marine areas for living, working, and relaxing. A wide variety of birds, fish, shellfish, and other marine animals also depend on these environments for food and shelter. Even our national economy is linked to the productivity of these areas. For example, coastal wetlands provide food, shelter, and spawning grounds for more than 70 percent of our valuable commercial fisheries, including shrimp, salmon, oysters, and blue crab.

Unfortunately, we are not as careful with our marine and coastal resources as we should be. Pollution is still a big problem. Improperly disposed trash can eventually reach our oceans and beaches and seriously harm sea turtles, birds, and other marine animals. Some beaches have been closed because of unsafe debris washing ashore. Where pollutants settle into sediments, creatures that live on the ocean bottom often cannot survive. Sewage can foul offshore waters, which then become a threat to public health. Fish can become unsafe to eat when they are contaminated by toxic chemicals, thus depriving the fishing industry of its most basic resource.





The future welfare of our marine and coastal resources depends greatly on our actions today. To restore and safeguard these resources, the U.S. Environmental Protection Agency (EPA) has launched many efforts to identify and control problems that threaten the health of our oceans and coasts. Such efforts require making important decisions after gathering and analyzing essential data about the environment. To collect these crucial data, EPA scientists rely heavily on the Ocean Survey Vessel (OSV) PETER W. ANDERSON.

The PETER W. ANDERSON was first launched in 1966 as the U.S. Naval Patrol Gunboat USS ANTELOPE. As the ANTELOPE, the ship had distinguished deployments with the U.S. SEVENTH FLEET in Vietnam and the U.S. SIXTH FLEET in the Mediterranean. The vessel, renamed for EPA scientist Peter W. Anderson, was converted for EPA use in 1979 to defend and protect the environment. The modified and re-equipped ANDERSON now serves as a platform from which EPA scientists gather critical information needed by EPA's ocean and coastal programs.

The ANDERSON

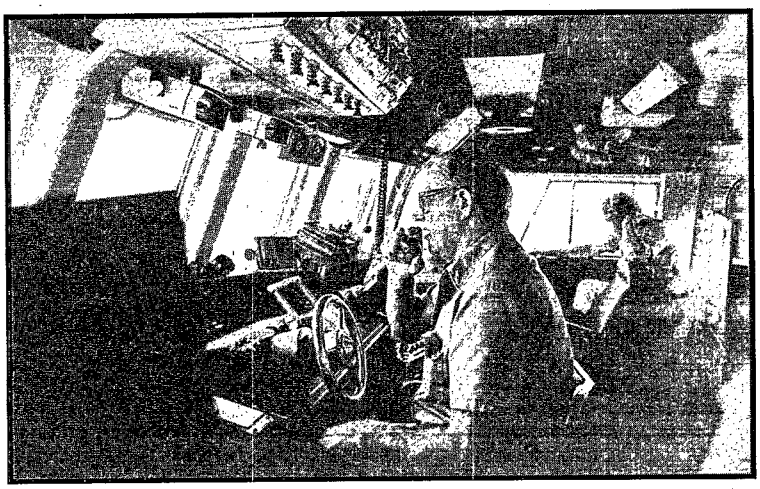
Mission

The Ocean Survey Vessel PETER W. ANDERSON is one of EPA's primary collectors of crucial marine observations and information. Sailing hundreds of miles each year along the Atlantic Coast and in the Gulf of Mexico, the ANDERSON is used by EPA scientists to collect data from harbors, ports, and offshore waters. Once collected, this information helps EPA scientists identify and monitor the environmental problems affecting our oceans, bays, and estuaries.

The scientific work aboard the ANDERSON is making a significant difference in the protection of marine and coastal environments. In Massachusetts Bay, for example, scientists aboard the ANDERSON found a new location for a sewer outfall pipe where contaminants would not accumulate. Other missions aimed at restoring the health of coastal waters along the Atlantic Coast examined the problem of garbage and debris littering harbors, beaches, and waterways.

Background

The ANDERSON sails from the cold harbors of Maine to the warm waters of the Gulf of Mexico. It maintains a busy schedule, working 4-hour shifts, often 24 hours a day, to fulfill an ever-increasing demand for its services. The ship maintains an operating staff of 15 crew members year-round who ensure the ship functions properly and that all surveys are conducted consistently. In addition, a scientific staff of up to 15 scientists from the survey area and elsewhere in the country joins the operating crew to conduct various surveys along the U.S. coastline.



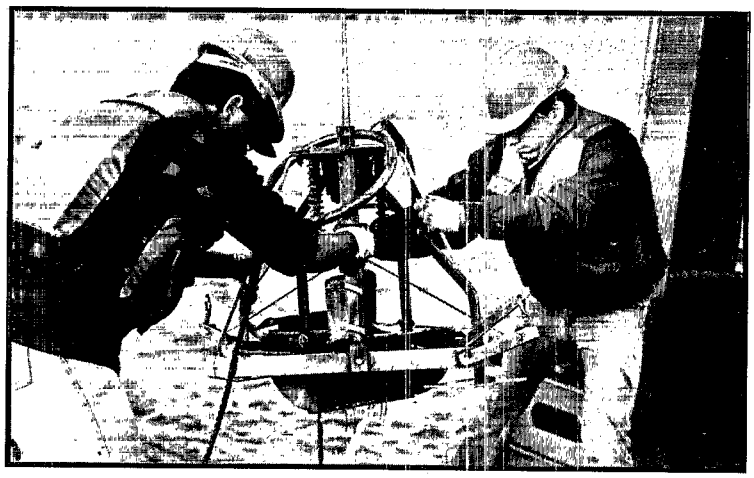
After its years of distinguished service in Vietnam and the Mediterranean, the ANDERSON was converted into a floating scientific facility, complete with chemistry and microbiology laboratories, a wet lab for biological sample processing, an underwater video camera system, a sonar system to profile the sea floor, and custom-made equipment designed to sample the ocean water from top to bottom. The significance of this equipment was confirmed after the Chernobyl nuclear power plant disaster when the former Soviet Union borrowed some of the ANDERSON's unique and sophisticated equipment to assess the impacts of radioactive fallout in the Black Sea.

One such piece of technologically advanced equipment used on the ANDERSON is the Gamma Isotope Mapping System (GIMS), otherwise referred to as the gamma sled. This device explores sites where material dredged from shipping channels is dumped, and solves cases in which dredged material has migrated from its intended disposal site. The gamma sled uses the natural radiation emitted by chemical elements as clues to solve cases of migrated material. By measuring the strength of the "signal" received from key elements, scientists can distinguish between dredged material and natural sediment. When towed across a dump site, the gamma sled creates a map of the sea floor that shows if the material is moving into areas that could be harmed.

The ANDERSON's Accomplishments

Designating ocean disposal sites for dredged materials

Accessible harbors are vital to the transport of goods and the defense of our nation. To be accessible, harbor waterways must often be dredged to remove sediments that settle over time and obstruct vessel navigation. Such deepening and widening of channels requires finding a place to deposit the large amounts of sand and sediment that are dredged from the harbor. However, disposed dredged material may threaten the marine life on the ocean floor if it contains toxic chemicals or alters the existing natural habitat and ecosystem. These potential threats to the marine environment prescribe two of the ANDERSON's principal functions: assisting in the selection of new dump sites for dredged material and in the monitoring of existing sites for negative environmental impacts. To date, the ANDERSON has successfully performed many of these missions.



- Near Cape Arundel, Maine, the ANDERSON determined the full extent of sediment contamination at an existing site and concluded that the site was minimally impacted by disposal activities.

- In Galveston Harbor, Texas, the ANDERSON surveyed a potential dredged material disposal site for a proposed channel-deepening project and determined that additional monitoring was necessary to fully assess the site.

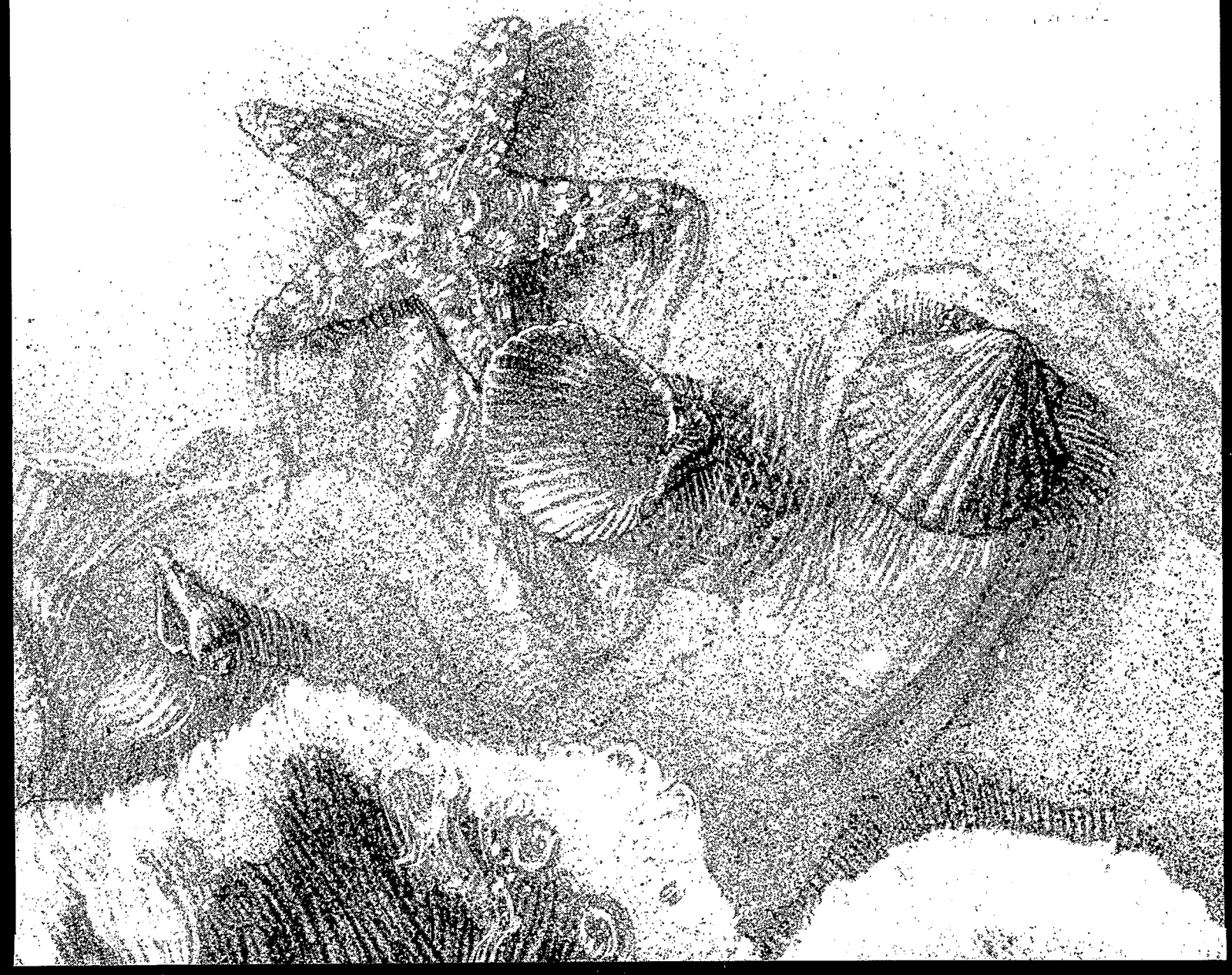
- In Charlotte Harbor, on the Gulf Coast of Florida, an ANDERSON survey discovered a rock outcrop supporting a flourishing marine environment located within the dump site boundaries. Recognizing the importance of rock outcrops as protective habitats for fish, EPA directed its scientists to use the ANDERSON to locate a new environmentally sound site.

- Using underwater video equipment in Boca Raton, Florida, ANDERSON scientists discovered that a proposed dump site could harm a coral reef. As a result of this discovery, an alternative non-threatening site was located.

Monitoring the impacts of sewage

Beaches attract thousands of people each year for recreation. In addition, more individuals are locating their permanent homes in or near beach communities. As a result, the increased population in coastal areas — especially in the summer — means treatment and disposal of more and more sewage. Because wastewater that is produced during treatment processes is released back into our waters, receiving waters must be monitored for any potential negative environmental impacts.

Toward this, ANDERSON scientists test water quality along the Atlantic coast throughout the busiest vacation months. By analyzing observations and data collected on the ANDERSON, scientists can detect seasonal deterioration in water quality. Some survey data have already been used to limit harmful elements of sewage discharge in Ocean City, Maryland, and Bethany Beach, Delaware, thus protecting valuable recreational resources and their uses.

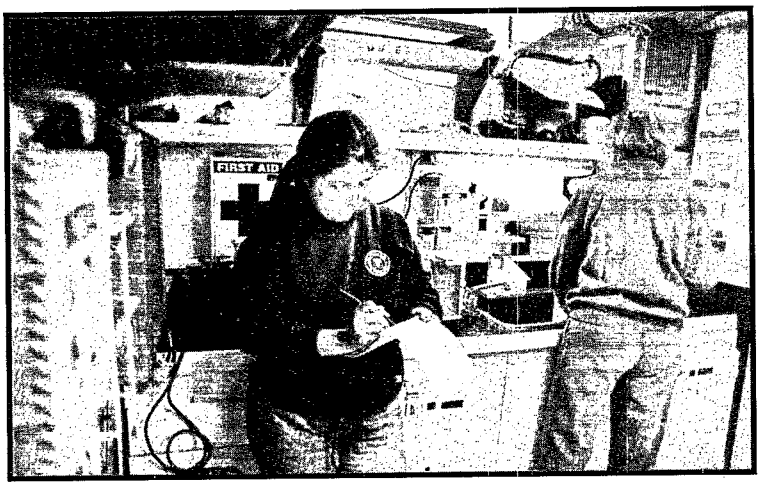


Identifying types and sources of aquatic debris

Garbage and other debris clutter vital urban waterways, threatening commerce, public health, and marine life. Sewage waste and medical waste such as syringes have washed up on nearby coasts and alarmed many people. These incidents have raised questions about the types and origins of debris in our waters. To answer these questions, ANDERSON scientists searched the harbors of Boston, New York, Philadelphia, Baltimore, Norfolk, and Miami for aquatic debris.

ANDERSON scientists found food wrappers, plastic bags, and cigarette filters, among other items, in the harbors of every city they surveyed. Such trash can harm marine animals if they mistake small pieces of plastic and other debris in the water for food and eat it. If ingested, debris could block digestive tracts, damage stomach linings, and reduce feeding drives of marine animals. Furthermore, birds and other animals may become entangled in six-pack yokes, fishing line, and other waste, hindering movement and even causing strangulation.

Another debris item found in every harbor surveyed by ANDERSON scientists was plastic pellets. Plastic pellets (the raw material used to produce plastic products) concern EPA scientists because they resemble fish eggs, a common food item for fish and birds. Following the discovery of plastic pellets in

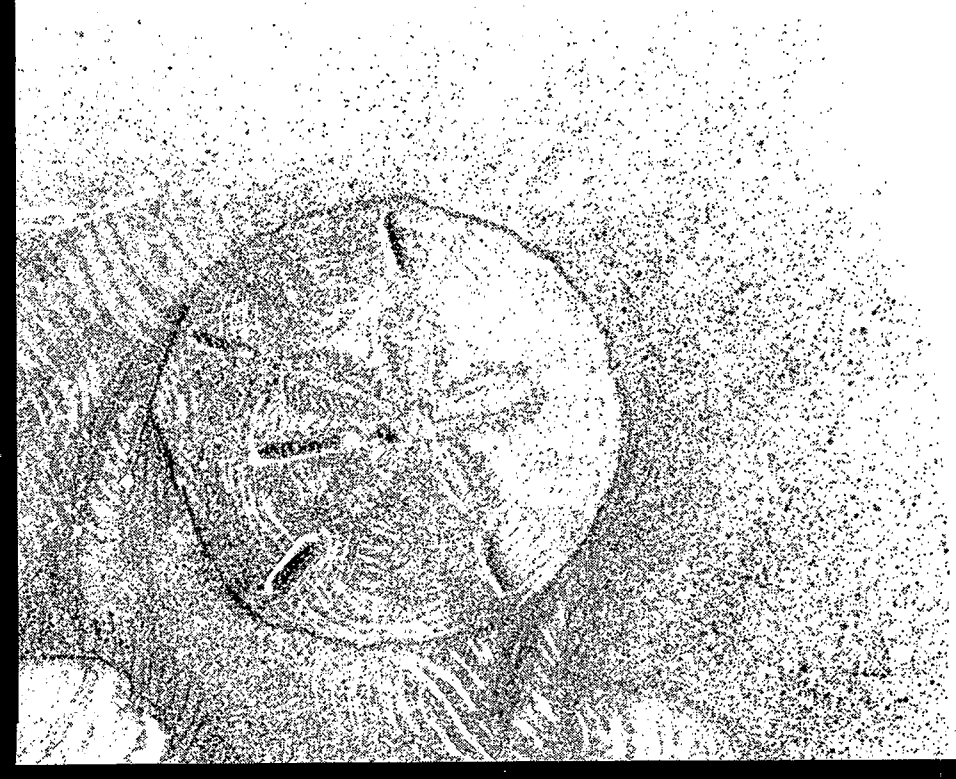


U.S. harbors, EPA launched a study to identify the sources of plastic pellet releases, so that it could recommend ways to prevent future releases of these pellets into the environment. The results of this study were shared with the plastics industry, which is now taking voluntary actions to minimize its contribution to plastic pollution in the marine environment.

The harbor surveys also provided ANDERSON scientists with an opportunity to document the contribution of land-based sources (e.g., storm sewers) versus the contribution of marine sources (e.g., ships) to the aquatic debris problem. The findings of these surveys identified that storm water carrying street litter to nearby waterbodies is a major source of land-based debris in harbors. This information will assist EPA in future efforts to control the release of debris to the marine environment.

Environmental education

In addition to performing scientific work, EPA uses the ANDERSON for public environmental education programs while the ship is in port between its scientific surveys. Several times each year, people are invited to tour the ship. These popular events provide visitors with a rare view of the sophisticated equipment and operations of the vessel. The ANDERSON is also featured in an educational videotape, available to schools, that addresses pollution prevention in terms children can understand. In addition, EPA occasionally takes out groups of teachers and students for on-site viewing of the ANDERSON at work.



Delaware Oil Spill — An Emergency Response

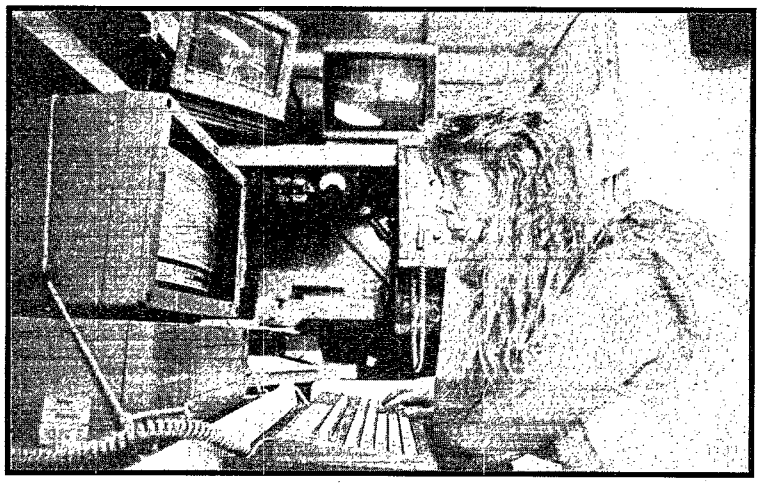
When the phone rings at 5:00 AM, it's often bad news, and 5:00 AM, Saturday, June 24, 1989, when the phone rang at EPA Oceanographer Bill Muir's house was no exception. EPA's Emergency Response Coordinator in Philadelphia told him that crude oil was spilling into the Delaware River from the tanker Presidente Rivera, which had run aground on its way to the Sun Oil refinery at Marcus Hook. All told, 300,000 gallons of oil eventually spilled into the river.

Within hours, Muir pulled together an experienced research team that boarded the ANDERSON to go to the oil spill. Important questions that the U.S. Coast Guard and the State of Delaware wanted answered were: how much oil had spilled, how far it had reached beneath the surface, where it was moving, and how much damage the blue crabs, striped bass, and marine birds would suffer. "We got there so quickly, the oil slick, or plume, had moved only five miles," Muir explained, "and we were able to determine where in the water column the oil was. It had not yet fallen to the bottom." By locating and quantifying the spill, the ANDERSON scientists were able to direct the cleanup efforts and assess the environmental impacts. "We had never used the ANDERSON in an emergency situation before," he went on, "but because I could reach an experienced team that was able to move fast, we could better assess the damage."

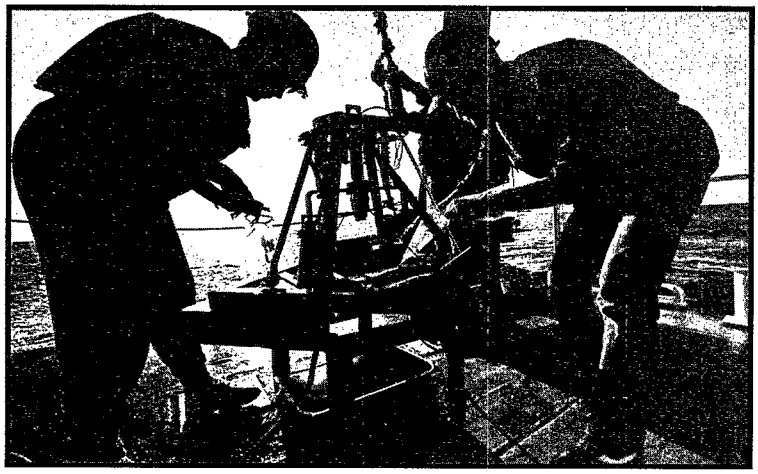
Spill responders skimmed oil off the water's surface before it could reach deep-water habitats. Marshes located where the slick was headed were immediately identified so the laborious process of mopping and soaking up crude oil could begin as it washed ashore. A new community of blue crabs, which could have been destroyed, survived, largely because of the quick response of the ANDERSON crew.

Pensacola Navy Home Port — Preparing for an Aircraft Carrier

When something as big as an aircraft carrier moves into town, people can expect many changes. This was the case in 1985 when the U.S. Navy decided to make Pensacola the home port of the USS Forrestal. Before this could happen, however, the harbor channel and turning basin had to be deepened. Four million tons of fine clay and silt had to find a "new home," but just any place would not do, because fine-grained sediment binds contaminants to its surface and can permanently damage ocean habitats if dumped on them.



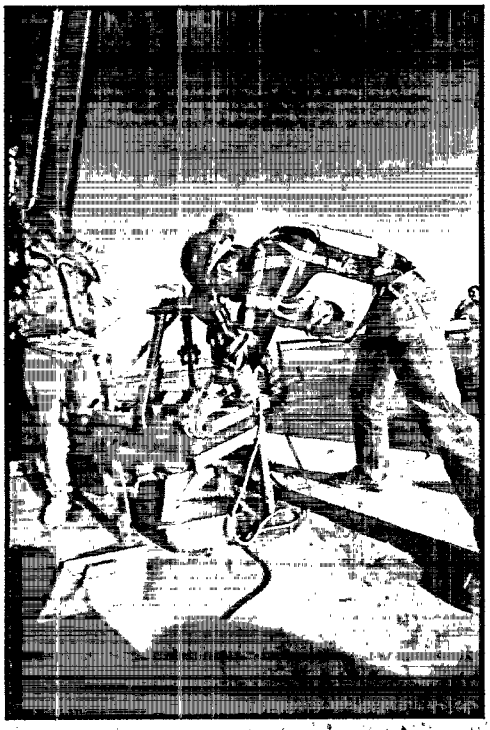
Working together, the Navy, the U.S. Army Corps of Engineers, and EPA had the opportunity to develop a model for designating new dredged material disposal sites — a logical role for the ANDERSON. Often, dredged material disposal sites must be relocated when they are proven to harm a marine community. However, the relocation of an existing site requires the designation of a new site. In the case of the Pensacola disposal site, scientists selected three possible new sites according to sea floor topography. Scientists aboard the ANDERSON completed intensive field work, including viewing over 100 hours of videotape of the ocean bottom, before selecting one of these sites, confident that it would be a safe location. To verify the decision, the Corps of Engineers set up special containment basins down-current from the dump site to catch shifting dredge material. Subsequent monitoring surveys revealed that the mission was successful.



Charleston Harbor — Protecting Fishing Grounds

Local sport fishermen did not take kindly to the intrusion of a barge into their favorite fishing grounds, particularly since it was ready to dump its load of dredged material on a known fishing spot. The barge was transporting material from the Charleston Harbor Deepening Project to a designated dump site in the Atlantic Ocean. The fishermen protested to the South Carolina Wildlife and Marine Resources Commission, who then used an underwater video camera to see what was there. Observers found rock outcrops, soft coral, and a dense population of small black seabass — right in the middle of the dump site.

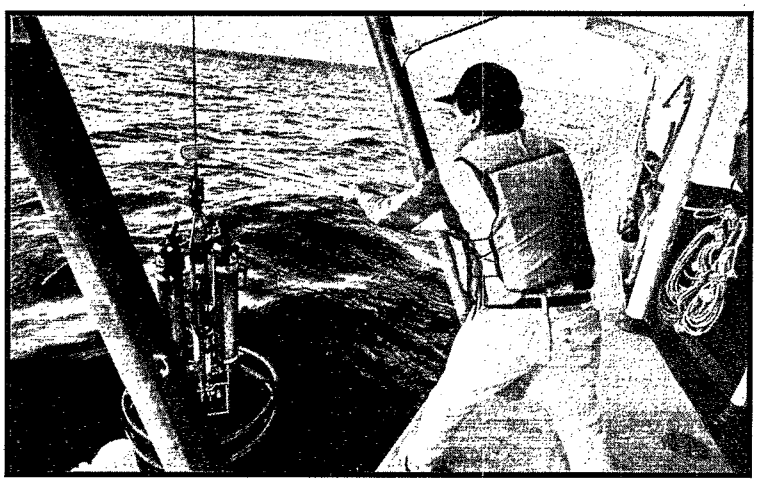
The State of South Carolina notified the EPA Regional office in Atlanta and the ANDERSON was dispatched to the scene. Scientists aboard the ship mapped miles of sea floor, discovering many soft coral communities close to the South Carolina coast, an area originally thought to be too turbulent and murky for such life. The largest of these sparse and patchy coral communities was centered at the designated dump site — about to be smothered in clay and silt. Responding to this discovery, ANDERSON scientists located a new disposal site for the dredged material and has continued to monitor the site to detect resulting changes in the marine community.



Georges Bank — Fish Tissue Studies

Ironically, just as Americans are eating healthier by including more fish in their diet, toxic contamination, among other factors, is limiting our supply of fish. Nearly all of the fish caught in coastal waters from Maine to North Carolina contain traces of toxic substances that if present in large enough quantities could harm those who eat seafood. These fish are being affected by toxic chemicals entering our estuaries and coastal waters from a variety of sources, including municipal and industrial discharges, urban and agricultural runoff, and recreational and commercial boating.

EPA researchers Bruce Reynolds and Sandy Baksi, located at the EPA Laboratory in Narragansett, Rhode Island, are addressing the problem with the help of the ANDERSON. Field researchers aboard the ANDERSON sailed to the Georges Bank, located off the New England coast, to collect flounder to compare to contaminated fish collected elsewhere. Because the fish in George's Bank are considered to be virtually contaminant-free, the levels of contaminants in those fish are considered to be normal, or safe. By comparing the normal levels of contaminants found in the fish from George's Bank with those found in fish from other areas, scientists can determine the extent of water and fish contamination in other areas of the country. In the future, this study will help identify differences between fish that are safe for human consumption and fish that contain harmful levels of toxic chemicals.



Arsenic Containers in the Atlantic — A Potential Emergency

On January 4, 1992, the cargo ship Santa Clara was fighting its way through gale winds and 25-foot waves between New York City and Delaware Bay when disaster struck. The storm swept 21 large cargo containers, four of which held 441 25-gallon drums of arsenic trioxide off the ship's deck into the Atlantic Ocean. If this lethal chemical leaked into the water, it would be readily absorbed by marine organisms. Fishermen who trawl frequently in the area could pull up a drum with their catch and become sick or possibly die from exposure. The arsenic had to be found!

The Navy and Coast Guard mounted an immediate search, but did not have the right equipment on hand for the job. The ANDERSON, however, was nearby in New York Harbor with the right equipment, and sailed immediately to help.

Using the ANDERSON's side-scan sonar equipment, the EPA Emergency Response Team (ERT) located the scattered drums and containers approximately 25 miles east of Cape May, New Jersey. To verify that the containers were from the Santa Clara, the team lowered a remotely operated vehicle (ROV) equipped with an underwater TV camera into the water and read the numbers painted on the side of one of them. It was a positive identification — the numbers matched those on the ship's manifest.

The ANDERSON's rapid identification ensured the safety of fishermen in the area, enabled experts to assess potential threats to marine life, and allowed responders to consider other cleanup options in a more timely manner.

You Can Make A Difference

Threats to our coastal regions result from our continued and increasing use of these resources. To help protect these important resources, you can do the following:

- Recycle whenever possible
- Dispose of trash properly
- Avoid disposing of litter and other wastes in storm sewers
- Dispose of boat trash and sanitary waste properly
- Support community programs for safe waste disposal
- Participate in local beach clean-up projects
- Be conservation-minded; use resources wisely

For more information contact the appropriate EPA Region.

Region 1: Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut

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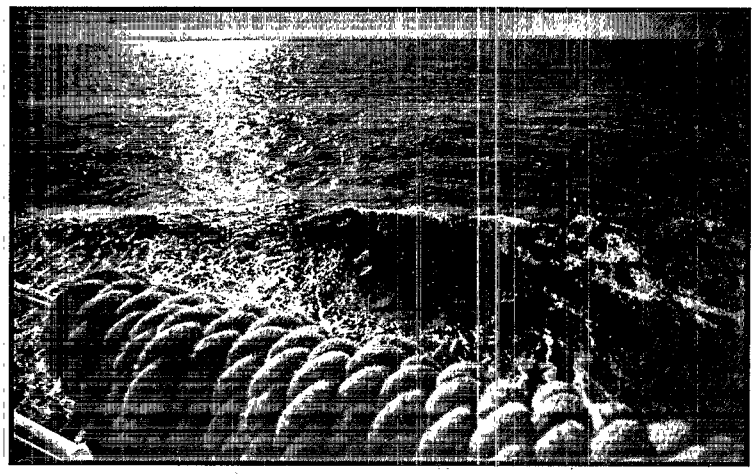

Region 3: Delaware, District of Columbia, Maryland, Pennsylvania, Virginia, West Virginia

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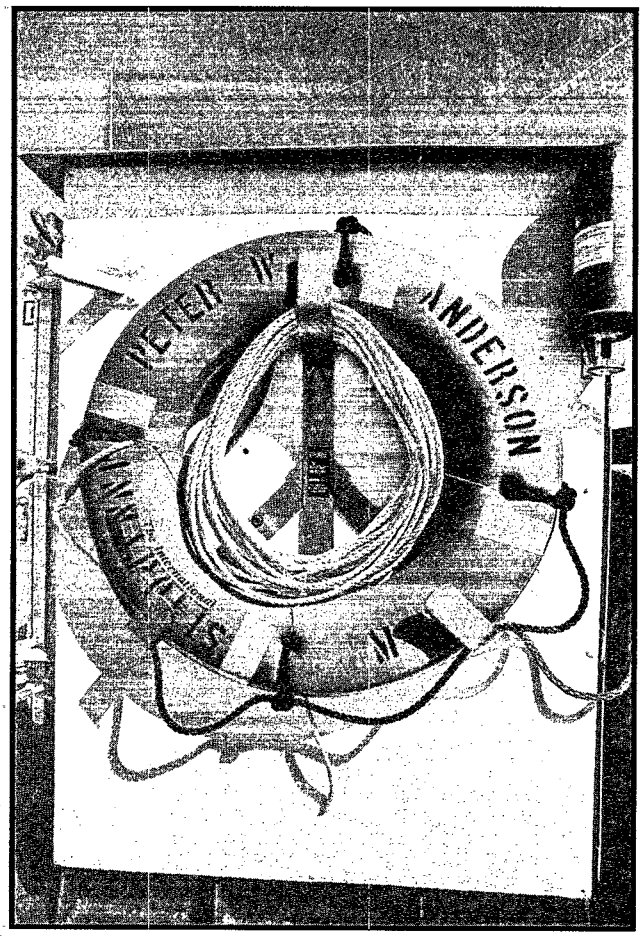

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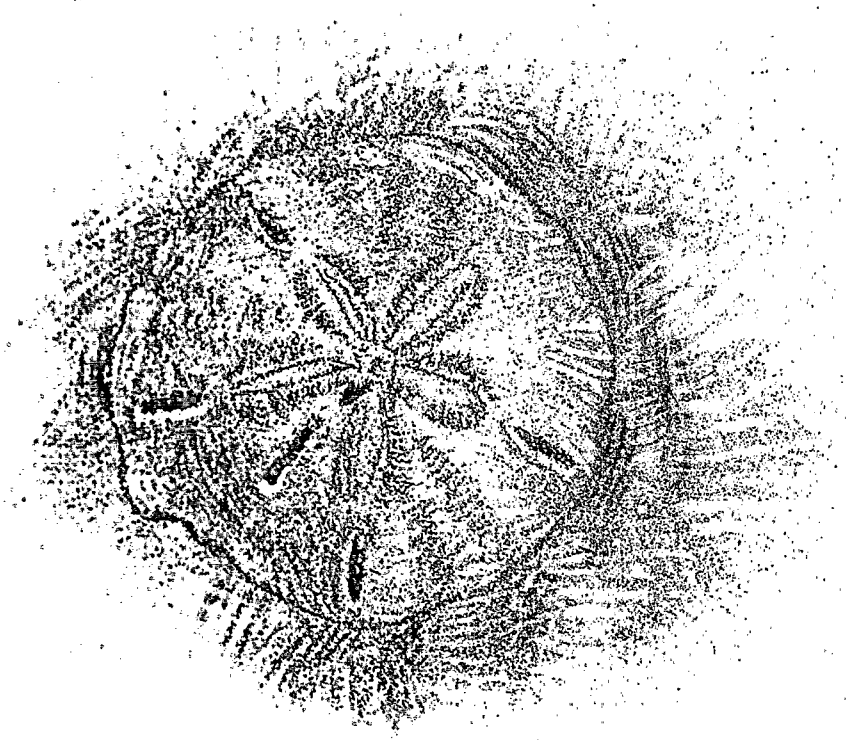

★1992★
THE YEAR OF
CLEAN WATER
Celebration of Commitment