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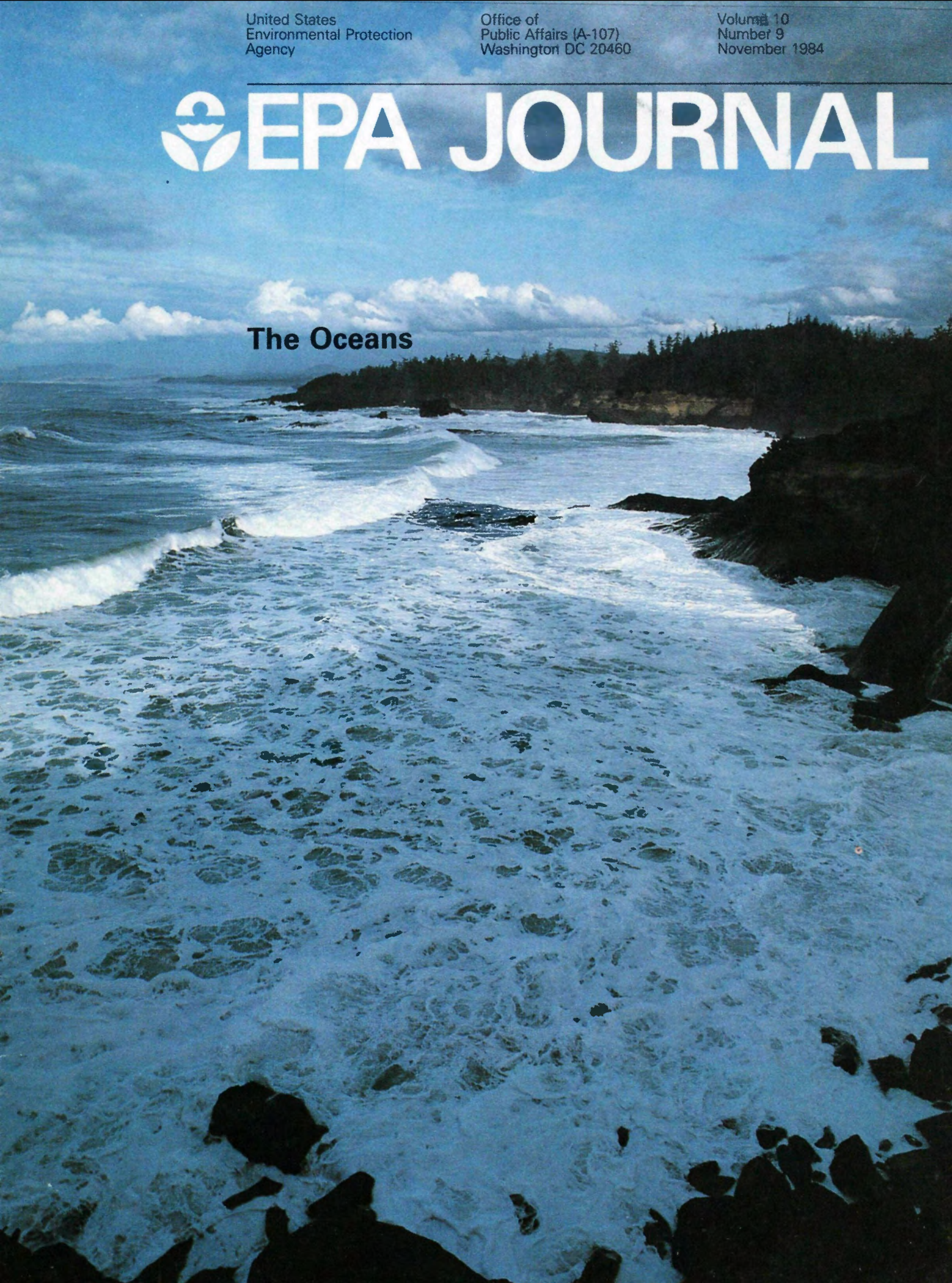

The Oceans

Steve Delaney

Surf fishing at dusk at Oregon Inlet, North Carolina, on the Atlantic Coast.

The Oceans

Last spring, the President proclaimed mid-1984 to mid-1985 as the Year of the Ocean. The aim is to expand understanding of the oceans' importance and to promote a sense of stewardship and partnership in managing ocean resources.

Focusing on this theme, the *EPA Journal* begins this issue with a passage from *The Edge of the Sea,* a book by naturalist Rachel Carson. The passage sums up the deep meaning of the oceans to people worldwide.

The magazine asked seven respected observers of marine environmental trends for their opinion on the health of the oceans. Their answers, which are included here, reflect a diversity of views on the vulnerability of the ocean environment.

The *Journal* interviewed Jack Ravan, the agency's Assistant Administrator for Water, for his views on the job of preserving the quality of the oceans. Ravan recently created an Office of Marine and Estuarine Protection which involves many of the agency's ocean protection programs.

Articles on specific EPA oceans activities include a review of the agency's research into the effects of ocean dumping and the dangers of pesticides absorbed in the marine environment, and an explanation of the agency's concern about disposal of sewage sludge in the Atlantic Ocean off New York City. A photo essay pictures a recent ocean work trip by the *Antelope,* an agency marine survey vessel.

The public awakening concerning pollution of a nationally important estuary, the Chesapeake Bay, is chronicled. A similar awakening in Puget Sound is reported in the third article in a *Journal* series on efforts by EPA regional offices addressing major environmental problems.

Taking a global view, a long-time participant in marine affairs discusses approaches to achieve successful protection of the world oceans resource. A related article discusses international pollution control programs.

From a national vantage point, an article presents the views of another federal agency involved in ocean stewardship: the National Oceanic and Atmospheric Administration. Another article presents an explanation by the oil industry of the steps it is taking to protect the environment when drilling for oil at sea.

Concluding this issue of the magazine are Update, featuring major developments at EPA, and agency appointments. □

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EPA is charged by Congress to protect the nation's land, air, and water systems. Under a mandate of national environmental laws, the agency strives to formulate and implement actions which lead to a compatible balance between human activities and the ability of natural systems to support and nurture life.

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Front cover: Pacific Ocean surf at Boiler Bay, Oregon. Photo by David Falconer, Folio.

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Rachel Carson on the Meaning of the Sea

World-famous naturalist Rachel Carson published a meditation on ocean life in her book, The Edge of the Sea. *We reprint the passage here for readers of* EPA Journal.

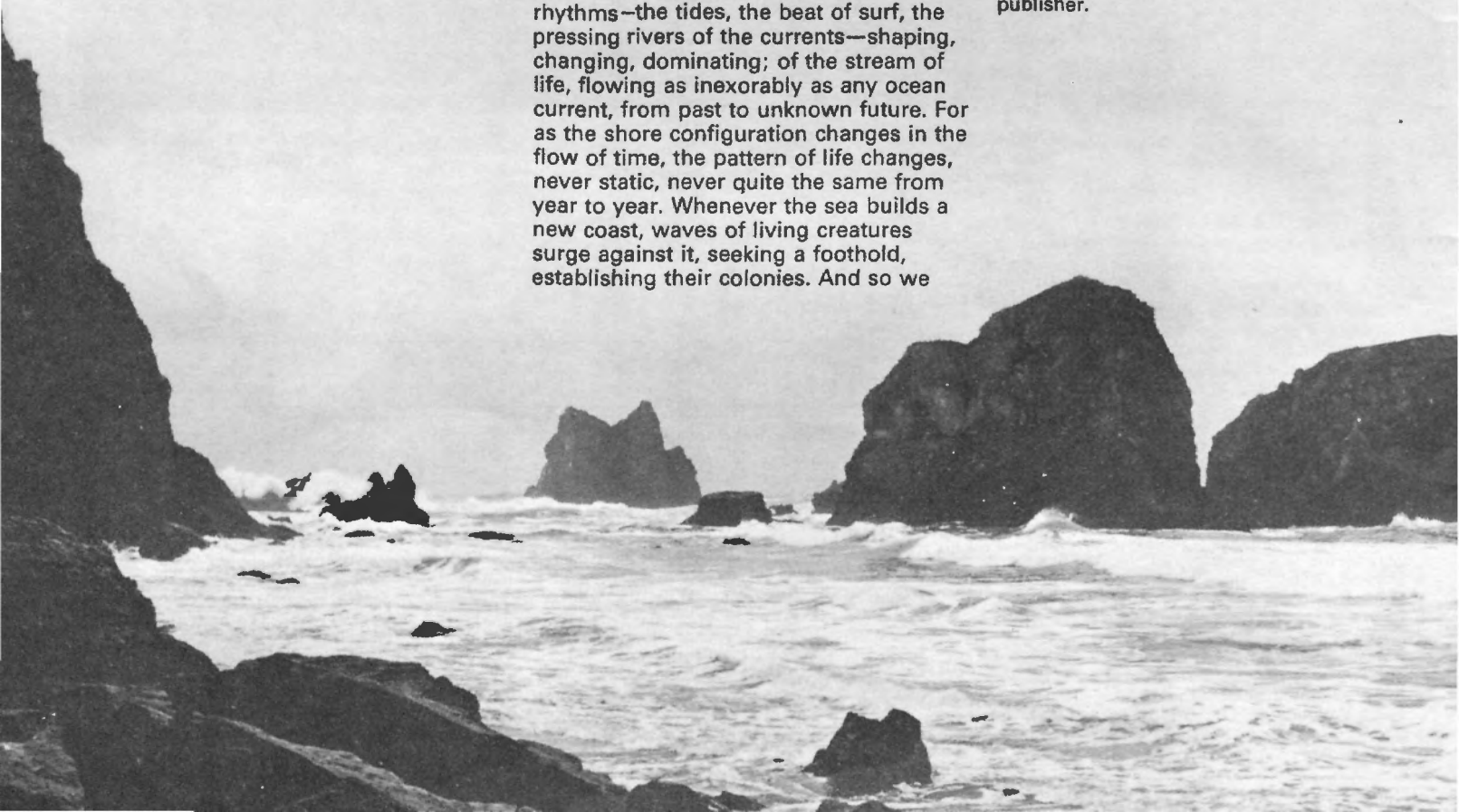
Now I hear the sea sounds about me; the night high tide is rising, swirling with a confused rush of waters against the rocks below my study window. Fog has come into the bay from the open sea, and it lies over water and over the land's edge, seeping back into the spruces and stealing softly among the juniper and bayberry. The restive waters, the cold wet breath of the fog, are of a world in which man is an uneasy trespasser; he punctuates the night with the complaining groan and grunt of a foghorn, sensing the power and menace of the sea.

Hearing the rising tide, I think how it is pressing also against other shores I know—rising on a southern beach where there is no fog, but a moon edging all the waves with silver and touching the wet sands with lambent sheen, and a still more distant shore sending its streaming currents against the moonlit pinnacles and the dark caves of the coral rock.

Then in my thoughts these shores, so different in their nature and in the inhabitants they support, are made one by the unifying touch of the sea. For the differences I sense in this particular instant of time that is mine are but the differences of a moment, determined by our place in the stream of time and in the long rhythms of the sea. Once this rocky coast beneath me was a plain of sand; then the sea rose and found a new shore line. And again in some shadowy future the surf will have ground these rocks to sand and will have returned the coast to its earlier state. And so in my mind's eye these coastal forms merge and blend in a shifting, kaleidoscopic pattern in which there is no finality, no ultimate and fixed reality—earth becoming fluid as the sea itself.

On all these shores there are echoes of past and future: of the flow of time, obliterating yet containing all that has gone before; of the sea's eternal rhythms—the tides, the beat of surf, the pressing rivers of the currents—shaping, changing, dominating; of the stream of life, flowing as inexorably as any ocean current, from past to unknown future. For as the shore configuration changes in the flow of time, the pattern of life changes, never static, never quite the same from year to year. Whenever the sea builds a new coast, waves of living creatures surge against it, seeking a foothold, establishing their colonies. And so we come to perceive life as a force as tangible as any of the physical realities of the sea, a force strong and purposeful, as incapable of being crushed or diverted from its ends as the rising tide.

Contemplating the teeming life of the shore, we have an uneasy sense of the communication of some universal truth that lies just beyond our grasp. What is the message signaled by the hordes of diatoms, flashing their microscopic lights in the night sea? What truth is expressed by the legions of the barnacles, whitening the rocks with their habitations, each small creature within finding the necessities of its existence in the sweep of the surf? And what is the meaning of so tiny a being as the transparent wisp of protoplasm that is a sea lace, existing for some reason inscrutable to us—a reason that demands its presence by the trillion amid the rocks and weeds of the shore? The meaning haunts and ever eludes us, and in its very pursuit we approach the ultimate mystery of Life itself.* □



Key Observers Comment on Ocean Pollution

How healthy are our oceans? EPA Journal *asked seven respected observers from different vantage points their views on this question. Here are their answers:*

Kenneth S. Kamlet

Director,
Pollution and Toxic
Substances Division
National Wildlife Federation

The ocean's vital signs are stable. However, some of its extremities are gangrenous and poisonous residues are showing up in some of its tissues. Round-the-clock care is still needed.

This was the thrust of a 1982 United Nations Environment Program report on "The Health of the Oceans." The report noted that, "although effects of pollution have not so far been detected on a global scale, general trends of increasing contamination can be recognized in some areas, and these trends are warning signals." Among the problem areas highlighted were: increased levels of DDT and PCBs in the southern hemisphere and lower latitudes of the northern hemisphere; the substantial contamination of semi-enclosed areas like the Gulf of Mexico, the Mediterranean Sea, the North Sea and the Baltic Sea; the human health risk posed by the discharge of sewage and sewage sludge, through consumption of contaminated seafood and through direct infection on some beaches; the pollution-associated reduction of some marine mammal populations in one area of the North Sea and in the Baltic Sea; and the mixing of contaminants in industrialized estuaries and coastal regions, such as the New York Bight.

The prognosis for U.S. coastal waters is similar to the global picture, as evidenced by a recent National Oceanic and Atmospheric Administration (NOAA) Report to Congress on Ocean Pollution. The report indicates that the Hudson-Raritan Estuary may be a smaller than expected source of contaminants in the New York Bight apex, increasing the significance of ocean-dumped sewage sludge and dredged material as a source of pollution. The report also cites studies on starry flounder in polluted parts of San Francisco Bay as evidence that severe organic pollution in urbanized estuaries may be responsible for "a large part of the observed declines in estuarine fish populations during the last 50 years."

Results recently published by NOAA's Northwest and Alaska Fisheries Center indicate that metal and aromatic hydrocarbon pollutants in Puget Sound sediments accumulate in the liver and muscle of bottom-dwelling fish and are closely linked to serious liver diseases, including neoplasms, in these species. These findings are consistent with the many previous reports of pathological conditions in marine fish from polluted coastal waters and estuaries at locations in the U.S. and abroad.

Low-level toxic contamination has become a problem even in deep-water species. Southern California researchers recently found that a "control" site off Malibu, in water 200 feet deep, contained seriously contaminated fish. And a search from Port San Luis south to Ensenada, Mexico, and out 90 miles to the Cortez Bank failed to turn up any uncontaminated fish.

The ocean can and should play a role in the management of society's wastes. But it is wrong to assume that persistent toxic materials can be harmlessly assimilated by the simple expedient of dilution.

Dr. Charles Osterberg

Marine Ecologist
Ecology Division
U.S. Department of Energy

Colin Moorcraft's 1973 book asked, *Must the Seas Die*? "Yes," replied Barry Commoner, "the oceans have become the world's sink and the death of the ocean will be the death of us all." Paul Ehrlich predicted in *Ecocatastrophe* that the seas would die by 1979. Cousteau, in 1976, said, "the Mediterranean is dead, killed by pollution."

Never since *Aesop's Fables* have so many falsely cried "Wolf!" For, despite the doomsayers, the ocean lives, as Food and Agricutural Organization world fishery catches show: 66 million metric tons in 1975 up to 75 million in 1981; while a "moribund" Mediterranean jumped from 1.21 million to 1.68 million metric tons in the same period. Yes, the ocean is the world's sink; it has been since time began and always will be, as long as rains fall on the land and flow to the sea, where runoff increases the productivity of coastal waters.

How healthy are the oceans? Frayed around the edges, especially the quiet shallows near population centers, but not too sickly, because coastal waters of 100 meters or less in depth continue to provide 85 percent of our seafood, even though they make up only two percent of the seas' volume. And the remaining 98

percent, water over 100 meters deep, contains less manmade contaminants than our drinking water.

Why then is so much environmental firepower aimed at "saving our seas"? I think because the foulest waters are in our busiest bays and estuaries, in full sight. "Save the Chesapeake Bay"? Yes, the Bay's 18 cubic miles of brackish water with its crabs, oysters and bluefish must be saved. But how different from the Bay is the deep ocean; isolated, empty, unfished, and yes, so clean and self-sufficient; its 326 million cubic miles of unproductive salt water need no such care.

So, while some local coastal waters may be ailing, the vast ocean is not. And yet the laws protect bay and ocean alike, forcing toxic wastes (which must go somewhere) onto the land to threaten freshwater supplies. Only 0.6 percent of the world's liquid water is fresh; it supports terrestrial life and makes the earth bloom, putting nearly 245 pounds of food on our table from the land for every one pound from the sea (averaged per unit area). It is not the health of the giant ocean that is endangered, but those relatively few drops of fresh water upon which human life depends. As a concerned land animal, I cry, "Wolf! Save our productive lands and sweet fresh water from the ocean savers!"

Joel Pritchard

U.S. Congressman (R.-Wash.)
Member, Subcommittee on Oceanography
and Ranking Minority Member,
House Committee on Merchant Marine and Fisheries

To answer the question, "How healthy are our oceans?", it is natural to look first at those areas where land and sea meet, and where most human activity is concentrated. Coastal areas in general, and estuaries in particular, represent one of the most valuable portions of our environment. For example, more than 70 percent of the total landings by all commercial fisheries and 65 percent of the recreational catch in U.S. marine waters are of species dependent on estuaries during some portion of their life stages.

Washington State's Puget Sound, one of the more significant large fjord-like estuaries in this country, has come under increasing environmental stress in recent years due to various kinds of pollution, and is now the target of a number of pollution control efforts. It is important to remember that Puget Sound, because of its greater than average depth and high energy level, has substantially different pollutant characteristics from most other estuaries. Therefore, any effective strategy for cleanup must be uniquely designed to take these patterns into account. This estuary-specific thrust is an important element of a program recently established by Congress to monitor water quality and environmental assessment activities in Puget Sound as well as Long Island Sound, Narragansett Bay, and Buzzard's Bay. In recognition of the unique characteristics of these estuaries, specific pollution control strategies will be developed for each.

Another element important to the success of any estuary program is coordination between the various federal and state agencies with applicable jurisdictions. The four-estuary program just established will be implemented as a cooperative effort of the EPA and the National Oceanic and Atmospheric Administration (NOAA), with NOAA providing monitoring of pollutant loadings and assessment of the effects on organisms, which will be used by EPA in developing its regulatory approach. State and local interests will logically be involved in this process as well.

Also crucial to any pollution control strategy is the development of priorities within a particular estuary. As we establish these priorities based on improving information about the fate and effects of pollutants in Puget Sound, we will be better able to allocate our pollution control resources to those areas which are most stressed and to those areas of the Sound where the benefits are greatest. This prioritization of needs is called for in the development of a Master Plan for Puget Sound proposed by Congressman Norm Dicks as a recent amendment to the House-passed version of the Clean Water Act.

Through these programs aimed at the study and costs of pollution on estuaries, we will be better able to answer the question, "How healthy are our oceans?" And I believe that with careful application of what we learn, coupled with effective pollution control technologies, we will be able to ensure the health of our marine environment in general and protect extremely valuable and productive areas such as Puget Sound.

W. F. "Zeke" Grader, Jr.

Executive Director,
Pacific Coast Federation of Fishermen's Associations, Inc.

Fishing is one of mankind's oldest activities. And it has helped provide society with its most essential of needs—food. Not unlike the habitats and species essential for hunting, gathering and trapping societies, or the farmlands

and soil necessary for agriculture, the rivers, bays, estuaries and oceans needed for productive fisheries are today threatened.

Nowhere is this threat more evident than in the United States and its coastal waters. The loss of fresh and anadromous fish due to habitat destruction is well documented. Dams and water diversions, unscreened pumps, and land use practices that have destroyed stream canopy and silted-in spawning beds have, for example, reduced salmon populations on the Pacific Coast to less than 50 percent of their historic levels.

The losses have not been limited to fresh and anadromous fish, however. The diking and filling of wetlands has destroyed spawning and nursery habitat for other fish. Pollution has affected some of this nation's most productive rivers, bays and estuaries from the Hudson to the San Joaquin, from Boca Ciega Bay to Puget Sound, from Chesapeake Bay to San Francisco Bay. The list of species affected ranges from shrimp to striped bass, from oysters to crab.

In the ocean, the effects of offshore oil development on fisheries is still not fully understood. Most of this development has been in areas where natural oil seepage existed and where organisms evolved that could exist in such an environment. Baseline studies are still lacking to determine what effects spills from offshore oil have and, more important, what effect the various components in the drilling muds being used are having on the marine environment.

New uses proposed for the ocean pose yet another threat to the fisheries. The disposal of nuclear wastes on the seabed, the incineration of toxic wastes at sea, and the mining of the seabed could all affect the fishing industry from leaks, spills or the disturbance of the ocean bottom and resulting sedimentation. The impacts could range from direct fish kills, to lowered resistance to disease or lowered fecundity, to fish that are unmarketable.

Just as programs need to be developed to protect our farmlands from urban sprawl, the build-up of salts and other toxics in the soil and the loss of soil itself, there needs to be a strong national commitment to the protection of fisheries. This includes cleanup programs to restore damaged or threatened fisheries, monitoring and enforcement programs to maintain healthy fisheries, and, finally, thorough baseline studies to determine what the potential impact is of any new use proposed for our waters.

Under sound regulations, U.S. fisheries can continue efficiently providing society with a healthy source of protein. But the U.S. fishing industry cannot continue to supply fish and shellfish at its present level or an increased level unless steps are taken now to ensure there are healthy rivers, bays, and estuaries *and* healthy oceans.

Dr. J. P. Ray

Manager,
Environmental Services
Support
Environmental Affairs
Department
Shell Oil Company

As a marine biologist in the petroleum industry, I am faced with the many facets of this question on a daily basis. How, based on the current state of our scientific knowledge, do we make sound determinations as to the oceans' health? What are the criteria?

The effects of man's activities can be detected in site-specific cases. In some instances the duration is short, and in others long periods of time will be needed for recovery. The determination of effort is, in part, dependent on the time-scale used: e.g., life cycle vs. geological time. Unfortunately, there is still much that we don't know about the oceans, especially the various processes.

My gravest concern is that the knowledge necessary to understand our oceans, and the impact that man has on their health, will be further delayed because of current approaches to marine science. All too often, the large sums of money needed for research are spent to solve politically-perceived ocean environmental problems, while at the same time we ignore the truly significant impacts.

For example, over the past decade, government and industry have spent in excess of $400 million dollars to study the impacts of oil and gas activities on the Outer Continental Shelf. Althought we have found little in the way of significant, measurable impacts from offshore oil and gas development, because of political pressures we will go on spending millions of dollars looking for phantom effects on the environment.

In contrast, we have overlooked the most important area of our oceans, the near-shore coastal environments. These are biologically the most important, and unfortunately, they are also the areas most prone to sequestering of pollutants from both onshore and offshore sources.

In addition to looking in the wrong place, we are worrying about the wrong pollutants. The ocean has a remarkable ability to disperse, sequester, and degrade a broad variety of contaminants. It does have assimilative capacity! We should be most concerned with the manmade pollutants, e.g., some of the synthetic organics, which can have long persistence times in the environment, and can be detrimental at extremely low concentrations. With the widespread use of synthetic chemicals throughout the world, the potential for affecting the overall quality of the world's oceans is present.

Based on current data, with the exception of small regionally-affected areas, the oceans still appear to be healthy. This opinion is limited by our current scientific knowledge and our lack of understanding of natural variability. The time has come to stop designing ocean research to meet political needs, and instead address the real problems.

Barbara Boxer

U.S. Congresswoman
(D.-Calif.)
Member, Subcommittee on Oceanography
House Committee on Merchant Marine and Fisheries

Oceans cover 71 percent of the earth's surface. A general feeling exists that this vast expanse of salt water represents our last frontier: unspoiled, untouched by humankind and laden with plentiful resources just waiting for the taking.

In reality, however, tar balls as big as golf balls can be found bobbing on the surface of the open ocean. Discarded fishing nets, seemingly harmless, entangle seals and cause drowning of large numbers of these marine mammals. Carbon dioxide, sulphur dioxide, and nitrogen oxide, the waste products of the burning of gas, oil, and coal, invisibly diffuse from the air into the sea. Our oceans, once a pristine environment, are increasingly being used as a garbage dump for civilization's refuse.

Today we are seeing an assault on our Outer Continental Shelf, including pressures for such activities as oil and gas development, deep seabed mining, ocean incineration, and ocean dumping. Can the oceans absorb this stress and increased pollution? How many species extinctions and population shifts can be sustained by the ocean without causing dramatic consequences? The answer is, we simply do not know.

While we know much about what plants and animals live in the ocean, we know surprisingly little about how these organisms interact, how animal communities interact, and the rates at which all these interactions and processes occur.

It is irresponsible and indefensible to deliberately dump toxic wastes into the ocean and to allow such pollution to occur as a result of insufficient safeguards when we do not even understand the full extent of the impacts on marine life.

The United States borders three oceans. Our nation boasts thousands of miles of coastline that support a large percentage of our population and millions of dollars in coastal industries. We cannot afford careless, shortsighted exploitation of our coastal and ocean resources. Until we can guarantee that our marine activities will be conducted without mishap and will not disrupt or harm marine life, we must exert utmost caution and adopt a conservative approach to offshore development and ocean waste disposal.

The pollution we cause today will be our legacy to our children. Marine life must and should be protected.

Christopher Roosevelt

President,
The Oceanic Society

The answers to the ocean health question will be diverse, by virtue of the very nature of the oceans and their myriad interfaces with land and human populations. The paucity of comprehensive long-term data makes it extremely difficult to detect, much less predict, trends. Even with intensive scientific study and the application of significant resources, many aspects of complex near-shore ecosystems elude our knowledge and understanding, particularly in the areas of subtle, long-term or cumulative impacts. Our science and technology for gaining knowledge and understanding of deep ocean ecosystems is leagues away from adequacy.

At the May 1984 National Marine Pollution Research and Monitoring Issues Workshop, 64 invited participants selected the following two issues as the 10th and 14th in highest priority of fifty issues:

"Validity of existing analytical techniques...as appropriate indicators of pollution impacts..;" and

"Sufficiency of indices to distinguish between natural and...[man-induced] change."

Without a doubt, these are threshold issues which must be resolved before we can expect consensus on the health of the oceans.

Within our current processes, little influence is given to such values as species diversity, special habitats, or the few remaining untouched areas of ocean ecosystem. Yet the momentum is developing for increased utilization of the oceans for disposal of toxics, sludge, and radioactive wastes. The number one issue at the previously mentioned May 1984 Workshop was *comparative assessment of various media for waste disposal.* If we are still near the beginning point of that investigation, how can one rationally recommend policy now?

The fallacy in the "comparative assessment" movement is the myth that we have somehow favored or overlooked the marine environment in our quest to utilize terrestrial and atmospheric environments for wastes. One need only look at our harbors, bays and coastal areas to be reminded of the extensive burdens of waste suffered by these marine environments since the days of the industrial revolution.

Given our history of mismanagment of land and air resources and the growing recovery of marine areas from previous periods of abuse, we should approach the future health of the oceans with a more conservative perspective. Let us affirmatively place the burden of proving the safety of ecosystems on the proponents of exploitation or waste disposal. Let us recognize the driving forces of economics and/or politics, but let us also insist upon thorough and comprehensive scientific data and assessment. Then, and only then, can we be comfortable that our advanced and advancing society has dealt intelligently with the health of the oceans. □

The Job of Protecting the Seas

An interview with Jack E. Ravan

Steve Delaney

EPA's Assistant Administrator for Water, Jack E. Ravan, is responsible for most of the agency's programs to protect the oceans. EPA Journal asked his views in the following interview:

Q What is the condition of the oceans today?

A When you consider that the oceans cover seven-tenths of the earth's surface, based on their sheer immensity, I would have to say they are fairly healthy. Our concern with this assessment, however, is twofold. One, we at EPA have not had any legislative mandate to operate beyond the 200-mile limit and therefore have little data of our own to independently assess the conditions of these waters. Accordingly, we must rely on secondary data.

Two, our main concern at this time is the near-shore marine waters. These are the waters most important in supporting marine life, commercial and recreational fisheries, and other activities. Since they are in close proximity to major population and industrial centers, they are most immediately and severely impacted by man's activities. Even here we don't have sufficient data to make the kind of assessment that I think your question requires. Given these concerns, Bill Ruckelshaus and I have established an Office of Marine and Estuarine Protection within the Office of Water to focus on these important issues.

Q Do you believe the oceans or portions of the oceans need special protection now?

A Yes, I do. The last 16 years of this century are important because of the continuing rapid expansion of technology. Although new technological processes are vitally important to our way of life, the standards of living which we enjoy as a nation can create serious threats to the environment and human health if not properly managed. This awareness peaked in the late 1960s and in the early 1970s with the birth of an environmental ethic that resulted in massive legislation and capital expenditure to correct the preceding decades of misuse and neglect.

We should take those lessons, learned the hard way, and apply them to the oceans. We must not look at near-shore oceans, and say, "Well, that's the dump of last resort, so that's where I'm going." That action simply transfers to some future generation the same kinds of problems that we have faced in many of our other streams and lakes. Instead, we must apply our environmental ethic to the protection of the oceans and estuarine waters and their many beneficial uses.

Q What will be the role of the Office of Marine and Estuarine Protection in achieving this goal?

A First, it will serve as the focal point within the Office of Water for carrying out our responsibilities under the Marine Protection, Research, and Sanctuaries Act. It will focus resources and energies on evaluating permits for discharges into our oceans and estuarine waters. It will emphasize and coordinate our marine research efforts and help those outside EPA who would like to bring some resources, either governmental or other, to this effort.

Q Does EPA play a major role in the protection of the oceans compared to other agencies like the Coast Guard, Army Corps of Engineers, the Maritime Administration and the Department of the Interior?

A No, it doesn't. This was dramatically demonstrated at a conference last September 12 when Bill Ruckelshaus hosted the other federal agencies with the mutual responsibility of protecting oceans. However, although we're small potatoes in this arena, our legislative mandate is very specific. In my opinion, we have been the repository for the environmental ethic in America and our purpose should be, again, to transfer that ethic into our ocean operations. The oceans are vital to a number of activities within the United States. In addition, as new activities become technically and economically feasible, the seas may be used in some sort of farming or mining. We must remember that the oceans do not belong just to America. They are not our rivers and they are not our lakes. Rather, the oceans connect all nations and make us neighbors. We must all help to protect the oceans.

Q What progress is being made in regulating the dumping of wastes in the sea?

A I am happy to report that over the last ten months we have made really good progress. We have sent a very clear message that we will regulate certain dumping activities. We have taken action on dump sites off New York, New Jersey, and the northeast coast. We are working closely with the Corps of Engineers to provide designated sites for specific use. Elsewhere, an example of our progress is the disposal program prepared for Tampa Bay in Florida. Even though the selection of a proper disposal site there was full of anguish and delay, it was a good demonstration of cooperation between local, state and federal government. With proper coordination, we can, in fact, put together a good disposal program that is well-monitored.

Q What did we learn about the environmental dangers of dumping sewage sludge in the New York Bight?

A From the beginnings of this dump site in the early 1900s, there was a gross amount of material disposed of and as a result the site had become biologically dead. We therefore are gradually closing it and moving disposal to a site much more appropriate for those kinds of activities. Let me be quick to add, however, that we do not consider this action an end-all solution. I think we should, to the fullest extent possible, control our activities and dispose of our various wastes where they are created. We recognize, however, that there may be some instances for which the oceans option is not only appropriate but also may be the best. The ocean environment may provide a certain amount of assimilation and neutralization of some wastes. This includes certain dredged materials and acid wastes which are neutralized or buffered in ocean waters without harming sea life.

Q What is the status of EPA's review of the petitions to allow some municipalities to treat sewage discharged into the oceans at less than secondary levels?

A I am not certain what Congress intended with the so-called 301(h) Marine Waiver. I would hope that it intended to provide a fairly narrow window of consideration where it was *readily apparent* that perhaps a lesser degree of treatment would be adequate to protect marine waters. But as it turned out, we have so far received 208 applications. We are already trying to deal with a universe of over 60,000 dischargers (end-of-pipe dischargers) in the United States, and the new applications for ocean discharges are unexpectedly numerous and complex. As a consequence, we have finalized approvals for only six 301(h) waivers (which would mean less than secondary treatment). We have tentatively approved 23, for a total of 29. At the same time, we have denied 24 applications and tentatively denied an additional 50, for a total of 74 denials. This means that we have handled about 50 percent of our workload in this arena. I think we may have to reexamine the situation and weed out those cases that are not suitable applicants.

Q What is EPA's policy regarding the disposal of radioactive waste at sea?

A We are reconsidering this now because of a moratorium established by Congress on such activities. What EPA would have to see, either at the end of the moratorium, or under some other directive from Congress or the President, would be a specific proposal or some sort of program plan for disposal of low-level waste. We would then go through a full environmental examination of the consequences of that proposed action.

Q Some specialists suggest that we ought to be putting more waste into the oceans. What is your view of this issue?

A There are two parts to that. First, I have not seen any evidence that would cause me to draw that conclusion. When you get right down to the basics, we have only three options for waste disposal: air, land, and water. I believe that disposal first ought to be handled on-site. If man's land activities create a certain waste load, then those wastes ought to be planned for, engineered for,

constructed for and handled there to the extent possible. Second, that may leave residues, and some of those residues may, in fact, best be handled through ocean disposal methods. The oceans do have an assimilative capacity for certain wastes. Even after employing our best treatment technology on land, here in America we plan for and use the assimilative capacities of our rivers. So I think it is appropriate and consistent to think of the assimilative capacity of the oceans as one resource. The difference is that we should set that assimilative capacity at a very high quality level and limit disposal there.

Q Do you favor ocean incineration as a method of handling waste?

A To me, ocean incineration is simply another option to dispose of wastes. It should be weighed based on the scientific evidence. It should be compared with the risks and benefits of other disposal methods that are available for these kinds of materials, including on-land incineration. The basic issue is disposing of a very small residue of material wherein the cost/benefit/risk ratio suggests that disposal is best done some distance away from man and his normal activities. I must quickly add that there is much controversy about the possibility of incineration at sea as a means of disposal. We need to do a substantial amount of research to determine as much about the truth of that situation as we can. We will then transfer what we learn to the people so they can make up their minds on whether or not they support such an operation.

Q If incineration is an option in some cases, how will you decide which sites would be used?

A There will be a number of environmental factors to evaluate, including considerations of

EPA Oceans Responsibilities

The statutes which give EPA its responsibilities to protect the oceans are listed below, along with the agency's duties.

Statute	EPA responsibility
Clean Water Act	
Section 104n	• Conduct and promote studies of pollution in the estuaries and estuarine zones of the U.S.
Section 301h	• Allow variances from secondary treatment for sewage discharge into marine waters, if the applicant for a variance satisfactorily demonstrates that the discharge meets certain criteria intended to protect the water and ecosystem.
Section 311	• Define quantity of oil that may be harmful if released into navigable waters of U.S. (up to 200 miles offshore). • Require certain onshore or offshore facilities to prepare and implement a Spill Prevention, Control, and Countermeasures Plan to prevent the unauthorized, unpermitted release of oil into navigable waters of the U.S.
Section 312	• Promulgate standards of performance for marine sanitation devices.
Section 403	• Evaluate the impact of pollutants on marine ecosystems prior to issuing National Pollutant Discharge Elimination System (NPDES) permits. Evaluation to include such factors as pollutant dispersal and persistence, presence of fish spawning or nursery areas, and ecosystem diversity, productivity, and stability.
Marine Protection, Research, and Sanctuaries Act	
Title I	• Regulate ocean dumping, including materials and transportation of materials which would have an adverse impact on human health and welfare or on the marine environment. • Issue ocean dumping permits. • Designate ocean dumping sites and areas where ocean dumping is prohibited, such as marine sanctuaries.
Comprehensive Environmental Response, Compensation, and Liability Act (Superfund)	
Section 102	• Designate which substances are hazardous, and allow the Administrator to designate additional hazardous substances which, if released, might endanger public health and welfare or the environment. • Establish reportable quantities for those hazardous substances.
Deepwater Port Act	
Section 18m	• Define the quantity of oil that may be harmful if discharged.

sensitive species that inhabit a particular site or nearby water. When we examine a site, we look at several things: first of all, how busy is the site? We do not want to pick a location where a number of other activities are already underway. Second, we are looking at the depth of waters, and what might happen to the material in final deposition at that site. The air and ocean currents are important. We are looking at the productivity of marine life. The next consideration is that we need port facilities and transportation systems that can support that particular site.

If these kinds of activities are safe, we may be only marginally increasing that safety or may actually reduce it by moving a ship another 500 miles; this suggests there is a limit to the safety you can acquire by simply increasing the distance. Also, when you consider distance on the seas, you are looking at safety factors that are not necessarily as significant on land, such as weather. Weather becomes an important factor in the process of selecting an ocean site. At the bottom of the list, perhaps, is the economic consideration of whether or not that site is available.

So, when we get to the point of selecting a site, we will have considered all the factors that I have just mentioned; and we will try to rate "the best sites" based on those considerations.

Q In making decisions about how to use the ocean, how will you take into account citizen reaction?

A Very much as we have in other areas, but there is an increased emphasis and new dedication for taking those kinds of opinions into consideration. The best example since Bill Ruckelshaus has been back is the lead smelter issue in Washington State. EPA presented all the evidence to the affected public as clearly as it could and the public participated in the decision. The agency is involved in a certain degree of public education, which certainly will result in a concerned and informed public capable of participating fully in such deliberations. However, there comes a time when the public wants leadership, either elected, appointed, or regulatory in nature, to make those tough decisions. Bill Ruckelshaus made it very clear to me in a recent comment: "Sometimes we have the legislative authority to perform certain actions, but the true power is with the people, and when the people don't want a certain action to take place in their country and on their seas, it's inappropriate, even though we are authorized to go forward with it...."

If the people can't feel confident that the activities are safe, they will not support them. Then our political system will not allow such activities to go forward. So it's a very important factor for us, and I think the mistake this agency made with regard to incineration at sea was indeed along these lines.

Q What role do you believe the states should play vis-à-vis the oceans?

A The states have a very large stake in our oceans activities. Congress has indicated this course and we are trying to encourage such participation. Having said this, I think we need to keep one point in mind, and it is the constitutional framework of our nation. The highest law in the land is the federal law. A state's constitution is dominant within the state; however, the national Constitution is our boundary, and there are national interests that may override in some cases. However, the state ought to have every opportunity to prepare itself, and should be considered a full partner.

Q Regarding the Chesapeake Bay, there are so many federal activities, states, cities, and millions of people involved, how is it ever going to be cleaned up? Are you optimistic?

A Yes, because I sense the people want the Bay cleaned up. Every time the American people, especially those most affected, have made a decision, the American people have been the winner. I think we will win in the Chesapeake Bay. I want to caution, however, that we Americans have become very demanding and accustomed to having "instant pudding." Instant cleanup won't happen. We cannot recover from many years of adverse activity on the shores of the Chesapeake in an instant, but I think we will see the Chesapeake Bay cleaned up and recovered over time.

Q What's your prognosis for the cleanup effort that is beginning in Puget Sound?

A The situation is very similar to what I just stated. The fundamental factor will be the people in the Puget Sound area. Their commitment will determine how successful the cleanup is. EPA can support with federal tax dollars, in terms of research and sharing our understanding of our oceans environment. We can contribute the wisdom of the federal family, but we are primarily dependent upon the deep commitment of the people. □

EPA's "Navy" at Work

Text by Margherita Pryor
Photographs by Steve Delaney

It may not be as awesome as the U.S. Sixth Fleet, but EPA has a navy, too.

Under EPA's marine protection responsibilities, this environmental fleet's mission is to monitor the effects of pollution in the Great Lakes and coastal waters, to survey and monitor ocean dumping sites, and to collect offshore scientific data.

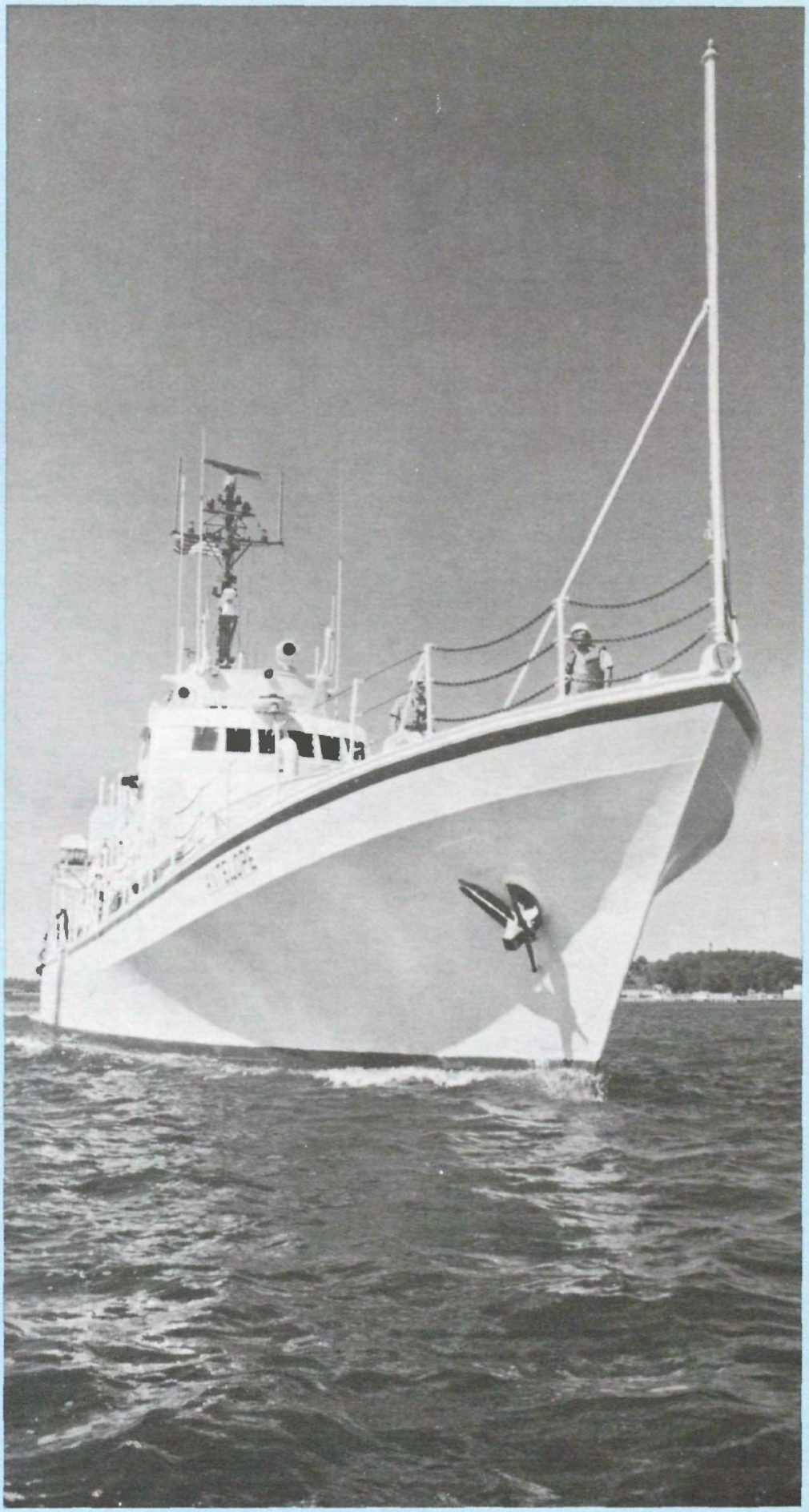
Right now, EPA's fleet consists of two ships: the *Roger R. Simons* and the *Antelope.* Former U.S. Navy patrol gunboats, they both have been refitted extensively for duty as ocean survey vessels.

The *Roger R. Simons* works out of Cleveland, Ohio, on Lake Erie, where it carries out pollution surveillance and limnology studies on each of the Great Lakes.

The *Antelope*, stationed in Annapolis, Md., carries out ocean and coastal studies and can remain at sea for up to ten days at a time. It carries a crew of 13 plus a scientific team of up to 17 members and is equipped with a wet lab, a microbiology lab, a chemistry lab, and a computerized survey center.

Recently the *Antelope* completed a five-day trip to study several sewage outfall and dredge dumping sites along the U.S. East Coast. Under the direction of chief scientist Bill Muir, 12 scientists from EPA, Old Dominion University, and the National Marine Fisheries Service investigated the effects of sewage on marine ecosystems and gathered background data on fish and other marine populations.

(Pryor and Delaney are on the staff of the EPA Office of Public Affairs.)



EPA's oceanographic survey vessel, the Antelope. *The ship is equipped with two deck winches, an extendable boom crane, and a variety of scientific gear, including sonar equipment, three laboratories, and an underwater TV camera. It also can support a diving crew. On this trip, researchers were studying a dredging disposal site off Virginia Beach, Virginia, and two sewage outfalls off Ocean City, Maryland, and Bethany Beach, Delaware.*

Crew members lower a bottom dredge, which rakes through sediment to collect bottom-dwelling organisms.

Crew members prepare to sort contents of a bottom trawl net. Trawl nets pick up deep water fish and organisms. L to r, Jay Lewis of the National Marine Fisheries Service; Chuck Burdick, a high school honor student working on this trip; chief scientist Bill Muir from EPA Region 3; and Ed McLean, EPA ship coordinator.

Marria O'Malley, from EPA's Central Regional Laboratory in Annapolis, Maryland, and consultant Don Lear analyze bacterial specimens in the microbiology lab of the Antelope.

L to r, Nancy Mountford of Cove Associates, an EPA contractor; Jay Lewis, and Bob Davis, EPA Region 3 biologist, identify species caught in a bottom dredge. One object of this trip was to study fish populations and migration patterns.

Crew completes collection of a bottom sample. The equipment they are using, called a grabber, picks up blocks of sediment for analysis.

EPA Region 3 personnel Bob Davis, engineer Libby Rhoades, and John Ruggero lower another type of bottom grabber.

Ocean Dumping in the New York Bight

by Jack Lewis

Many people believe that the New York Bight is imperiled by the continuation of ocean dumping. The Bight is a large area of the Atlantic Ocean bounded by lines drawn due east from Cape May, New Jersey, and due south from Montauk Point, Long Island. An estimated 95 percent of all United States ocean dumping occurs in this area. The three primary materials currently being dumped in the Bight are sewage sludge, dredged materials, and acid wastes.

Ships leave New York Harbor every day bound for ocean dumping sites specifically designated to receive these waste materials. The sites currently in use are all located near the entrance to New York Harbor, in the so-called "apex" of the Bight. In 1983, 8.3 million wet tons of sewage sludge were released from barges at the "12-Mile" site. During the same period, 4.1 million cubic yards of sand and silt dredged from New York Harbor were dumped at the dredged material site in the Bight apex, while 38,000 tons of acid waste were dumped at a separate aqueous industrial waste site.

Recently, EPA has taken actions on all three types of materials dumped in the Bight. If EPA's interim decisions, announced in May 1984, are made final, ocean dumping of sewage sludge will be moving to a site located approximately 106 miles south by southeast from New York Harbor. Dredged materials and acid wastes will continue for the time being to be dumped in the Bight apex. However, EPA has placed volumetric limits on dredged material dumping and granted final designation to an aqueous industrial waste site outside the Bight. Both of these actions will facilitate the eventual phaseout of ocean dumping in the New York Bight.

Ever since the 1920s, New York City and adjacent New Jersey municipalities have been dumping sewage sludge at a site located 12 miles off the coast of New Jersey in the apex of the New York Bight. This 12-Mile site is a significant source of contamination to the coastal waters of New York and New Jersey.

Municipal sewage sludge is approximately 95 percent liquid, and its principal components other than water are all harmful to humans if ingested. Sludge contains viruses, bacteria, trace metals, organic substances, organic chemicals, metals, and oils. Every day these and other pollutants are poured down drains and flushed down toilets throughout the New York metropolitan area. Even after sewage sludge has passed through all the purification processes at municipal treatment plants, it still contains a wide variety of contaminants.

Dumping in the New York Bight

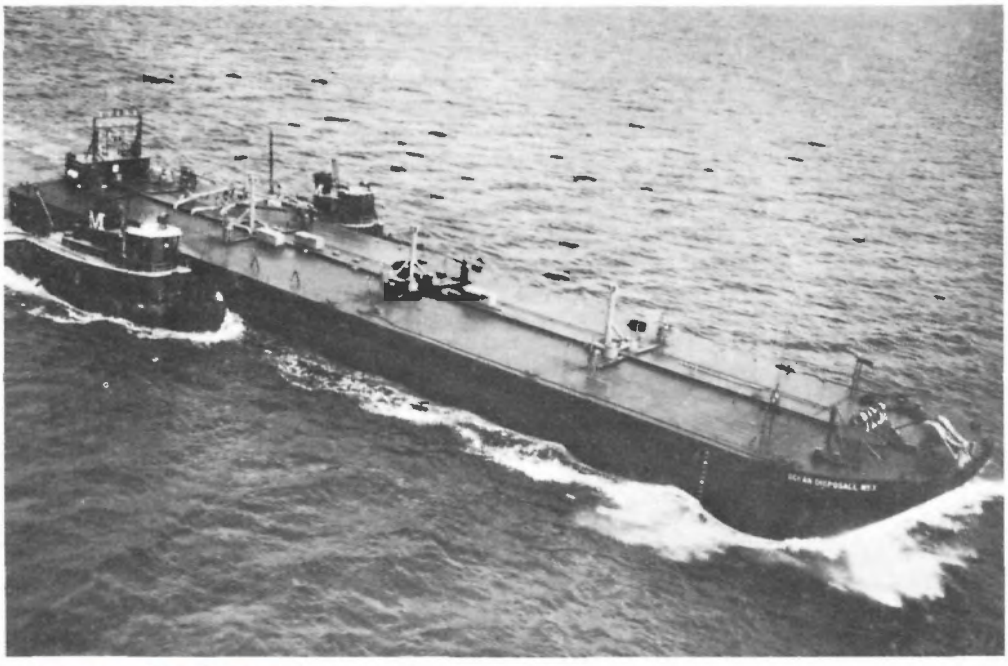
The chemical and organic components of sewage sludge are not the only reason EPA experts view it as the most hazardous of the three substances now dumped in the New York Bight. Sewage sludge is also more "bioavailable"—that is, more water-soluble and easily dispersed—than dredged materials or acid wastes. Dredged materials, although in some cases heavily contaminated, tend to sink quickly to the bottom of the ocean and remain at the site, while acid wastes are neutralized immediately upon contact with salt water.

Ever since EPA's interim designation of the 12-Mile Bight apex site lapsed in December 1981, the sewage authorities of New York and New Jersey have had to rely on court orders permitting them to continue using the site. Both states contend that the added expense of using the 106-mile site and the lack of environmental degradation directly attributable to sludge dumping at the 12-mile site are sound reasons for keeping the existing site open.

Waste disposal experts from both states point out that expensive new barges will have to be purchased to negotiate the much-longer round trip from New York Harbor to the 106-Mile site. Whereas a round trip from the Harbor to the 12-Mile site now takes 4-5 hours, each round trip to the 106-Mile site will take approximately 48 hours. Barges capable of sustaining this demanding usage pattern would have to be larger than those now in use, and there would have to be more of them. It has been estimated that New York City alone will have to pay an additional $20 million per year to shift its dumping operations from the existing near-shore site to the Deepwater Municipal Sludge Dump Sites.

EPA, the Congress, and other interested parties appear committed, however, to putting an end to sewage sludge dumping in the New York Bight. Since the continental shelf is 100 miles wide on the East Coast, EPA contends that any distance short of 100 miles is unsafe for dumping such a readily bioavailable waste as municipal sludge. Agency experts believe that continuation of sludge dumping at the 12-Mile site could needlessly imperil both the marine life of the New York Bight and the everyday life of neighboring people who depend on that marine life for

(Lewis is Assistant Editor of EPA Journal.*)*



A barge used to dispose of municipal sewage sludge is towed to an ocean dump site in the New York Bight.

Working in a portable lab on board ship, employees of the National Oceanic and Atmospheric Administration analyze water samples from a dumping area in the New York Bight.

National Oceanic and Atmospheric Administration

sustenance, whether economic or nutritional.

EPA has also announced plans to impose limits on the dumping of dredged materials and acid wastes in the New York Bight apex. In the case of dredged materials, the agency announced in May 1984 that it is setting a future limit of an additional 100 million cubic yards on the dredged material dump site in the Bight apex. If current rates of usage continue, probably near the turn of the century the Corps of Engineers will have to begin transporting dredged material to another site location further removed from New York Harbor. For the time being, however, EPA has granted a final designation to the so-called "Mud Dump Site" already in use within the New York Bight apex.

The ocean disposal of acid wastes will also continue during the foreseeable future at a site within the Bight apex, but the new 106-Mile site to which EPA has given final designation will include an aqueous industrial waste site. The still-functioning acid waste site within the Bight apex is in a declining usage pattern, owing to economic factors. Exercising its permit-granting authority, EPA will probably foster the gradual phaseout of the Bight apex site by issuing permits more readily to industrial dumpers willing to use the newly designated 106-Mile site.

EPA has announced that it intends to apply what it calls the "rule of reason" in its consideration of all future applications for ocean dumping permits, of whatever variety. This means that all parties wishing in the future to dump waste in the ocean will be required to demonstrate to EPA a clearcut need for such disposal. There is further evidence of EPA's cautious approach to the whole concept of ocean dumping. Even EPA's "final" site designation of the Deepwater Municipal Sludge Dumping Site is only viewed by the agency as an interim measure. □

Cleaning up the Chesapeake Bay: A Public Awakening

by Frances H. Flanigan

The people responsible for protecting our nation's estuaries are closely watching the Chesapeake Bay, where a unique experiment is underway. On the shores of H. L. Mencken's protein factory, where four centuries ago European settlers conceived of a new nation, the Bay area's citizens are engaged in an all-out struggle to restore the Chesapeake.

Concern about water quality and resource productivity in estuaries is not new, either in the Chesapeake region or elsewhere. What is so electrifying on the Chesapeake is the almost palpable sense that we, as a collection of individuals, *can* shape the future of the estuary which is so much a part of our lives. We are writing a new definition of environmental management, and the results we achieve are of great concern to professionals and interested citizens nationwide.

The story of the renaissance of the Chesapeake began long ago, and has many chapters familiar to all who have been involved in resource management issues. There were the periodic newspaper articles with banner headlines trumpeting a dying Bay; there were studies to look at this and look at that; there were laws enacted to prohibit, and regulations promulgated to control; and there were organizations, meetings, newsletters, hearings, boat trips, and speeches—all dedicated to getting something done about the Bay. Most everyone was certain that something was wrong, although no one seemed to know quite what, and solutions were elusive.

Enter the Chesapeake Bay Program. In 1976, Congress directed EPA to conduct an in-depth study of water quality conditions in the Bay and make recommendations for improved management. The resulting Chesapeake Bay Program succeeded in doing several things. First, it represented an effort to assemble a synoptic, bay-wide data set that would provide a baseline for comparison with historical data and for measuring future change. Second, it embodied an effort to assess the sources of pollution and to understand the relative contributions of each source. Third, the study attempted to link water quality and pollution with changes in living resources. And finally, the study recognized the importance of the governmental decision-making network in place on the Bay, and made a bona fide and fairly successful effort to involve representatives of affected entities in the program.

The technical findings of the EPA study have been presented in a series of reports which are available from the Program's office in Annapolis (839 Bestgate Road, Annapolis, Md. 21401). In essence, the study concluded that: most of the Bay system is nutrient-enriched; localized sediments are contaminated with metallic and organic toxics; the volume of water experiencing very low or no dissolved oxygen in summertime has increased 15-fold in thirty years; and living resources, especially those that depend on fresh water in their juvenile stages, are at historic lows. The study made a significant contribution to our technical understanding of how the Bay works and how it is being affected by contaminants generated on the land.

The strength of the response to EPA's study was remarkable. A close look at the factors which galvanized such a forceful response is advisable for anyone concerned with the protection of estuarine systems.

One obvious yet critical factor is that all kinds of people care about the Bay—fishermen, farmers, boaters, businessmen, seafood-lovers—and lots of them. EPA made an early commitment to public involvement by hiring the Citizens Program for the Chesapeake Bay, Inc. (CPCB), a nonprofit coalition of organizations to provide non-technical information to the public and to create opportunities for citizen involvement in the study. By the time the study's final reports were submitted to Congress in September 1983, large constituencies had been informed about what the new scientific information meant in terms of their relationship to the Bay. CPCB used a variety of techniques—newsletters, public meetings, and advisory committees—and worked hard to develop relationships with groups which had not been previously involved in Bay discussions, such as the farm community.

The emphasis on Bay users—sailors, shippers, utilities, fishermen, marinas, shorefront communities, and industry—was matched by efforts to couch Bay problems in terms of people and land. People in Richmond, Roanoke, Baltimore, Chestertown, Lancaster, and

Steve Delaney

(Flanigan is director of public participation for the Citizens Program for the Chesapeake Bay. The organization has been under contract to EPA's Chesapeake Bay Program since 1977.)

Loudon County have begun to understand the connection of corn grown in the hills of the Piedmont with fish spawned in the headwaters of the Potomac. The pathways taken by water on its way to the Bay—across the endless parking lots and highways, through millions of dishwashers and washing machines, over thousands of acres of farm fields and suburban lawns—are beginning to be understood not just by scientists, but by people in all walks of life. The interconnectedness of the web of users with the land and the water has disarmed those who would blame the Bay's decline on someone else. The growing sense that it is not "them," it is "us," has created an atmosphere where creative problem-solving can take place.

Because the problem-solving phase of the Chesapeake Bay Program was organized several years ago, moving from the technical arena to the political one was less difficult. Links had already been established with user groups, and a constructive working relationship with the states was in place. The involvement of the states on the Bay Program's management committee meant that Governors and other elected officials had firsthand knowledge of the study's findings early on and were already persuaded of the need for a political response. At the end of 1982, Maryland and Virginia committed to a high level meeting to conclude the Bay study. This commitment led to a summit conference held in December 1983.

During 1983, Governors Harry Hughes of Maryland and Charles Robb of Virginia traveled to Harrisburg, Pa., to encourage Governor Richard Thornburgh to join them in crafting a response to the Bay's troubles. The Harrisburg meeting was followed by a trip on the Bay, hosted by the governors, with EPA Administrator William Ruckelshaus as the guest of honor. The Governors convinced Ruckelshaus that the states were ready to make a substantive commitment to cleaning up the Bay, and urged him to seek long-term federal support.

These political events laid the groundwork; the summit conference provided the mechanism for the creation of specific solutions. The conference sponsors convened five workshops: habitat management, land activities, water activities, fisheries management, and monitoring. The workshops were each composed of 20-30 individuals who were asked to collectively examine scientific findings and to bring to the Governors and legislative leaders policy recommendations for improving the management and enhancing the productivity of the Chesapeake Bay.

Chesapeake Bay Foundation

Sailboat in the Chesapeake Bay off Annapolis, Maryland

The workshops made a series of tough recommendations. The land activities committee, for example, recommended specific load reduction goals for each of the major tributaries. The habitat committee examined eight kinds of ecological systems within the Bay and provided specific recommendations for their protection and enhancement. The fisheries committee evaluated harvest management policies, as well as environmental issues, and urged the states to take aggressive action to protect declining fish stocks. In every case, recommendations were based on best available scientific information but were couched in terms of policy and management, land and people.

At the conference, each principal made a commitment to undertake specific actions and programs. In addition, they signed a joint agreement creating a Chesapeake Executive Council. The Council was charged to "assess and oversee the implementation of coordinated plans to improve and protect the water quality and living resources of the Chesapeake Bay estuarine system." Composed of cabinet-level designees of the Governors and chaired by the administrator of EPA Region 3, the Council has met three times during 1984.

In January, state commitments crystallized as Governors submitted legislative packages and budgets to their respective General Assemblies. Nearly $50 million was appropriated by the states for fiscal year 1985 alone. The relatively easy enactment of the state packages provided overwhelming evidence that the task of working out political solutions based on scientific evidence was well underway. As a token of the federal government's intention to participate with the states in restoring the Chesapeake, President Reagan announced his intention to put $10 million into the EPA budget for the Bay in 1985.

The significance of these actions should not be underestimated. The states have responded aggressively to the findings of the Bay study and to the recommendations made by the conference workshops. Their actions are not dependent upon the availability of federal funds, but stand as testimony to the value each state attaches to the Chesapeake Bay. The federal government has announced its desire to support the cleanup program by appropriating funds and by taking concrete steps to coordinate multi-agency federal programs on the Bay.

This has been a remarkable year for the Chesapeake Bay. The governmental effort to "save the Bay" has had an auspicious beginning. EPA's study played a central role, by providing incontrovertible evidence of environmental decline, in terms comprehensible to the layman. The public played an equally important role, by pressing for action with a voice more unified than at any previous time. The political leadership, supported by science and by the people, forged solutions that clearly acknowledge the connections of people and land to the problems of the Chesapeake.

One of the lessons of the Bay Program that seems to have taken root in the public consciousness is that the recovery of the Bay will be a long-term affair. The need for money and for vigorous programs to manage the effects of growth will persist beyond the terms of office of our current public servants. This reality suggests that the ultimate salvation of the Bay lies with the people who live around it. As Virginia State Senator Joseph V. Gartlan, chairman of the Chesapeake Bay Commission, said at the December conference: "In the end, what will sustain this cooperative, voluntary effort is what got it started in the first place, and that is that growing numbers of people in the Bay region will want the effort to be sustained and to succeed."

The Chesapeake experience, we hope, will be a beacon to others who wish to protect their estuaries. □

A boatful of menhaden from Chesapeake Bay, near Cornfield Harbor, Maryland

Challenging the Pollution of Puget Sound

by Ernesta B. Barnes
Administrator, Region 10

This is the third article in a series by EPA's regional offices on major environmental problems they are addressing. The series began with an article by Region 1 about progress in dealing with Boston Harbor pollution. The second article reported on Region 4's extensive involvement of the public in the program to protect the Biscayne Aquifer in Florida. This article reports on the efforts to clean up Puget Sound in the State of Washington.

Puget Sound is a great place if you're a tourist . . . however it's not so hot if you're an oyster.

For the past three years, Harold Wiksten's oyster beds on the shores of Puget Sound have been closed to harvesting. There are fecal coliforms in his oysters.

Puget Sound is a great place to catch a salmon . . . though you might not want to catch a Dover sole or an English flounder. Unlike the salmon, who just pass through, the sole and flounder are permanent residents at the bottom of the Sound.

In Eagle Harbor, about seven miles from downtown Seattle, no less than 89 percent of all the bottom fish have liver tumors. The sediment from which they feed contains toxic contaminants that include cancer-causing benzo-a-pyrene and other polynuclear aromatic hydrocarbons.

Puget Sound is a great place to watch the harbor seals . . . it is better to see one than to be one.

The harbor seals of Gertrude Island in southern Puget Sound have been found to contain concentrations of poly-chlorinated biphenyls (PCBs) higher than almost any other seal population in the world.

Bacteria in oysters; toxic chemicals in sediments and seals: these discoveries are among the mounting indications that Puget Sound is not the pristine body of water people would prefer to think it is.

Contaminants have been discovered in the sediments of Tacoma's Commencement Bay, at the mouth of the Duwamish River in Seattle's Elliott Bay, and in harbors at Everett and other cities and towns—literally everywhere scientists have surveyed.

Finding pollutants in sediments offshore from urban areas with industrial or commercial activity would not be all that surprising to most people in other parts of America, but it has come as a surprise—almost a shock—to the people near Puget Sound. They thought that because of Puget Sound's size and strong currents and tidal flows, any pollutants entering it would be quickly washed away into Admiralty Inlet and out to the Pacific. The Sound's dispersion characteristics, the residents reasoned, were such that any remaining pollutants would be so scattered as to be virtually undetectable.

Not many people hold to such theories anymore.

Now the prevalent notion is that the strong currents are actually working to the Sound's detriment. The process may work like this: pollutants entering the Sound from the Seattle area, for example, are rapidly carried north to Admiralty Inlet. At some point within the Inlet the currents are reversed, and as much as 70 percent of the pollutants are driven back into the Sound, where they form pockets of contaminated sediments.

If this hypothesis is correct, it would help explain why heavy metals are showing up in the sediments in the remote stretch of Puget Sound just north of Olympia. Near Case Inlet, for example, whose only town has no industries, few people, one church and one saloon. Not the sort of place where one expects to find "big city" pollutants.

Just around the bend from Case Inlet are the closed-up oyster beds of Harold Wiksten, who blames his trouble not on heavy metals, but on bacteria from failing septic tanks and "hobby farmers." According to Wiksten, just upstream from his shellfish operation on Minter Creek, sewage is leaching into the ground water and cattle and horses are using the creek as a toilet. The inevitable result is oysters contaminated with fecal matter.

Wiksten is not the only shellfish grower whose beds have been closed to harvesting. Fecal coliforms have been found in more than a dozen other beds, up and down the Sound. The beds are home to the mussels, clams, oysters and the giant clams called "geoducks" which make up a major share of the State of Washington's $10 million-a-year shellfish industry. The rate of shellfish bed closures is increasing, and the outlook for the future is troubling.

The problem of runoff from hobby farms and failing septic tanks is only a part of the larger problem of runoff from agricultural lands and the residential and commercial development that is urbanizing almost all of the Sound's shoreline. But such runoff is not the only contributor to the Sound's degradation. Others include inadequately treated discharges from municipal sewage treatment plants, combined storm water overflows, direct industrial discharges, and the disposal of contaminated sediments dredged to maintain navigation in the many shipping channels that ring Puget Sound.

Toxic contaminants are a major concern of EPA and the State of Washington's Department of Ecology as they step up their ongoing efforts to clean up the Sound.

A significant move in controlling toxics was taken last summer when EPA and the State of Washington's Department of Ecology announced their intention to deny a variance from secondary treatment sought by a Seattle sewage treatment plant. The plant, with its current level of treatment, discharges 10 times the toxics released by a nearby secondary plant, even though the volume of discharge from the latter is half that of the plant in Seattle.

The EPA-Department of Ecology announcement was of symbolic, as well as practical, importance. It settled a controversy that had been raging around Puget Sound for more than 10 years. Since the enactment of the 1972 Clean Water Act, operators of municipal treatment plants had sought relief from the law's secondary treatment requirement. They had applied for the variances that the 1977 amendments to the Clean Water Act allow to municipal plants which discharge to salt water. Variances can be granted if the operators can demonstrate conclusively that their discharges will not harm marine life, will

Framed by the Seattle skyline, a killer whale surfaces in Puget Sound.

Ken Balcomb

not violate state water quality standards, and will not impair recreation or other uses of the water receiving the discharge. The variance denial, prompted by new data showing toxics in the discharge from the Seattle treatment plant, gave the strong signal that EPA and the Department of Ecology were not likely to waive secondary treatment for any of the other two dozen Puget Sound dischargers whose variance applications were still pending.

The news was hailed by local environmentalists, but received with less than total enthusiasm by the sewerage authorities who now face the prospect of paying for the improvements to their plants. Given current uncertainties about future federal funding for new treatment facilities, much of the financial burden will be borne by the users of those sewage systems.

The people around the Sound will have to come up with the money to finance the upgrading of their treatment plants, and to eliminate the storm-water overflows that cause the plants to be bypassed during heavy rains. But more than money is needed to support all the efforts required to prevent degradation of Puget Sound. The people around the Sound must be willing to sustain the political will that already has convinced their elected officials in Washington, D.C., and Olympia to get cleanup started, and started soon.

The response of the elected officials at the federal and state levels transcends political party lines. Last summer, at a Seattle news conference with Washington Governor John Spellman and EPA Administrator William Ruckelshaus, a Republican congressman (Joel Pritchard from Seattle) heaped praise on a Democratic congressman running for re-election (Norm Dicks from Tacoma) for pushing through a $1.4 million appropriation for EPA and the Department of Ecology to accelerate the cleanup program. The aggressive support of the appropriation by the two Washington senators (both Republicans) and all eight congressmen (six Democrats, two Republicans) was their acknowledgment that public opinion has coalesced over concern for the Sound.

That $1.4 million appropriation was immediately added to funds committed months before by EPA and the Washington State Department of Ecology in the two agencies' joint effort to develop a coordinated management plan for Puget Sound. This management initiative is called the Puget Sound Action Program, and is administered by staff members from both EPA and the Department of Ecology. Although both agencies recognize that it may take a decade or more to solve the Sound's pollution problems, they are off to a running start that promises some early pay-offs. Two examples:

- EPA is contributing most of the $3.5 million being spent by the Department of Ecology on a Superfund feasibility study to develop a remedial action plan for toxic containment in Tacoma's Commencement Bay. The work to develop this plan is expected to be completed in early 1985.

- Of the approximately $2 million the Department of Ecology has committed for work in the Sound during its current fiscal year, a sum of $260,000 is being spent to study bacterial and nutrient contamination in the south portions of the Sound where Harold Wiksten's and other shellfish growers' beds are closed to harvesting.

Protecting shellfish is one of the state's highest priorities. A significant part of the Department of Ecology's shellfish strategy is currently centered around the development of model ordinances that can be enacted by counties or municipalities to regulate septic tanks and animal waste from hobby farms. Without such controls at the county or local level, shellfish will continue to be contaminated by pollution from those sources.

Preventive measures are the keys to protecting the Sound. Many or most of the keys are in the hands of the more than 700 agencies of local government that exist around the Sound. Counties, municipalities, sewerage authorities, port districts and the like must come to grips with problems federal and state governments have no authority to handle. Land use or zoning codes will be needed to control population densities in unsewered areas near sensitive wetlands or shellfish beds. Local approvals would be required for the possible siting of an upland disposal area that would keep material dredged from a navigation channel from being dumped into Puget Sound. Local government must enforce existing regulations for failing septic tanks or drainfields. Ordinances must be enacted at the local level to control animal wastes and other agricultural runoff.

EPA and the Department of Ecology can suggest these measures to local governments, but they cannot tell them to carry them out. Only the people who elect those local officials can make such demands. They are the same people who might once have said "It can't happen here," and who now seem to be saying, "It shouldn't happen any more." Surely the oysters, flounders, and seals would agree. □

Global Oceans Cleanup: A Time of Transition

by Alan B. Sielen

When looking at the evolution of international law to protect the oceans against pollution, one is struck by the parallels to our own experience within the United States. Whether for political, scientific, or institutional reasons, we have entered a new phase in fighting degradation of the oceans. It is a phase characterized more by efforts to effectively carry out existing laws than to create new ones, and by work to better understand and control the more intractable forms of pollution not addressed in the early days of oceanic activism.

The early 1970s saw the signing of two major environmental treaties: one to prevent pollution from ocean dumping, and the other to counteract tanker discharges and spills. Agreements were also concluded dealing with such matters as tanker safety, and liability and compensation for oil pollution damage.

The London Dumping Convention has served in many ways as a model for cooperation among nations in controlling pollution. Now that the novelty of reaching widespread agreement on this matter of global environmental significance has faded, however, the Convention has begun to experience growing pains. Policy makers, scientists, and diplomats from some 54 member nations are now facing the difficult task of making the Convention work. Similar to our experience with U.S. environmental laws, the London Convention nations are beginning to experience the inevitable clashes between laudable environmental objectives and the reality of finding politically and technically acceptable solutions to their waste disposal problems.

Several tough issues—only vaguely familiar to the Convention's original framers—are now the subject of intense international negotiation. Can high-level radioactive wastes be safely buried beneath the seabed? Is at-sea incineration of hazardous wastes an acceptable disposal option? Should certain substances heretofore off-limits to dumping (heavy metals, organohalogens) be disposed of in the oceans if new techniques such as "capping" can prevent their dispersion?

Having to face such questions in a responsible fashion reminds one of how much more gratifying it can be in a free society to make rules than to implement them. Nevertheless, faith in the efficacy of international law as a useful instrument for keeping nations on their good environmental behavior requires that these complex problems be studied and acted on in a thoughtful way. International treaties, like national laws, do not work by magic; at least as much energy and commitment is required in their conscientious application as in their formulation.

The task at hand is formidable. As an example, the conclusion of the 1973 International Convention on the Prevention of Pollution from Ships (MARPOL '73) was hailed as a seminal event in the global effort to combat oil pollution from tankers. The Convention was seen as leading to the complete elimination of intentional discharges of oil into the oceans from tank cleaning and de-ballasting, and as a vehicle for eventually curtailing the discharge of noxious chemicals, sewage and garbage. History has severely tested our faith in this ambitious goal.

By the late 1970s, not a single major maritime nation had ratified MARPOL. As an added twist, the U.S., after a spate of tanker accidents off its shores, suddenly decided that the MARPOL standards were not strict enough—notwithstanding its previous refusal to ratify them for reasons quite the opposite. As a result, in 1978, the MARPOL Convention was substantially upgraded and agreement was reached by the maritime nations to work toward its rapid ratification. Just last year the requisite number of ratifications finally had been obtained for MARPOL '73/'78 to enter into force.

A decade, then, after conception, a treaty with state-of-the-art standards to prevent pollution from vessels is in place with sufficient numbers of maritime nations committed to it to result in a substantial improvement in the quality of the world's ocean waters. Should the slow, and at times tortuous, pace of the past ten years be any indication of the maritime community's attitude toward implementation of MARPOL, there is little reason to be optimistic. However, it appears that these nations have learned something from their experience—not the least of which is the real cost of vacillation and inaction—and there is reason to believe they will now approach the implementation stage of this important international initiative with renewed vigor.

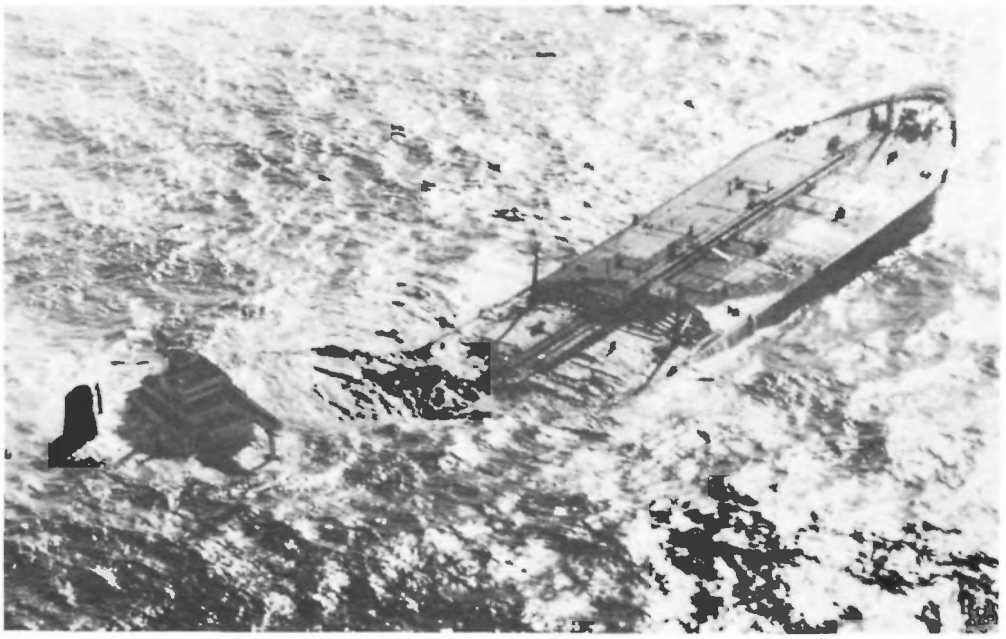
There is another part of the vessel pollution problem which has also received considerable attention lately, and whose history, at least in the U.S., is similar to the MARPOL experience. This is the matter of liability and compensation for pollution damage caused by oil spills. Treaties were negotiated in 1969 and 1971 to establish strict shipowner liability for tanker spills, and to create a fund, paid for by cargo owners, to compensate the victims of spills beyond liability limits. Although the Liability and Fund Conventions have been in force for some time, our nation has not become party to either agreement on the grounds that the liability amounts are too low, and would pre-empt higher limits set by U.S. law.

In May 1984, a diplomatic conference was held in London with the chief goal of increasing liability amounts substantially under both Conventions. Agreement was reached on shipowner liability in the range of $60 million with fund coverage up to $200 million. Such figures are now adequate to cover damages from an *Amoco Cadiz*-type spill off U.S. coasts, and we have expressed our intent to ratify the new agreements. The Conference did not reach agreement on the difficult question of liability for spills of hazardous and noxious substances other than oil; this matter will be taken up at future negotiations.

Ocean dumping and ship discharges and spills are relatively easy sources of ocean pollution to control, given sufficient political will. The source is easily identified, and proven control technology exists. Most ocean pollution, however, comes from land-based sources such as rivers, pipelines, atmospheric fallout, and urban and agricultural runoff. After it has reached the ocean, it can be very difficult to determine where such pollution originated. Moreover, attempts to establish international controls for pollution originating on land raises questions of national sovereignty not encountered with dumping or vessel pollution—activities which generally take place on the high seas or in areas of tempered sovereignty such as 200-mile exclusive economic zones.

Sovereign states are often reluctant to subject their national laws and regulations to scrutiny by an international authority. Looking at but one example, the disposal of nuclear wastes in the ocean, helps to illustrate the resultant environmental dilemma. The ocean dumping of nuclear wastes is regulated by international treaty and by rules set by the International Atomic Energy Agency. The ocean discharge of nuclear wastes by pipeline from coastal facilities such as nuclear fuel reprocessing plants is not subject to similar international rules even though

(Sielen is Director, Multilateral Staff, EPA Office of International Activities)



Associated Press, Wide World Photos, Inc

In March 1978, the supertanker Amoco Cadiz ran aground off the coast of France. It broke in two, spilling thousands of tons of crude oil. In May 1984, at a diplomatic conference in London, agreement was reached on shipowner liability to cover damages from such spills.

this practice can pose a greater environmental hazard than dumping. Until sensible international rules are applied to these sources, a truly effective global regime to protect mankind's common saltwater heritage will continue to elude us.

Recognizing the significance of land-based sources of marine pollution, the United Nations Environment Program (UNEP) recently set up a group of legal and technical experts to consider control guidelines. Whether this group will come up with meaningful proposals remains to be seen, as does the matter of whether such controls are appropriately addressed in a "global" agreement similar to those existing for dumping and vessel pollution. Whatever final form it takes, the UNEP initiative is an encouraging beginning, and signals growing recognition that the control of pollution coming from land is an important dimension in promoting the health of the oceans.

Another recent trend is the recognition that certain regional marine areas have special pollution problems of their own, not necessarily amenable to global solutions. UNEP's regional seas program has identified eleven such areas throughout the world and embarked on negotiations for regional agreements directed at the particular needs of each. Agreements have been in place for several years for the Mediterranean Sea, the Persian Gulf, and West Africa. With the prompting of the U.S., a Convention on the Protection of the Marine Environment of the Caribbean was concluded in 1983. Negotiations are now underway for a similar agreement among the nations of the South Pacific.

Finally, it is important to note the changing outlooks of some nations on the scientific aspects of marine pollution control. When the dumping and vessel conventions were written, there was a great deal of sympathy among scientists and lawmakers for the simple proposition that the best way to keep the oceans clean would be to keep all wastes out. In fact, it was that philosophy which shaped much of the content of international and U.S. law on marine protection. The U.S. Ocean Dumping Act and London Convention prohibitions as well as MARPOL requirements to segregate cargo and ballast water are examples.

Since the early seventies, however, there has been a greater emphasis among marine scientists on the capacity of the oceans to assimilate wastes. Some scientists now believe that the oceans, because of their immensity and natural recuperative properties, have a much greater capacity to safely absorb certain wastes than was earlier thought. Moreover, the oceans are being increasingly viewed as part of national integrated waste management strategies—evaluated and compared with other environmental media (e.g., the air and land) for their waste disposal potential.

With these shifting scientific perceptions, there are bound to be stresses on many of the underlying principles of the early ocean protection treaties, just as the U.S. in recent years has reexamined key provisions in its marine laws. This constant quest to see that the environmental rules by which we live are consonant with the latest scientific thinking is a healthy impulse. The challenge for saltwater diplomats in the years ahead will be to see that this more sophisticated understanding of the scientific aspects of marine pollution is not used as an excuse by the expedient and shortsighted for policies which result in further degradation of the oceans; but rather continues as a force for bettering our lives and enhancing the quality of our natural heritage. □

American Petroleum Institute

Workmen near Portsall, France clean up a beach fouled with oil from the Amoco Cadiz spill.

Strategies to Safeguard the Sea

by Peter Thacher

Steve Delaney

Seen from space, this is indeed "the Water Planet"; unique in our solar system not only because five-eighths of the surface is aquatic, but also because life developed first in a watery environment, as the chemistry of our blood reminds us.

But more than history attaches us to the oceans, and makes us mindful of our continued dependency on its proper functioning. For many, oceans are the primary source of proteins, as well as livelihood, commerce, and recreation.

(Thacher is a Distinguished Fellow of the World Resources Institute in Washington, D. C. He was formerly Deputy Executive Director of the United Nations Environment Program.)

And the climate of the entire globe is intricately interdependent with the state of the seas.

Anyone who has lived on the edge of the oceans would testify that obvious changes have taken place in recent decades: there are, regrettably, mayors of many coastal towns who are uncomfortable about their children swimming in waters they once took for granted. Even though we know how shoreline conditions are changing in such personal terms, we still know very little, in quantifiable terms, about changes underway in the oceans of the world.

Until recently, most of our knowledge was deficient because there was no comparability between different sets of data collected by different means in different places. Understandably, this gave rise to concern that the lack of good data delayed actions which seemed obvious and compelling. Without comparable data no sound cost-benefit calculation could be made.

Nonetheless, more than a century ago, long before the 1972 United Nations Conference on the Human Environment in Stockholm, good progress in cooperative scientific investigations had begun during the First Polar Year in 1882. This work has been augmented more recently in Antarctica and during the International Geophysical Year (IGY) of the mid-50s. By 1972 the work of the IGY had led, in the Baltic Sea, to a

measurement program with built-in intercalibration to ensure data compatibility.

Jurists also have been hard at work attacking some of the most obvious maritime sources of pollutants. A variety of agreements and treaties have been signed which are intended to reduce accidental spills through improved navigation and ship design. Still, most of the ocean's contaminants come not from spills at sea but from the land. It was this point which both the Stockholm conference and the United Nations Environment Program's Regional Seas Program emphasized.

Fortunately, the "health" of the oceans can be measured best in the area at greatest risk, near-shore waters (particularly in enclosed or semi-enclosed seas like the Baltic and the Mediterranean, and the Gulf of Mexico). Not only are the levels of pollutants much higher in coastal waters—before gradual dispersion in ocean currents—but also contamination of near-shore waters demonstrably harms many human concerns. Swimming can be unhealthy or unpleasant, seafood becomes contaminated, and tar balls of congealed oil from tankers ruin tourism. Spawning and breeding grounds of fisheries are at risk when pollutants mix with rich nutrients flowing from land.

Dealing with such losses in a concerted way led to one of the United Nations Environment Program's (UNEP) most successful efforts, the Mediterranean Action Plan. A comprehensive attack on all sources of marine pollution by regional groups of coastal states, the Plan has now been replicated in eleven regions serving some 120 coastal states, through a comprehensive approach, tailored to the specific priorities of each group of states.

The political aspects of dealing with marine pollutants deserve attention. Despite the disputes and conflicts which, as always, could be found at one end or the other of the "cradle of Western civilization," the fact that marine pollutants were somehow a bit more distant, "out there" offshore, rather than "here" on dry land, where sovereign states tolerate no voice but their own, made it easier to win governmental agreement. It was obvious to all of the neighbors on "Mare Nostrum," even if they refused to talk to each other about it, that something had to be done to protect their "common" property against further deterioration.

Is a major effort needed in the '80s at a *global* scale, like the regional efforts in the '70s? To answer this, we must seek a comprehensive assessment of the state of the oceans, recognizing that to be complete we should include not only pollution trends but also the status of fisheries, marine mammals, and other ocean life.

First, a definition of "marine pollution" is essential. Consider this one, from the 1972 Stockholm conference:

> *The introduction by man, directly or indirectly, of substances or energy into the marine environment (including estuaries) resulting in such deleterious effects as harm to living resources, hazards to human health, hindrance to marine activities, including fishing, impairment of quality for use of sea water, and reduction of amenities.*

Since being approved by governments at Stockholm, this formula, in one form or another, has been incorporated in each of the various Regional Seas treaties, starting with the Barcelona Convention of 1976.

The most recent, comprehensive assessment of the state of the oceans was done only a few years ago by the U.N. Group of Experts on the Scientific Aspects of Marine Pollution (GESAMP), in the first of what are to be periodically-updated reviews. The Executive Summary of this 100-page report (available from UNEP or the other agencies who sponsor GESAMP) has this concluding remark:

> *The Group noted that although effects of pollution have not so far been detected on a global scale, general trends of increasing contamination can be recognized in some areas, and these trends are warning signals. The signals are noticeable mainly in the marine areas most intensively used by man, viz., coastal waters. The oceans are capable of absorbing limited and controlled quantities of wastes and, as such, represent an important resource. But careful control of waste disposal is necessary. Programs must be maintained for this purpose and initiatives taken to regulate the entry of new contaminants to the oceans. The effects of pollution should be carefully monitored, and our understanding of the fate and effects of pollutants in the oceans must be improved. This approach makes for more accurate predictions and assessments and therefore provides the most effective means of ensuring that the health of the oceans is maintained.*

As a retired international civil servant, I can dare to say some things which I earlier could not. One of them is, to me, an obvious truth: no international effort at the global scale has succeeded in the past unless the U.S.was strongly behind it. It was a U.S. proposal which launched the World Weather Watch in the early 60s; today we can see some of the results every night on our TV screens. And no nation benefits more than the U.S. from the kind of foresight which is today possible because of the global program coordinated by the World Meteorological Organization (a GESAMP member). No reliable two-week weather forecast will be possible unless the ocean-atmosphere exchange processes are better understood; "GARP" (Global Atmospheric Research Program) was another U.S. proposal from the 60s, and work continues under it today. The U.S. and the USSR were among those who proposed that something serious be done about smallpox; today, thanks to cooperative programs developed by governments sitting at the World Health Organization (also a GESAMP member), smallpox has been eradicated.

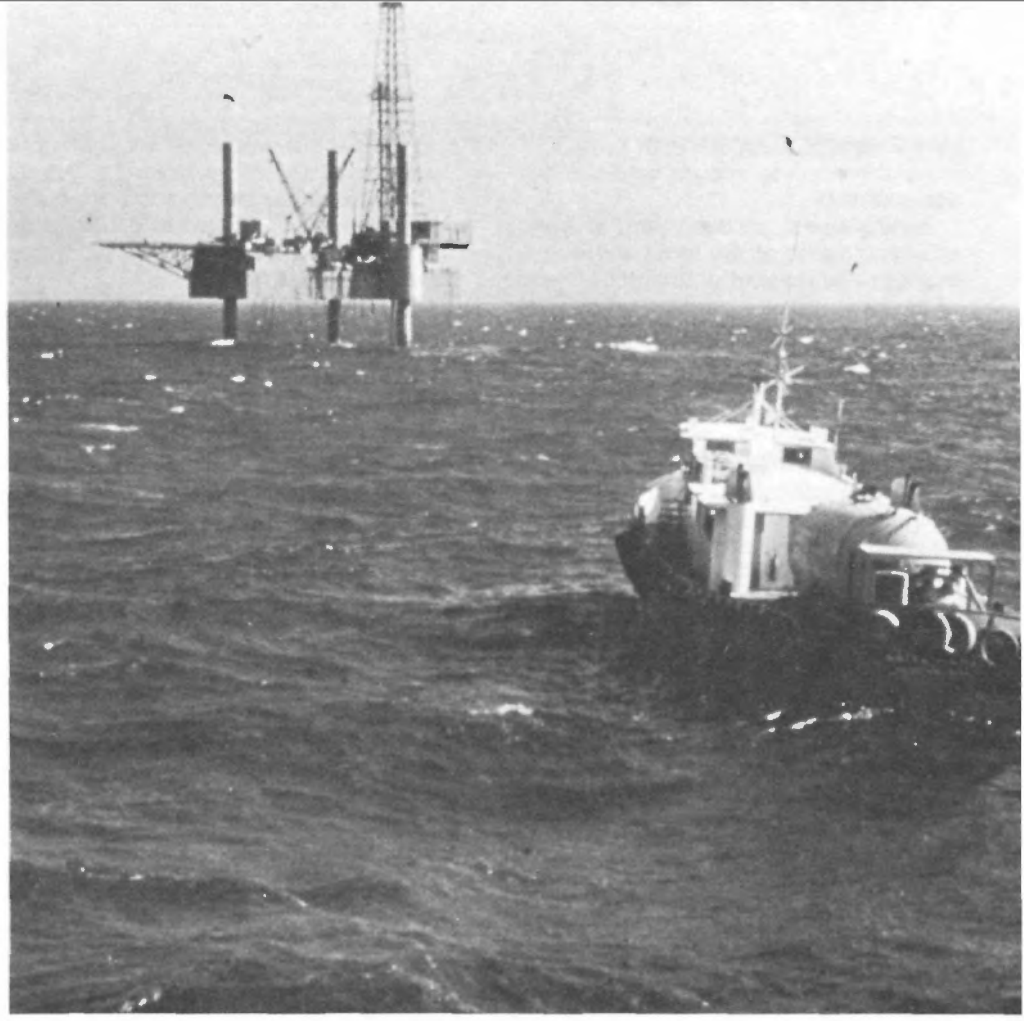
Specific international agreements to tackle land-based sources of marine pollutants have been reached in a number of regional pacts, such as the conventions of Helsinki (1974), Paris (1975), Athens (1980), and Quito (1983). Within UNEP's Regional Seas Program others are under negotiation for the South Pacific and the East African sea. Work on these agreements is encouraged under Chapter 12 of the Law of the Seas Convention, which calls on states to take

> *all measures that are necessary to prevent, reduce and control pollution of the marine environment from any source, using for this purpose the best practicable means at their disposal and in accordance with their capabilities, and they shall endeavor to harmonize their policies in this connection.*

Although the United States has not signed the Law of the Sea Convention, U. S. influence could still be felt if we exercised leadership. The United States is a multi-ocean state with interests in all the oceans of the world. It is time for our nation to take the lead in proposing broad programs to safeguard the marine portion of the "Water Planet." □

Offshore Oil Drilling: An Industry View

by C. T. Sawyer



The history of petroleum exploration and production in U.S. waters is one of dramatic and continuing technological advancement.

This is perhaps no more clearly demonstrated than in the care that is now taken to assure the protection of the nation's offshore environment and in the state-of-the-art technology being applied during the search for and production of crude oil and natural gas off our coasts. Because of this effort, the chances for accidental release of significant amounts of oil into the environment during such operations are minimal.

Offshore drilling, of course, is not new to the American scene. The first wells were drilled in U.S. waters more than 90 years ago, from piers extending into the coastal waters of Southern California. Throughout the ensuing years, more than 30,000 offshore wells—25,000 in the U.S. portion of the Gulf of Mexico alone—were drilled here.

Over the same period, more than 10 billion barrels of oil and in excess of 76 trillion cubic feet of natural gas have been produced from federal and coastal-state waters. On average, domestic offshore wells are currently contributing more than one million barrels of oil and some 12 billion cubic feet of gas to our energy supplies each day of the year.

Yet it is a matter of record that—throughout the long history of offshore operations in these waters—there has been only one spill from exploration and production operations that has resulted in significant amounts of oil reaching shore. That was the well-known spill at a platform in California's Santa Barbara Channel in 1969.

Scientific studies by government agencies, academia and the petroleum industry confirm that the damage which did occur there was temporary and that the area quickly recovered. There was some loss of life among certain marine organisms and seabirds. Fish and other animal populations returned to normal levels within a year following the spill.

Since that accident 15 years ago, environmental protection during offshore operations has taken a quantum step forward. This improvement has resulted both from stricter governmental regulation of offshore operations and from a growing environmental consciousness among members of the petroleum industry.

According to the U.S. Department of the Interior, since 1970 there has been only one spill from exploration and production operations in federal waters in which more than 10,000 barrels of oil were released into the environment. That spill occurred when an anchor was dragged across the seabed and ruptured an oil pipeline. Moreover, during the period from 1975 through 1982, the department reports that more than 2.2 billion barrels of oil and some 34 trillion cubic feet of gas were produced from under federal waters. Total spillage over that eight-year period amounted to a little over 17,000 barrels—only seven one-hundredths of one percent of the volume of oil produced. The Department states further that "no oil from [these] operations reached the U.S. coastline in significant quantities." As a point of comparison, natural oil seeps at Coal Oil Point in the Santa Barbara Channel annually introduce about 22,000 barrels of oil into the local marine enviornment.

What steps and technology have contributed to this record? They are numerous and effective at both the exploratory and production stages, as the following examples show.

There is little risk of adverse environmental impact during exploratory operations, beginning with the methods currently employed in seismic surveying through the drilling of exploratory wells. Seismic surveys, designed to provide information on subterranean structures, are routinely made in both federal and state waters. Nondestructive energy sources are used to produce the acoustics needed in the surveys. These sources include the use of controlled air chambers trailed behind the vessels. Explosions or implosions activated within the chambers create a muffled sound and, in the use of propane and compressed air chambers, produce air bubbles visible in the wake of the vessel. Newly introduced technology uses a contained implosion of water without creating bubbles. Studies have shown that these surveys have little impact on sea life.

Fishing and other vessels in the survey area are kept informed of the seismic survey path. Sophisticated collision avoidance and vessel guidance equipment is used to track other vessels in the area and to keep the seismic vessel on course.

(Sawyer is Vice President of the American Petroleum Institute.)

A workboat brings equipment to an oil drilling rig in the Gulf of Mexico.

Cities Service Co.

When exploratory drilling is to take place, regulations and industry standards require that strict safeguards be in place. Among these are regulations prohibiting the discharge of nonbiodegradable wastes overboard. Such wastes may be either brought to shore or disposed of in an environmentally safe manner aboard the drilling vessel. Oil and oily waters brought onboard the vessel during drilling must be contained onboard and the waters cleaned before they can be returned to the sea.

Drilling fluids or "muds" pose little danger to the environment. This has been confirmed by a recent National Petroleum Research study. These mixtures, composed primarily of clay, barite, water and low concentrations of special chemicals, are used to bring rock chips cut by the drill bit up from the well and to help control pressures within the well. Oil-based fluids are sometimes used in offshore drilling but are not discharged into U.S. waters. Natural movements in the water column quickly disperse any of the components to normal background levels. The heavier particles drift to the seabed, where they become covered with silt or are moved away by ocean currents. The area around the drill site begins to "heal" itself quickly, once drilling stops.

In addition to the pressure control exerted by drilling fluids, blowout preventers (BOPs) are installed in the drilling system on board the drilling vessel or placed on top of well casings after they have been installed. BOPs are generally used in stacks of three or more, which provides an extra margin of safety. These stacks consist of a series of automatically or manually activated valves which can close down the well within a matter of minutes.

If an unexpected change of pressure occurs, the drilling operator can control pressures in the well by adjusting the composition of the drilling fluid and its rate of flow into the well. In addition, well operations can be closed down from a number of points aboard the drilling facility.

Unannounced emergency shutdown and evacuation drills are held routinely and all safety equipment is periodically tested. All offshore platform operations are shut down and people are evacuated when a severe storm threatens.

Where special environmental conditions exist, such as in arctic water, safeguards are often tailor-made to meet those conditions. For example, seismic and other exploratory operations are halted during certain periods to avoid conflict with native subsistence hunting. Operations are also postponed during the migration of endangered species of whale. And special construction technologies such as manmade gravel islands are applied to shield drilling and production operations from the movement of arctic ice.

Production operations in the nation's offshore areas are governed by the same operational safeguards as are in place during the exploratory phase. There is, however, an environmental "plus" resulting from platform installation. The platforms serve as artificial reefs, attracting plankton and other small sea life which, in turn, bring an influx of a wide variety of fish to the area.

A recent report by the Council on Environmental Quality states: "It is not uncommon to see these platforms [in the Gulf of Mexico] circled by fishing boats. Besides an increase in sport and recreational fishing, commercial fishermen have begun to harvest shrimp concentrations associated with the platforms." Several coastal states have asked that platforms scheduled for demolition be left in place or removed to other areas to create new fishing opportunities in state waters.

As a consequence of improved technology and increased environmental awareness on the part of both company management and operations personnel, the petroleum industry's recent offshore environmental and safety record in U.S. waters has been excellent. That does not mean that there will never be another oil spill; there is some environmental risk in virtually every activity of man. The risk of an accidental spill from exploration and production operations, however, is minimal.

The National Academy of Sciences estimated recently that offshore oil and gas operations in U.S. waters account for only five one-hundredths of one percent of oil pollution in the world's oceans. Natural seeps, in comparison, account for 15 percent of the oil that reaches the world's oceans.

With continued advances in offshore exploration and production technology, and with the application of additional safeguards as they are developed, the record of environmental protection may further improve in the years ahead. □

John Keller, Texaco, Inc.

Workman prepares a blowout preventer for installation on an oil well being drilled off the Louisiana coast.

From Fisheries to Sea Turtles: Managing the Ocean Environment

by Dr. John V. Byrne

Environmental management is not as well known a concept as it deserves to be. At the National Oceanic and Atmospheric Administration (NOAA), it involves a philosophical approach to problems of the environment that stresses the importance of optimum use of land and water resources. The reasoning behind this attitude is clear: we have a responsibility to protect and improve the lot of human beings and their surroundings—the environment.

NOAA has a number of important responsibilities relating to environmental management. Our fundamental reason for being is to provide service—service to the American people and to industry—service that cannot be provided by the private sector. And our sphere of responsibility is environmental, encompassing the atmosphere and the oceans.

We forecast the weather, manage marine fisheries, monitor and seek to ameliorate marine pollution, study climate, maintain marine and estuarine sanctuaries, chart the coasts and waterways. And we have other responsibilities: protecting whales, porpoises, seals, and sea turtles; fostering technology for recovering manganese nodules from the deep seabed, and for ocean thermal energy conversion; and providing on-scene scientific coordinators in response to offshore and coastal spills of oil or hazardous materials.

All of our science, whether fundamental or applied, is keyed to the needs of our mission. It is designed to help us do our safety and service jobs better.

Although NOAA has environmental management responsibilities for marine fisheries and sanctuaries in particular, its major contributions to environmental management involve providing unbiased scientific data on which management agencies (EPA, the Department of the Interior, state and local governments) can base decisions.

(Dr. Byrne served as Administrator of NOAA from July 1981 until this month. He has just taken a new post, President of Oregon State University.)

For example, we conducted a multidisciplinary study of the Strait of Juan de Fuca, off the coast of Washington State, as a result of proposals by the Northern Tier Pipeline Company to move petroleum shipments there. Our scientists grappled with questions about the Strait. What would happen if oil were spilled in the waters? What physical, chemical, and biological processes would come into play to disperse, transport, or degrade it? What biological resources would be at risk, and under what circumstances? What shoreline areas might be impacted?

NOAA's National Marine Fisheries Service, together with our environmental research group, has a team of scientists working on a major project dealing with the overall marine environment of Puget Sound and the nature, fate, and effects of its chemical pollutants: petroleum hydrocarbons, synthetic organics such as PCBs, and metals.

The scientists are addressing critical environmental questions on how marine organisms react to the pollutants. Do fish and shellfish take them up? Are they biologically transformed, or retained by the animals? Do they cause disease or cellular and subcellular abnormalities?

We are also developing a monitoring program to give us long-term information from which we can assess the spatial and temporal trends in water pollution. This national program will cover the major pollutants and other factors that may cause stress on our fisheries. During the first year we will monitor pollutants in sediments, water, and bottom fish.

Once we've built up records of spatial and temporal changes in pollutant levels, and data on how the pollutants got there and what processes are involved, we will be in a better position to advise management and regulatory agencies on possible management strategies.

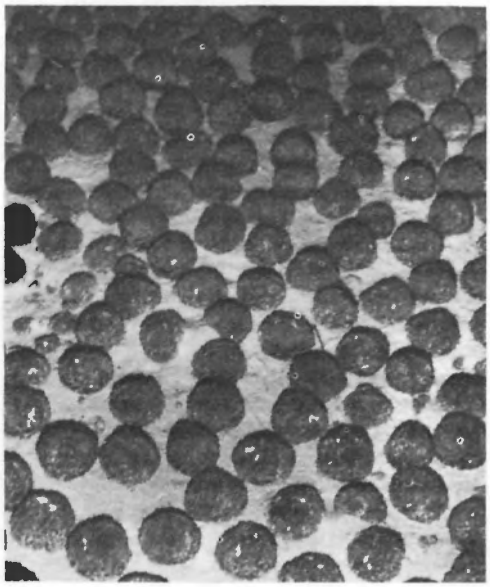
NOAA's National Ocean Service also provides technical assistance to the EPA Office of Emergency and Remedial Response (the Superfund office) during cleanup operations at hazardous waste sites.

More than 18,000 such sites have been identified as possible candidates for EPA's National Priorities List and a possible 4,000 sites may be identified this year by the states. EPA has so far listed 538 sites on the National Priorities List (NPL), and proposed the addition of 244 others. NOAA has identified 348 of the NPL sites as located in coastal counties, including counties adjacent to the Great Lakes, and mapped them in preparation for determining priorities.

In addition, the Ocean Service has developed a detailed data base on the individual characteristics of all 348 sites, which includes types and quantity of waste at each site; distance to tidal surface waters, coastal wetlands, and critical habitat; and depth to ground water. NOAA and EPA will determine which of the sites pose the greatest threat to living estuarine and marine resources.

We also cooperate closely with the Coast Guard on oil and hazardous materials spills along the coasts or at sea, and provide a scientific support coordinator to assist the Coast Guard's on-scene coordinator at such disasters. This responsibility had its beginnings at

An unusually regular array of manganese nodules on the seabed. The National Oceanic and Atmospheric Administration is helping to develop technology for recovering such nodules from the ocean bottom.



National Oceanic and Atmospheric Administration

National Oceanic and Atmospheric Administration

A scouting helicopter lands on the National Oceanic and Atmospheric Administration (NOAA) ship Surveyor, *on a scientific mission in the Arctic.*

the *Argo Merchant* wreck off Nantucket Island in 1976, when a small scientific research team from NOAA and the Coast Guard undertook a limited project designed to describe the movement and fate of the oil released from the tanker.

Another area of increasing environmental interest to us is the Alaskan Polar Region. One of America's great fisheries lies in the Gulf of Alaska and Bering Sea, where safety, as well as economy, depends on good weather forecasting. In addition, we have responsibilities for certain of the marine mammals in the area.

We are about midway in a study of superstructure icing, a critical phenomenon which threatens fishing vessels in the cold Alaskan waters. Fishermen often run into the problem of ocean spray freezing to the metal parts of their vessels in areas where there is no sea ice. It is very difficult for them to determine the extent of danger to their ship. Our scientists have data showing that the amount of freezing depends not only on wind speeds and air temperatures, but also on the temperature differential between air and sea. We've devised a guidance card for mariners that shows zones of superstructure icing depending on certain weather factors, and our people are working on putting it into a formula so forecasters can easily compute icing probabilities.

Finally, NOAA has an Assessment and Information Services Center that studies the economic impacts of weather and climate events on the U.S. economy. In addition to its regular reports, the Center does special studies on such events as El Nino, whose oceanic and atmospheric effects were felt so strongly last year throughout much of the world.

NOAA deals in many ways with the ocean environment, through research, operations, and management. Much of the work is innovative and dramatic. All of it is aimed at furthering our obligations relating to the ocean environment and our involvement in service to public health and safety.

As our responsibilities expand under the recently proclaimed 200-mile-wide Exclusive Economic Zone off the United States coast, and as our knowledge increases through more and better research, our understanding of the ocean environment—and our ability to change it for the better—will grow as well. □

National Oceanic and Atmospheric Administration

At NOAA's National Marine Fisheries Laboratory in New Jersey, a scientist analyzes biological samples. Researchers at the lab are investigating the correlation between pollution and fin rot disease in fish.

Exploring the Secrets of the Sea

by Bob Burke

Jumping overboard, a diver holds an underwater acoustic locator device. He uses the instrument to find baskets of mussels deployed around a dump site in central Long Island Sound. The mussels will be retrieved for chemical and biological analysis to help EPA determine what effect dumping operations have on the environment.

It has become apparent in recent decades that many saltwater resources are potentially threatened with permanent damage from a variety of human activities. In order to protect our oceans and coastal areas from these effects, we must know more about our saltwater resources, how they sustain life, and what happens when the wastes from man's activities intrude. EPA's marine research is currently focused on two areas that relate to these developments. The first is the environmental consequences of dumping industrial and municipal wastes at sea. The second is the adverse environmental and public health effects that pesticides residues and toxic wastes are having on ecologically sensitive coastal areas.

EPA's Ocean Dumping Research Program

EPA's ocean disposal research is centered at the Environmental Research Laboratory in Narragansett, R.I., and at the laboratory's West Coast field station in Newport, Ore. Their basic mission is to provide information to help EPA and other federal agencies discharge their responsibilities under the Marine Protection, Research and Sanctuaries Act and the Clean Water Act. These laws established permitting programs to regulate the disposal of municipal and industrial wastes into the ocean.

To facilitate the permit program, EPA's Office of Research and Development and the Narragansett laboratory have put together a five-part Hazard Assessment Strategy which evaluates the environmental hazards of waste disposal at sea. The Strategy covers activities starting before a site is even selected for dumping, and continuing long after disposal. These five components are:

Site Assessment: Pollutants have been described by one Narragansett official as materials which are simply in the wrong place. This thought pretty well summarizes the objective of site assessment, a process that looks at the physical, chemical and biological

(Burke is Contributing Editor of EPA Journal)

characteristics of an existing or proposed dumping area to see if it is environmentally suited for such use. Suitability depends on such things as how water currents and other physical factors would affect the transport of wastes, the kinds of commercial fish and other resources that are in the area, and their particular vulnerability to pollution.

Waste Characterization: Some wastes are banned from ocean dumping altogether. Once eligibility is established, chemical assessments are needed to determine how toxic the wastes are, how they will disperse in the ocean, and their potential for creating contaminant residues. All of these factors influence the degree of hazard that the wastes would pose to marine life and to human health.

Exposure Assessment: This phase of hazard assessment determines the likelihood that the proposed wastes will contact an ocean resource that warrants protection from pollution — and the concentration, frequency, and duration of that contact. Predictions of exposure are often required since the proposed waste discharge and the critical resource which could be threatened aren't always in the same location.

Effects Assessment: This phase seeks to establish the functional relationships between exposure conditions and specific biological effects on the living marine resources that can be exposed to the wastes, as determined earlier. This is not a simple test, nor is it easily amenable to current mathematical modeling. Therefore, field verification and monitoring become exceedingly important to prevent either inadequate or overly restrictive regulation.

Monitoring Programs: An extensive monitoring program is recommended as part of hazard assessment. This documents both short- and long-range environmental effects of the dumping. The long-term monitoring is intended to ensure that problems which might not be apparent immediately following dumping at the site do not, in fact, contribute to environmental problems at a later date or farther place. This involves frequent sampling at and around the site with sophisticated monitoring equipment, and running biological tests on fish and other species.

EPA's Hazard Assessment Program is being put to the test in a comprehensive laboratory and field verification program by the Army Corps of Engineers at a location in central Long Island Sound. The site has been used as a designated dumping area since 1972. Wastes from Black Rock Harbor in Bridgeport, Conn., are being dredged by the Corps for subsequent disposal at the designated area. The Corps is trying to find out how the dredging of these materials affects neighboring wetland and upland areas in the Bridgeport area. EPA is involved in determining the specific impacts that the dumping of the dredged material will have on the disposal site and on surrounding areas of Long Island Sound. All of this information will be used to test portions of the Hazard Assessment Strategy.

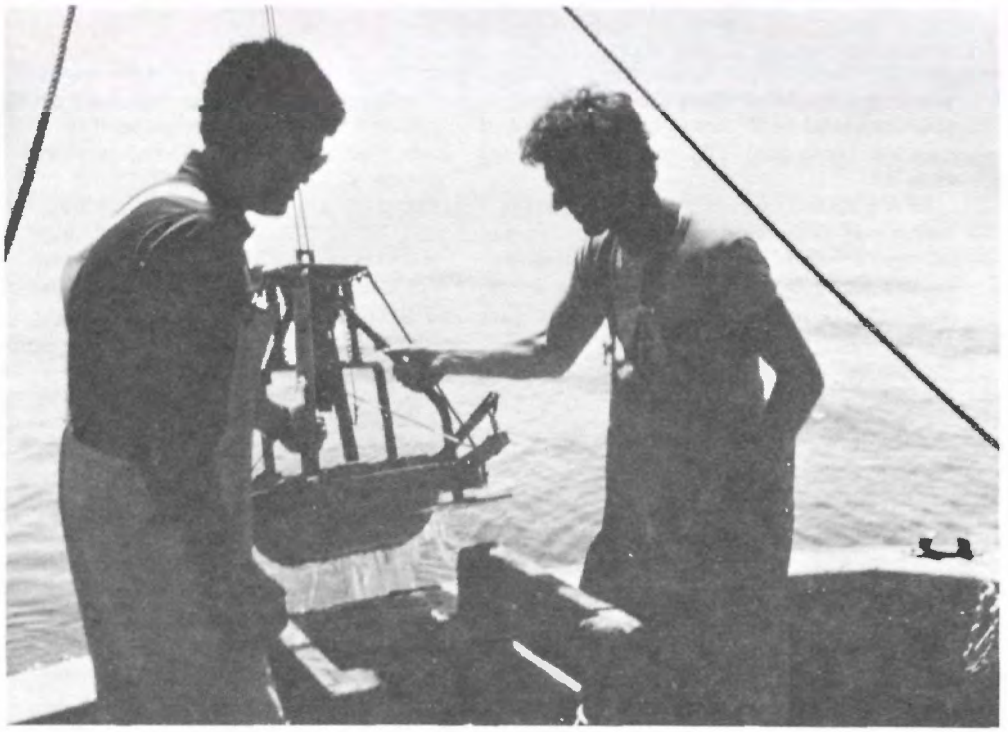
Some of the techniques EPA will be using in the Black Rock Harbor Program demonstrate how comprehensive and varied the science of evaluating ocean dumping has become. Assessment of the biological effects alone involves over 20 short- and long-range tests or analyses. They range from determining how well fish, shellfish, and other sensitive life adapt to the dumping shortly after it occurs, to complex biological and chemical testing of the long-range effects on growth, reproduction and abundance of several species. Perhaps these biological assessments can be seen as a relative measurement of the quality of life that various aquatic species experience in the midst of controlled dumping. Conditions are closely monitored by the Narragansett laboratory using underwater photography, sonar, and diver observations. Participating scientists from Yale University and the University of Connecticut are contributing sophisticated underwater measuring devices that profile changes in chemical composition from the dumping in and around the dumpsite. Laboratory models also are employed to predict future developments from current data on the site and from information as it is supplied from the field. The physical, chemical, and biological impacts of the dumping are thoroughly examined for their effects on water, sediments on the ocean floor, and biological communities in the site area. The Black Rock Harbor Project should considerably expand EPA's capability to determine the best sites for dumping wastes into the ocean, and the conditions under which such dumping should take place to minimize environmental damage.

Marine Pesticides and Toxic Research

EPA research is also being conducted to understand the effects that pesticides and toxic substances are having on the marine environment. While some of this work is being done at Narragansett, most is being implemented at EPA's environmental laboratory in Gulf Breeze, Fla. Various research projects at Gulf Breeze support EPA's enforcement and regulatory functions under both the Toxic Substances Control Act (TSCA) and the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). While the legislative mandates are separate, many of the specific activities are either coordinated or use similar procedures and testing methodologies, including field studies, laboratory tests and computer modeling.

The pesticides and toxic substances research programs are largely focused on studies in coastal or estuarine areas rather than deep sea research. These shoreline areas are home to several fragile forms of aquatic life and terrestrial wildlife, some of which are particularly sensitive to pesticides and toxic substance residues or degradation products. Studying these fragile areas is important to develop programs that would specifically reduce environmental damage to affected animals and vegetation. Furthermore, these areas serve as "nursery grounds" for aquatic life. They provide a unique early warning system of the harmful effects that pesticides and toxic substances may be having on sensitive or ecologically important forms of marine life.

Some of these projects include:



Researchers working for EPA's Narragansett lab pull up a sampler filled with sediment collected from the ocean bottom.

Development of methodologies to determine how and to what extent marine life is exposed to pesticides and toxic substances and how it is affected by this exposure. Three specific areas of research are:

- Studies on sensitive crustacean populations to determine how pesticides may be affecting their health, growth and reproductive capabilities. If these crustaceans are affected, it provides researchers with a clue that other sensitive estuarine life forms are potentially threatened.
- Fish life-cycle studies and testing programs in several different coastal environments to help judge the adverse impacts that pesticides are having on commercial fish populations and other species important for maintaining ecological balance in coastal areas.
- Investigations to determine the effects that certain biological control agents (such as those for mosquitoes) may be having on other forms of life in the estuarine environment. Among other things, this research may shed light on substitutes that control these pests without harming other living things.

Field studies which allow researchers to compare laboratory techniques and findings with actual pesticide impacts experienced when pesticides are used under normal conditions.

Biological or other influences that exert some controls on how pesticides settle, concentrate, move, or degrade in the marine environment. Of particular interest is how biological microbes reduce pesticides residues by, in effect, feeding on them. This information makes it possible to predict how extensive the accumulations of unwanted pesticides will be.

Research on toxic substances in the marine environment, which involves a monumental undertaking when one considers how many kinds of old and new products potentially threaten saltwater resources. EPA's research is essentially developing answers to three basic questions.

- How do toxic chemicals get into the marine environment?
- Which way are the toxics being transported and what will be the effects on the marine environment?
- How vulnerable to damage are specific saltwater areas, and are they resilient enough to recover when exposed to these toxicants? EPA research seeks answers to these questions through separate but interrelated forms of analyses. The first determines how different kinds of marine life and water systems are affected when they are exposed to toxic wastes. The second determines the specific hazards posed by certain kinds of toxic substances in the marine environment. The third combines these factors to provide a collective risk assessment in terms of the hazards of a particular toxic waste and the kinds of marine life and levels of exposure to these hazards. One innovative area of research related to toxics in the marine environment is biotechnology. This research effort is seeking to determine if there are decontamination sources within the marine environment such as small biological organisms that, in effect, search out and destroy toxic contaminants or curb their influences in other ways.

EPA's marine research programs are balanced in their assumptions and in the ways the various programs are conducted. With ocean dumping, for example, the objective is not to obstruct the disposal of wastes at sea, but to make certain that all disposal activities are carried out in a manner which protects saltwater resources that would otherwise be threatened. Marine pesticides and toxic substances research proceeds in a similar fashion by trying to determine how fragile coastal areas and man's dependence on modern substances can co-exist in some acceptable fashion. Protecting our saltwater resources from the pressures of 20th century developments is a complicated, multi-faceted challenge which EPA research is addressing with increased precision. □

Update

A review of recent major EPA activities and developments in the pollution control areas

AIR

Coke Oven Emissions Listing

EPA has announced that it is listing coke oven emissions as a hazardous air pollutant under the Clean Air Act and will develop regulations to reduce emissions because they pose a significant risk of cancer.

Coke ovens produce a carbon residue called coke that comes from the heating of soft (bituminous) coal. Coke is used primarily in the steel industry's blast furnaces to make iron that is subsequently refined into steel.

EPA is officially listing coke oven emissions as a hazardous air pollutant under Section 112 of the Clean Air Act, based on a finding that these substances "may reasonably be anticipated to result in an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness."

The agency estimates that between 1.5 and 16 lung cancer deaths per year are attributable to exposure to coke oven emissions.

The hazardous air pollutant listing signifies EPA's intent to issue regulations for reducing emissions and public health risks from new and existing coke plants in the U.S. Proposed emission regulations are expected to be issued next year.

Alcohol Fuel Violations Penalties

EPA has given official notice to ten Southern California gasoline manufacturers that a total of $8.1 million in civil penalties has been proposed against them for violating provisions of the Clean Air Act governing the use of alcohol in gasoline.

The penalties sought in these actions are the largest ever proposed for the misuse of alcohol additives in gasoline.

The parties were identified in two separate investigations conducted by EPA, the California Department of Food and Agriculture, Division of Measurement Standards, and the California Air Resources Board.

In the first of two investigations, EPA began an inquiry into the La Mesa Corporation and related companies after receiving a tip from an anonymous source last fall. A search of company records at the Rosemead and Banning, Calif., home offices of the La Mesa Corp. turned up evidence which verified the earlier allegations.

EPA found that the owner of La Mesa oversees the operation of three other companies, Nelson Oil and Tell Industries of California, and Morago Company of Delaware, and that all four were involved in blending and selling illegal fuel.

The EPA charges allege that the companies broke the law when methanol, used to increase octane ratings, was added to unleaded gasoline without the co-solvents and additives needed to prevent an increase in automotive emissions.

Further evidence that the fuel was not properly blended was found in samples of gasoline taken at La Mesa retail outlets owned by the Morago Co. EPA proposed a $4,280,000 penalty against the four companies.

Based upon the La Mesa investigation EPA also proposed a $2,560,000 penalty against Petroleum Exchange, Inc. (PEI), and Drive Oil, Inc., in Long Beach, Calif., which sold methanol to the four companies and allegedly engaged in the blending of the fuel as well. The penalty also took into account PEI methanol sales to petroleum wholesalers, T. B. Smith Co. and Wright-Willbarb, for producing the illegal blends.

1985 Mileage Ratings

The Honda Civic Coupe HF has captured the highest mileage rating at 49 miles per gallon in city driving and 54 mpg on the highway for the second year in a row, according to the 1985 mileage figures released by EPA.

Other top-rated cars in the 1985 mileage estimates are the Chevrolet Sprint, rated at 47 mpg in the city and 53 mpg on the highway; the Nissan Sentra, rated at 45 mpg and 50 mpg; and the Ford Escort and Lincoln Mercury-Lynx, both rated at 43 mpg and 52 mpg.

EPA said fuel economy continued to improve for the fleet as a whole. Based upon projected 1985 model year sales and fuel economy estimates, the fleet average fuel economy for domestic and foreign passenger cars is expected to be 26.8 mpg. In 1984, the comparable estimate was 26.6 mpg. In 1975, the fleet average fuel economy for cars was 15.8 mpg. This improvement has occurred while air pollution from new cars has been substantially reduced.

This year's estimates have been revised to more accurately reflect fuel economy under both city and highway driving. The two-number system for estimating fuel economy was adopted in response to Department of Energy consumer surveys. In these surveys, respondents indicated a preference for individual city and highway estimates, rather than the composite single average value previously published.

ENFORCEMENT

Pollution Control Enforcement

Enforcement of the nation's pollution control laws is meeting or exceeding projections, according to EPA's latest figures.

Figures from the third quarter (April to June) of fiscal year 1984 (October 1983 to September 1984) show that the agency exceeded overall third-quarter projections for enforcement action.

The agency's regional offices issued 624 Administrative Orders (direct, non-judicial enforcement orders) in the third quarter, exceeding the overall third quarter target of 514. The regions also referred 66 civil judicial cases to EPA headquarters or directly to the Department of Justice, against their overall projection of 53 referrals. The agency conducted 3,008 inspections of regulated facilities, against a target of 2,556.

During this period, EPA headquarters and regional offices referred a total of 78 judicial cases to the Justice Department for prosecution; there were 40 such referrals in the second quarter and 49 in the first quarter of fiscal year 1984.

HAZARDOUS WASTE

244 New Superfund Sites

EPA has proposed 244 new sites for inclusion on the Superfund National Priorities List (NPL).

Priority sites are those deemed to pose the greatest potential for long-term threat to human health and the environment.

As a result of this proposed updating, there are now 786 sites, including 538 actually on the list and four others proposed earlier for listing but still under consideration.

Among the 244 sites proposed are 36 federally-owned facilities. This is the first time federal facilities have been proposed for inclusion on the NPL.

In addition, the agency said it is considering the inclusion of sites where the environment may have been contaminated by releases of pesticides duly registered under and applied in accordance with the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA). Six Hawaiian sites included in EPA's proposed update may have been contaminated by low levels of pesticides used in pineapple fields.

PESTICIDES

Genetically Engineered Pesticides

EPA has announced the first steps toward regulating pesticides derived from genetic engineering. Companies which produce certain types of microbial pesticides will be required to notify the agency before they release such substances into the environment during small-scale field testing.

An EPA interim policy statement to be published in the *Federal Register* requires industry to give notice to EPA before starting small-scale field tests involving the use of certain microbial pesticides. These include pesticides which contain (1) naturally occurring micro-organisms that will be used in environments where they are not native (nonindigenous or exotic), and (2) micro-organisms which have been genetically altered or manipulated by humans (EPA has previously registered pesticides which contain naturally occurring micro-organisms). EPA has 90 days to evaluate the proposed testing, to determine if there is any potential risk to public health.

Linuron Review

EPA has initiated a special review of all pesticide products containing the active ingredient linuron after determining that both dietary and workplace exposure to this herbicide may pose a hazard to public health.

The decision to review the substance is based on evidence that linuron causes tumors in laboratory animals.

EPA's special review of products containing linuron is designed to determine whether registration of these products should be permitted to continue and, if so, under what conditions. During the review process, EPA will examine the risks and benefits of using linuron products to determine an appropriate regulatory response.

Linuron, a broadleaf weed control herbicide, is used mainly on soybeans, but is also registered for use on carrots, celery, asparagus, corn, cotton, parsnips, potatoes, sorghum, and winter wheat. It is used as well on golf courses, sod fields, fencerows, highway

rights-of-way, streets, alleys, and vacant lots.

To reduce the risks associated with linuron during the review process, EPA has limited its application to "restricted use." This means that only certified applicators trained in and familiar with safe pesticide uses, or persons under their direct supervision, may use the product. In addition, label changes will require protective clothing for those applying the pesticide and provide a warning statement regarding the potential oncogenic (tumor causing) effects of linuron.

TOXICS

Virginia Asbestos Penalty

EPA has announced a proposed $14,600 penalty against the Arlington County, Va., public school system for federal asbestos rule violations. Arlington County is a suburb of Washington, D.C.

The administrative civil complaint was issued under the authority of the Toxic Substances Control Act (TSCA).

The complaint against the Arlington County Public Schools alleges that the system failed to (1) complete and maintain the required inspection forms at its central administrative office; and (2) post the required public notice and keep required inspection and notification records at three schools. There are 33 other schools in the Arlington system that EPA has not been able to inspect yet.

WATER

Acid Rain Lakes Research

EPA has begun, with the cooperation of the states, a large scale survey of lakes in several regions across the country so that scientists will have a better understanding of the type and number of lakes affected by acid rain in the U.S.

The sampling is the first part of a three-phase multi-year project called the National Surface Water Survey designed to measure the extent of acidic, low alkalinity and fishless lakes and streams.

More than 1,800 lakes will be sampled in the Northeast, Southeast, and the upper Midwest regions of the country. A preliminary survey of 50 lakes in the mountainous West will be conducted at the same time in preparation for a complete survey next year. The estimated cost of the lake survey is $6 million.

The National Surface Water Survey is designed to study a representative sample of lakes in "sensitive" areas of the United States. The results will provide essential information from which EPA can predict the number of lakes across the country which are now acidic, and those which are at risk.

EPA's effort is part of the National Acid Precipitation Assessment Program, a congressionally-mandated nationwide research effort that includes 12 federal agencies and hundreds of scientists working in universities, state governments, the private sector and federal and national laboratories. The program's role is to develop and improve on the objective scientific information base for use in decision-making by Congress, the Administration, and the public. □

Appointments at EPA

Richard H. Mays has been appointed Senior Enforcement Counsel in EPA's Office of Enforcement and Compliance Monitoring. He has held this position on an acting basis since March 1983.

From June 1982 to March 1983, Mays served as Special Assistant to the Enforcement Counsel and the Deputy General Counsel on issues related to EPA's enforcement program. During his first year and a half at the agency, he was an attorney, first in the Office of Hazardous Waste Enforcement and then in the Office of Legal and Enforcement Policy. Since joining EPA, he has received three cash awards for special and meritorious service.

From 1980 to 1981, Mays worked as Department Attorney for the Arkansas Department of Pollution Control and Ecology. Prior to that, he was in private practice as an attorney-at-law in Little Rock and El Dorado, Ark., for a period of almost 20 years.

Mays received his B.A. in philosophy from the University of Oklahoma in 1959. He completed his legal studies in 1961 at the University of Arkansas.

A member of the Arkansas bar, Mays served on two occasions as a Special Justice of the Arkansas Supreme Court by Gubernatorial appointment. In addition, he was a member of the school board and Vice President of the Arkansas Constitutional Convention.

Lee A. DeHihns, III, has been appointed EPA's Associate General Counsel for Grants, Contracts and General Law. He has been Acting Associate General Counsel in that division of the Office of General Counsel since November 1982.

DeHihns has been with EPA since June 1974, the month after he received a J.D. from the Columbus School of Law at Catholic University. DeHihns began his EPA career as an area specialist in the office of then-Administrator Russell E. Train. Shortly after his arrival at EPA, DeHihns was appointed special assistant to then-Deputy Administrator John R. Quarles, Jr., for whom he worked until May 1975. From 1975 to 1978, DeHihns worked as Attorney-Advisor in the Water Division of EPA's Office of General Counsel.

In October 1978, DeHihns moved into the Grants, Contracts and General Law Division as an Attorney-Advisor. In March 1981 he was named to the post of Acting Assistant General Counsel for Grants; he assumed that position on a permanent basis in May 1982.

DeHihns' EPA career has been distinguished by several awards for meritorious service. Twice—once in 1983 and once in 1980—he has won EPA's Bronze Medal, and twice in 1982 he was selected for special achievement awards.

DeHihns completed his undergraduate education at the University of Scranton, where he majored in history and received his bachelor of science degree in 1967. Before beginning law school in 1970, he worked for the Raymond Corporation in Greene, N.Y. From 1970 to 1973, DeHihns worked as an adjudicator in the Claims Division of the U.S. General Accounting Office. He worked as a law clerk in the Superior Court Division of the U.S. Attorney's Office from 1973 to 1974. □

Steve Delaney

Out for a stroll in the Atlantic Ocean surf.

Back cover: Fishing pier at Ocean City, New Jersey. Photo by E.C. Johnson, Folio.

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