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Progress and the New Decade

What is the state of the Nation's environment? How much improvement can we expect from current cleanup efforts? This issue of EPA Journal seeks answers to these questions in interviews, articles, and reports.

One of the main articles gives the views of more than 30 prominent national leaders in various sectors of American society about how the environment will fare in the new decade.

EPA Administrator Douglas M. Costle gives his own forecast of what lies ahead in the 1980's and reviews in an interview upcoming problems and progress.

This year marks the 10th anniversary of a national effort to protect the environment. Plans are being made now to celebrate on April 22 the anniversary of Earth Day, to forge a new commitment to environmental goals for the 1980's.

Conservation organizations also have named 1980 as the "Year of the Coast." This designation has been endorsed by the President, who has proposed new steps to help provide special protection for our threatened coastal areas.

The year is also the 10th anniversary year of EPA which was established by a Presidential executive order on Dec. 2, 1970.

The events centering around these anniversaries and designations will be reported by EPA Journal, which, incidentally, marks its fifth anniversary this month.

Some of the other articles in the current Journal include:

- A warning by EPA Deputy Administrator Barbara Blum that one of the main challenges ahead will be to keep technology as a servant of humanity rather than a ruler.
- Some examples of the progress made so far in curbing the pollutants which endanger the water, air, and land on which we and all living things depend. These examples include the Great Lakes and a number of smaller rivers and creeks around the country. Starting next month, the EPA Journal will begin a series of articles on progress and problems in curbing pollution in some of America's better known rivers.
- Pollution control agreements EPA has reached with nine major steel companies who are spending hundreds

of millions of dollars to reduce pollution.

● A report by Florida Gov. Bob Graham on the environment at a State level.

● A review by Dr. M. K. Tolba, executive director of the United Nations Environment Program, on challenges at the international level.

● A summary of cleanup progress in developed countries in the Western World by J. W. MacNeill, director of the Environment Directorate, Organization for Economic Cooperation and Development.

● A brief review of a new film developed by Charles M. Schulz, creator of the Peanuts family. The cartoon film shows how improving the environment can make a difference.

EPA JOURNAL

Douglas M. Costle, Administrator
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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 focused on air and water quality, solid waste management and the control of toxic substances, pesticides, noise and radiation, 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: Wintry sun breaks through the clouds over Lake Erie. The city on the shore in the background is Cleveland. (See story on P. 16.)

Opposite: Pigpen, of the Peanuts characters, carries an environmental message.

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*Documerica

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Progress and Challenges

An Interview with
Douglas M. Costle
EPA Administrator

Are the Nation's pollution control efforts paying off in better quality water?

Since 1972, Congress has given EPA authority to spend about \$28 billion for the construction of wastewater treatment plants. In addition, since 1972, because of requirements imposed by the Federal Government, private industry has invested another \$12 billion in capital facilities to control water pollution.

On July 1, 1977, about 40 percent of all major municipal discharges had received secondary treatment; and about 80 percent of all major industrial discharges were using the "best practical" technology.

In most cities where the data go back far enough, waterway analyses show definite improvement. For example, a study of coliform levels in 24 such cities between 1968 and 1976 showed higher levels in only four, no change in two, and lower levels in 18. Fecal coliform bacteria are a widely-used measure of pollution in sewage.

And throughout the 50 States we have instance after instance of clear-cut improvements in water quality—some of them dramatic. EPA has more than 70 examples of such clean-ups in waters, large and small, from Hawaii to Maine, and from Alaska to Texas. They prove the success of our clean-up efforts in areas where these efforts have been carefully monitored for a sufficient period of time.

Moreover, this success is only a small indication of the further improvement we can expect as more treatment plants come on line. I mentioned earlier that Congress has given EPA the authority to spend \$28 billion for construction grants. That sum sounds huge enough to produce definite statistical improvement, no matter how rudimentary our monitoring efforts are.

It will be huge enough once that money actually goes to work. As of March, 1979, EPA had actually written checks for \$20.7 billion, covering the Federal share of 15,858 projects. But only 5,276 of those proj-

ects, costing \$1.7 billion in EPA funds, have been completed. Another 10,582, representing \$19 billion, are in progress.

The completed projects tend to be the smaller, more readily completed ones—those with a much smaller impact on national water-quality data than those now under construction. For every Federal dollar that is already at work cleaning up our water, another eleven dollars have been invested in the construction of plants that have yet to process a single ounce of wastewater. As those plants come on line, we will start to see a dramatic acceleration in the rate of clean-up.

Our water clean-up effort has not yet had time to demonstrate its full impact.

Is there comparable progress in air quality?

Dirt and smoke are down by 8 percent, sulfur dioxide by 17 percent, and carbon monoxide by 35 percent since 1972. The air is, in fact, healthier. There's no question about it.

The dilemma continues to be the automobile. There, carbon monoxide is down; ozone is stable. But progress is much slower because we're imposing these controls when there is a 30 percent increase in vehicle miles traveled.

You almost have to go back and say where would we have been if we hadn't taken auto cleanup steps. There is also a delay because only so much of the auto fleet turns over each year.

And as we gradually get more and more catalyst-equipped vehicles on the road and prolong the catalysts' lifetime with unleaded gasoline, you begin to see that gradual glide path toward significant pollution reduction. And, of course, we've got some problems in that area too—not the least of which is the problem of continued operation and maintenance of catalyst-equipped cars.

On the basis of air quality data, 21 States need auto inspection and maintenance programs to help improve the quality of their air. Practically all of these States are moving

to begin inspection and maintenance programs.

In short, on the conventional pollutants that we set out to deal with, very real headway has been made. There are very few social problems we can point to where there's so much tangible progress in as short a period of time as in the area of environmental protection. The progress is shown in a recent compendium of success stories compiled by EPA.

Are new pollution problems appearing as old ones are being solved?

We've gotten insight over the last five years into a whole new generation of environmental problems. That new generation of problems I suspect can be loosely summarized as the legacy of the chemical age, showing up as hazardous wastes and as chemicals in our daily lives. They can cause genetic alteration, neurological damage, fertility loss—the subtle, degenerative kinds of effects that come from long-term exposure to fairly low levels of certain kinds of contaminants.

In facing these problems we are on the cutting edge of science—discovering problems, trying to understand the mechanisms, and learning the effects upon the body. We are also trying to comprehend the regulatory implications as we move to reduce overall risk of exposure.

It takes sophisticated approaches to deal with these problems, but we're beginning to do what has to be done. We've got a consent decree in Federal court to begin to reduce human exposure to certain high priority toxins in water. The hazardous waste management program is on the drawing board. We will begin to put that in operation sequentially over the next two years, and it will eventually get us to a point where we're managing hazardous wastes effectively. It's an enormously complicated challenge. We've got the promise of the Toxic Substances Control Act which will allow us to intercede before a chemical is



introduced into the market place. We plan to put out our first chemical testing notices very soon. We're also focusing on hazardous wastes and toxic substances in air.

How do you compare the job of cleaning up the environment to other national tasks?

I can't think of any other social problem that the Nation is wrestling with that is as pervasive as the environmental problem, or that has required such a fundamental change in behavior—corporate and personal behavior in this country—in a relatively short period of time.

You know, the environmental protection laws that we administer and enforce are controversial. And we're dealing with a very complicated economy in which environmental protection

has a role. We're fortunate that we can now look back on the efforts of the Agency over ten years, and say, oh, yes, we've accomplished something. We've got a long ways to go and we're going to be in business for a long time. But we're on our way.

Environmental cleanup may have first seemed simple. How did it turn out to be so complicated?

I can remember that the minute we peeled back the conventional pollutants, the BOD's (oxygen-consuming pollutants) and suspended solids, we began to find other stuff we didn't know was there. And it's also been true that within the last ten years we've developed more

sensitive measuring and analytical techniques, and the health scientists are beginning to identify potential problems that are associated with lower levels of contaminants.

We have been through a chemical revolution in which we've devised countless thousands of exotic chemicals to do things for us, and they have been a very important part of our growth and economic well-being over the last 20 years. But we haven't yet asked all the questions in terms of the residues, the legacies. Of course, not all chemicals cause cancer. We're finding that, of those tested, perhaps less than 10 percent actually can cause cancer.

So what we're learning is essentially that we're dealing with residuals in society that have to be managed very carefully.

What would you rank as the biggest success in environmental protection in the last year?

I'd rather do it in a two-year perspective and note several accomplishments. We're beginning now to see the payoff in cleaner water and cleaner air. We have proven ourselves a competent, professional Agency, dedicated to our mission, with a professional ability that's been tempered by being in the center of controversy.

As an Agency, we are far better able now than we were ten years ago to handle in a competent way anything that comes up and we're producing regulation that meets three critical tests: It's reasonable, it's fair, and most of all, it's

effective. If regulation fails on any of those three, it's not good regulation.

For an example of sound regulation, take the quality of the analysis that went into the establishment of new source performance standards for coal-fired power plants: the balancing that we did of concerns about energy, economics, and the environment, the fairness with which the options and the data were reviewed, the openness of the process within the government for doing that. I think this is a good example of the Agency knowing how to do its business well. These standards will help us use coal cleanly in this country at a time when we have to reduce our dependence on foreign oil for national security purposes.

The whole approach of how EPA does its business is different than what you find generally throughout the Government. I think that is a very healthy thing. I am very proud of EPA and the way the Agency has grown into the very big shoes that it was given by the Congress to fill. We are considered leaders among Government agencies.

What major problems do you see unsolved?

Very broadly speaking, we've got to finish the job we started in the area of conventional pollutants. We're close to 90 percent compliance with the first requirements of the Clean Air and Water Acts. The 10 remaining percent of sources would tend to represent upwards of 30 to 40 percent of the environmental problem.

As I pointed out, the wastewater treatment construction program is just poised on the verge of major accomplishment. It comes at a time when some of the glamour has gone out of that program. The questions are harder, and the questioning is intensifying. We've got to maintain or sustain Congressional commitment to this program.

As I said, in the future the real challenge is going to be

understanding sophisticated chemical pollution and dealing effectively with it. For example, one of the most damaging environmental legacies that we may find ourselves with in the year 2000 is that we have contaminated enormous amounts of our groundwater. We were always worrying about drinking water from surface streams and everybody just sort of assumed that groundwater would be safe. Unfortunately, when we go out and sample groundwater now, we're finding what we're looking for. We're finding contamination because of our past disposal practices.

We're going to have to be technologically equipped to protect that groundwater. We're going to need it. It's going to be impractical to quarantine it. And I think we're going to have to develop techniques to clean it for use. These groundwater management steps are going to

“There are very few social problems we can point to where there's so much tangible progress in as short a period of time as in the area of environmental protection.”

occur at a time when our need for water increases dramatically.

Do you think the environmental movement is flexible enough to deal with emerging problems like this, and the energy crisis?

Movements that have as much intellectual vitality as the environmental movement will also be evolutionary. History teaches us that movements that don't evolve, die. And I think there's too much intellectual vitality in environmental principles for the movement not to evolve.

Do you think these environmental solutions can be integrated with our energy and economic goals?

Oh, yes, there's little doubt in my mind about that. In an age of confrontation, in an era of so many special interest groups, you tend to look for the irresolvable confrontations and use that to characterize the whole body politic. But the fact is that we're finding ways to have both environmental protection and energy development. Coal is an example of this. We can burn coal cleanly at this point. It's not a problem of technology and, as oil prices have gone up, it's proving not to be a question of cost either.

We're finding out that the cost of not managing environmental residuals soundly can turn out to be much worse than the cost of control.

Take, for example, the well-known case of the Love Canal in Niagara Falls, New York. So far, New York State has spent \$23 million on cleaning up Love Canal. That expense includes evacuating 239 families, purchasing their homes, performing medical tests on the former residents, installing drainage pipes, and paying personnel costs for a task force of State employees. Claims against the chemical company are reported to exceed \$2 billion. Even these dollar-sums exclude costs which we have no way of measuring: the life-long agony, for

example, to one girl born with a cleft palate, an extra row of teeth, and slight mental retardation.

Perhaps the most appalling fact of all is this: had the proper government regulation been in force at the time, it would have cost Hooker Chemical a maximum of \$4 million—that's in current, 1979 dollars—to find, construct, and seal a secure hazardous waste facility. Instead, the public has already spent \$23 million . . . and the ultimate cost to former Love Canal residents and to the company is beyond credible calculation.

Early in 1979, a trucker and his two sons were convicted in Raleigh of dumping PCB's along roadsides in North Carolina. Handling that waste properly would have cost about \$100,000. Unless a simpler, equally safe method can be devised, that contaminated soil will have to be dug up and shipped to a secure site . . . at a cost of \$2 to \$12 million.

Similarly, an investment of about \$200,000 at the Life Sciences plant in Hopewell, Virginia, would have made it safe for the production of Kepone. The owners' failure to make that expenditure led to the contamination of workers, the Hopewell water-treatment system, and the James River. To date, known judgments against Life Sciences total \$12 million; damages awarded workers claiming nerve damage and sterility are unknown, because some are still pending and others have been settled out of court. EPA estimates that it would cost \$8 billion to clean up the James . . . if that can be done, ever.

Each of these examples—and I could cite a dozen others—presents us with a case in which enormous social costs stemmed from the lack of environmental regulation, or from the violation of laws that were in effect. And these cost comparisons do not even include the costs of the damages—the damages that have actually occurred to life, health, and property—that occurred because we were penny-wise. We

either pay now or pay later. It's very clear that if we choose to pay later it's going to be a much higher price. It's smart if we just think of it in terms of managing our own household budgets.

Today if you look at the costs of regulations, you must also look at the offsetting benefits. I think pretty clearly the benefits outweigh the costs.

How would you rate our country, compared to others, in terms of environmental costs? Are we ahead in some areas, behind in others?

We generally started out ahead. We started out aggressively. Congress enacted tough laws. We've got a bigger problem than other countries, in that we have such a large economy with such a diverse technological base.

But other countries are moving up very rapidly in pollution control. Germany, for example, has a very sophisticated program of hazardous waste management. It's a smaller country. It's a more manageable system in that respect. Or if you put it another way, the problem more readily submits to management than it does in this country, where you're dealing with 270,000 generators of waste, 10,000 transporters, and 30,000 disposal sites.

In air pollution and water pollution, other countries, other industrial nations are beginning to catch up. The entire industrial world has awakened in a short decade to the fact that there's a common problem. There is increasing awareness that we're dealing with a global commons.

For the same reasons environmentalism has had intellectual drawing power in this country, it has had drawing power worldwide. I recently went to Geneva to the first international convention on controlling trans-boundary air pollution. About 10 years ago I would have been laughed out of any major capital. Today, nobody's laughing about it. I

delivered, among other things, comments on recent National Academy of Science findings that the rate of ozone depletion is twice what we thought it was. And I think in the international community we've got to get moving in terms of reducing that rate. We see increasingly an international concern about the impact of national actions and we need to find international agreements for the reduction of pollution.

We have been very aggressive in the last two years, trying to share with other chemical producing nations what we're now finding in our own country in terms of chemical agents. Nine countries in the last two years adopted approaches similar or analogous to our Toxic Substances Control Act. The United States seems to be a leader, but other countries are quicker to react now than they were 10 years ago.

Public support has been crucial in environmental projects, of course. Do you feel that public attitudes are beginning to change towards the environmental situation?

I think that you get a mixed picture. As a new crisis emerges, like energy, there is some fluctuation at the polls. But I think, by and large, all polls that I've seen show remarkable staying power for this issue.

And when you break the polls down demographically, you see the strongest and the most intense concern about these issues among younger people. And you find school-children today are far more sensitive to environmental issues than we were when we were going to school.

The environment has proved to be a good teaching device as well. The teachers in school systems have adopted as part of their curriculum the notion of environmental management, stewardship, the interconnectedness of things, and the children readily pick up this idea.

The sense of environmental stewardship will become an even more powerful idea as time goes on.



Environmental Prediction

Administrator Costle was asked how the environmental cause will fare in the 1980's. Mr. Costle's answer follows:

"The environmental 'cause' will fare well, in that such ecological concepts as carrying capacity and the interdependence of life-forms will penetrate much more deeply into our common intellectual understanding than they already have. Ultimately, as a new generation schooled in environmental concern moves into middle-age and begins running industry and government, such ideas will be taken almost as much for granted as the concept of gravity.

"The environment itself—the tangible thing, as distinct from our thinking about it—may have a rougher time. It's one thing to discover a problem, and another to act on it. Effective action can trail discovery by many years, and the impact of that action can be delayed an even longer time... especially when interna-

tional action is required. The whole world is playing environmental catch-up, and we cannot reverse such phenomena as acid rains and CO₂ buildup for years or even decades after we've agreed to go to work on them. Population growth is another example of this lag between decision and impact.

"My hunch is that the two biggest environmental problems for the U.S. during the 1980's will be the legacy of the chemical revolution in the form of hazardous wastes, and soil loss caused both by the conversion of prime agricultural land to urban use and by short-sighted management practices. The biggest pluses will be our discovery that we can solve seemingly intractable environmental problems, and a boom in solar development that will surprise even its most enthusiastic advocates."

(In another story in this issue, beginning on page 26, other leaders respond to the same question.)

The public will always ask questions about whether we're managing these issues competently or not. Are there tradeoffs to be made? Are they being handled well?

And it's doubtful this agency will ever be non-controversial. You expect public debate and, as a result of this debate, some day-to-day fluctuation in the polls.

But what you look at is the underlying trend, and those underlying trends have been very solid, not diminishing.

What does environmental protection need more of? Regulation? Money? New laws?

The most important thing is public education. People live in an age in which we generate more data, more studies, more information every day. Our capacity as a society to assimilate that, and the capacity of our institutions to act on that, lags behind our actual knowledge. It's a challenge for effective, responsive government.

You said earlier that, as far as water pollution goes, industry seems to get its part of the job done quicker than cities. Would you say that is true overall in environmental improvement?

Cities are public entities. They have to deal with State legislatures, finance boards, referenda by voters—so it's a more ponderous decision-making process than for most corporations. For this reason I think private industry has been better able to marshal its capital and its resources to do a task than a political organism like government.

As Chairman of the President's Regulatory Council and Administrator of a major regulatory agency, what potential and priority do you see in regulatory reform?

President Carter recognized both the benefits and shortcomings of Federal regulation in a message to the Congress last

April. Much of it, he said, "is vitally important to modern society. Goals such as equal opportunity, a healthy environment, a safe workplace, and a competitive and truthful marketplace cannot be achieved through market forces alone."

Further on in the same message, however, he said that the overall regulatory system has become "burdensome and unwieldy."

"Our society's resources are vast," he continued, "but they are not infinite. Americans are willing to spend a fair share of these resources to achieve social goals through regulation. Their support falls away, however, when they see needless rules, excessive costs, and duplicative paperwork. If we are to continue our progress we must ensure that regulation gives Americans their money's worth."

Regulatory reform measures are already showing results.

Can you give some examples?

Among the specific improvements that might be cited are these:

- Airline deregulation saved travelers \$2.5 billion in the first year alone; reduced fares attracted more customers and boosted airline profits. (Though it hasn't happened yet, deregulation of trucking will save \$5 billion a year.)

In the future the real challenge is going to be understanding sophisticated chemical pollution.

- EPA regulations lowering the level of water-pollution control on hundreds of industries that do not discharge toxic pollutants will save about \$200 million in control costs—with no loss in water quality. Our "bubble" policy, which allows plant managers to choose the most economical control strategy for air emissions, will permit major savings.

- According to Labor Department estimates, the cotton-dust standard adopted by this Administration has a capital cost \$2.1 billion below the original Ford Administration proposal. As a result of intensive analysis by OSHA and the President's Regulatory Analysis Review Group, the cost of a regulation to control acrylonitrile—a chemical used to produce resin, rubber, and other products—was reduced by \$100 million below the original proposal.

Elimination of unnecessary regulation and reduction of paperwork has also resulted from the President's reforms:

- The Occupational Safety and Health Administration has cut 1,000 standards that did not contribute to worker safety, and exempted 40,000 low-risk businesses from annual reporting requirements.
- EPA has speeded up the average processing time for rural water-treatment applications by more than a year—saving local governments several hundred million dollars annually.
- HEW has reduced the reporting burden associated with its education programs by an estimated 274,000 hours annually—by omitting superfluous data, combining forms, and reducing the number of people required to fill them out.

Finally, by making regulation easier to understand, Federal agencies believe they can encourage voluntary compliance and reduce the need for enforcement.

In all these ways, the reforms mandated by the President are saving billions of

dollars, millions of hours, and heaven only knows how many ulcers. But because regulatory programs are created by Congress, comprehensive, permanent reform requires new legislation approved by Congress.

Hence the President has submitted a proposal known as the Regulation Reform Act of 1979. In addition to making permanent the improvements already initiated by the President within the Executive Branch, it would extend them to the independent agencies.

What is the heart of this proposed legislation?

Simply stated, President Carter's reforms emphasize three main goals: to get rid of bad regulations, to save the good, and to improve Federal management of the regulatory process. This is an important goal, and a worthwhile one. Precisely because it is so popular, however, we can oversimplify the complexity of regulatory reform and demand hasty action where thoughtful analysis is needed.

We have to sort out our rules, not throw them out. We must safeguard vital social goals, and President Carter's reforms do not retreat from any of them.

But we must also get rid of rules that needlessly discriminate between gerbil food and parrot food, between crosswise logs and lengthwise logs; we must restore competition to healthy, mature industries that do not need those regulations passed in a time of monopoly 75 or 100 years ago; we must enable American business to devote its energies to production—not of forms and data, but of goods, services, jobs, and national economic health; and we must make American government use its delegated powers with efficiency as well as compassion. □

This interview was conducted by Charles Pierce, Editor; Truman Temple, Associate Editor; John Heritage, Assistant Editor; and Chris Perham, Assistant Editor, all of EPA Journal.

A New Technology

By Barbara Blum

Will technology—the commercial and industrial application of America's scientific achievements—be the servant of humanity or its ruler?

This is a major question before scientists, executives, legislators, and the American people, as the year 2000 approaches. The answer is critical, affecting not only our national well-being, but the quality of our lives and the future of the fragile world around us.

There are signs that the Nation is moving in the right direction.

Contaminated inland waters are clearing up, so much so that fish and waterfowl are beginning to return.



National air pollution levels are coming down—dirt and smoke by 8 percent, sulfur dioxide by 17 percent, and carbon monoxide by 35 percent since 1972. Even city smog levels have remained fairly constant, despite a 30 percent increase in the number of miles motorists travel.

Opinion polls document public confidence in the ability of science, properly applied, to help improve the human condition. At the same time, they document strong support for pollution controls. Energy and inflation, to be sure, are top public concerns, according to current polls. But over the last 10 years, as an article in a recent issue of *Public Opinion* points out, people consistently have judged pollution to be a very serious problem.

Health, safety, and environmental departments have been added to the corporate hierarchy. Companies are investing more than \$7 billion a year in pollution control equipment; saving lives, the environment, and more. By redesigning a production process, the 3M Corporation, for example, is eliminating 73,000 tons of air pollutants and 500 million gallons of polluted waste water annually. Savings in terms of the company's operating costs total \$11 million. Pollution control systems now being used at some pulp and paper mills have resulted in significant savings of wood fiber and energy. Incinerators at a John Deere plant burn solid waste to generate steam heat for the factory. It is an environmentally-sound, energy-conscious approach. It is also saving the company about \$2,000 a day.

Yet as we stand in the shadows cast by Pennsylvania's Three-Mile Island and dozens of other disasters or near-disasters, it is clear that America still is plagued by the tragic consequences of its own ingenuity.

Perhaps nowhere has the dark side of technological advances come into sharper public focus than with toxic chemicals.

Insecticides, herbicides, food additives and preservatives, and other commercial chemicals by the tens of thousands may bring unspoiled food, wonder drugs, and millions of common products to every household and workplace. But they also, as Americans were shocked to learn in recent years, can bombard the environment with substances that may cause cancer, birth defects, nerve damage, reproductive disorders, and other adverse health effects.

Is nothing safe any more, people ask? Is this the price we must pay for living in a highly industrialized society? Are we victims of over-dramatization by the media? Industrial conspiracies? Regulatory overkill or underkill?

Definitive answers have been slow in coming, slower than some of us would have liked.

Still, EPA and other agencies have begun the long, difficult journey to find the answers, especially for those substances that clearly pose the most serious health and environmental hazards.

A major step in this journey was taken recently when, for the first time, the six Federal agencies that regulate cancer-causing chemicals agreed on a uniform policy for controlling these substances. This kind of inter-agency cooperation is what President Carter's call for regulatory reform is all about. This new policy means that agencies, such as EPA, OSHA, FDA, and others, will work together in a coherent, unified fashion to protect the public from carcinogenic chemicals on the job, in the environment, in food, drugs, and other consumer products.

Some progress already has been made.

Well-known chemicals such as PCB's, DDT, and fluorocarbons are being removed from the environment, and action is underway on many others less familiar but equally troublesome. State and Federal agencies—principally EPA—are working on several fronts to protect school children from exposure to asbestos in the classroom. EPA is regulating the safe use of pesticides and encouraging development of practical alternatives. The Agency is setting limits on toxic chemicals in the air and water and requiring industry to take precautionary steps before chemical wastes are discharged into municipal sewer systems.

But it is the newest Federal law governing toxics that best expresses the public's hope for the future. Under the law, EPA is moving to screen new chemical substances for possible hazards before they are manufactured. It is a big step forward, acknowledging—for the first time and in a major way—that the job before the Nation is to prevent tragedies from happening in the first place.

We are asked not only to stop environmental damage already done, but to anticipate problems and to act on them up front.

We are asked to acknowledge that the way products are designed, manufactured, sold, and disposed, bears fundamentally on the integrity of ecological systems upon which we depend for life itself.

And we are asked to recognize that it serves not only the public interest but industry's own economic interest to build the pollution controls and to market safer products.

The point is this: It's wiser and cheaper for a company to take effective action early on than to be the target of regulation, the defendant in product liability suits, or to

mount expensive recall campaigns and endure the sales-wrecking publicity and loss of consumer confidence. If we don't move in this direction, everybody stands to lose.

The challenge—and the opportunity, as I see it—is to reverse the years of environmental neglect and mismanagement. But government alone cannot do the job.

In corporate boardrooms, we must hammer out a new technological morality, one which demands that economic progress and public health go hand in hand.

- As a Nation we must ask, in a vigorous and systematic way, what human needs are served by every technological advance and if the benefits outweigh the risks.
- We must rethink and redirect technology, making certain that progress serves a decent human end.
- We must insist that products are as safe as possible before they reach the retailers' shelves and consumers' hands.
- We must anticipate the dangers of complex technologies, building in safeguards so that the potential for harm to human health is minimized.
- Finally, we must continuously re-examine issues like these long after new technology has been put into place.

Not all of the evidence to confirm or refute our worst fears is in. But it seems to me that we know enough to know the odds are against complacency or reluctance to act.

The longer we wait, the greater the risks, the fewer the choices. □

Barbara Blum is Deputy Administrator of the EPA. These comments are excerpted from her Oct. 3, 1979, speech to Women in Governmental Relations, Inc., Washington, D.C.

The Global Environment

By Dr. M. K. Tolba

Although we live on only one Earth, our knowledge of the basic processes that underlie its global ecology is very limited. It is evident that multi-disciplinary scientific research involving international co-operation is absolutely necessary to bring forth data, analyses, and insights which could guide our policies.

For example, a better comprehension of the workings of biogeochemical cycles of carbon, nitrogen, sulfur, and other elements is essential if we are to understand ways in which resources of soil, vegetation, water, and atmosphere can be better utilized and their utility sustained.

People exert major influences on these cycles. The flow of carbon dioxide to the atmosphere is intensified through burning of fossil fuels, clearing of forests, and cultivation of land. The World Climate Conference held early in 1979 pointed out that as a consequence of such activities the amount of carbon dioxide in the atmosphere is increasing, probably about 4 percent every ten years. Should this trend accelerate, or even continue, a gradual warming of the lower atmosphere might occur, which could lead to serious changes

in temperature and rainfall patterns and hence have serious impacts on agriculture.

Chemical fertilizers are applied to increase agricultural production as part of the attempt to meet our food needs. Industrial production of nitrogen in fertilizers may eventually exceed the

quantities produced in nature, with potentially significant global effects. For example, nitrogen oxides, of which nitrogen fertilizers are one source, may be an important factor affecting the stability of the stratospheric ozone layer. Yet the rates of production, transfer, and destruction of nitrogen oxides on the global scale are at present known only in broad outline.

Further complicating the task of meeting even minimum nutritional needs is the fact that the resource base in the regions where the need for augmenting food production is most urgent, namely Asia, the Middle East, and Africa, is being eroded by desertification, soil erosion, salinization, deforestation, and simply by the pressures of expanding populations.

The rates at which tropical forests are being depleted are rapidly accelerating, with ominous and far-reaching consequences. The effects of clear-cutting in mountain areas are equally severe, especially in the Himalayas, the Andes, and the East African Highlands. There is, for example, a report of a large island, about 50,000 square kilometers in area, being formed in the Indian Ocean as a result of



Physician checks a resident of Ghana for signs of an ocular disease carried by flies that can lead to blindness.

soils washed away from the Himalayan slopes and watersheds.

In South Asia, Southeast Asia, and the South Pacific, forests are being depleted at a rate of 2 percent per year. In certain areas such as Malaysia, Nepal, and Thailand, there are even some indications that if present logging, farming, and other practices continue, "closed forests," those in which the canopy of trees covers 20 percent or more of the ground, could virtually disappear within the next 25 years. The environmental consequences of such large-scale destruction of tropi-

cal forests in terms of erosion, salinization, desertification, flooding, waterlogging, silting up of reservoirs and streams, clogging up of irrigation networks, and unfavorable changes in local micro-climatic patterns are bound to be very grievous. Next month, UNEP, in cooperation with the Food and Agriculture Organization, UNESCO, and other interested organizations, will convene an international meeting in Libreville, Gabon, to examine in depth the urgent question of

conservation and wise utilization of tropical forests.

Loss of arable land is another escalating environmental problem. Nearly 44 percent of the land resources of Africa, and 43 percent of those in South Asia, are subject to drought. Moreover, 47 percent of the soil resources in South America and 59 percent in Southeast Asia are subject to nutritional deficiencies or the impact of toxic substances.

Barely 15 to 18 percent of the soils in South America, Africa, and Asia may be



Unprotected water supplies can endanger health. A medical team checks a young Egyptian patient for signs of schistosomiasis, an internal ailment carried by a snail that lives in sluggish water.

described as free of serious limitations for agricultural use. As much as 95 percent of the total land area in the arid and semi-arid zones, and nearly 35 percent of the world's total land area is subject to moderate-to-very high desertification risks.

These and other indications of danger are the result of dynamic and complex interactions among social, economic, and physical factors. In a given ecological and socio-economic setting, a process that seems eminently rational for adequate satisfaction of household needs can lead to devastating consequences when multiplied over extensive terrain over a long period of time.

Intensive cultivation of marginal lands, clearing of slopes for farming, and removal of tree cover near villages for fuelwood may be the only means of subsistence for individual families. But they can lead to disastrous consequences on a large scale. Moreover, there are trade-offs among development goals which must be carefully evaluated for their long-term effects: Abandonment of subsistence agriculture in favor of commercial mono-cropping to earn essential foreign exchange, substitution of a number of small scale projects in multi-purpose dams for large-scale irrigation and hydro-electric power generation, and depletion of cropland in the interest of industrial development.

The situation can still be remedied, however, if proper action is taken. Human alterations of nature have in many cases been for the better, and have even evolved pleasing, productive, and highly diversified ecosystems. Marshes have been drained; water has been channelled into artificial streams and lakes, barren lands have been converted into pastures and farmland, tree cover has been planted and cultured in extensive forestation schemes. In short whenever the transformation and adaptation have been based on scientific understanding of natural ecosystems and their evolution, the results have contributed to improving the human condition on a sustainable basis.

There are vast opportunities and still other improvements. Reliance on pesticides alone, in several areas, created serious environmental hazards, including the development of pesticide-resistant pests and vectors of malaria, and pollution of inland waters. Integrated pest management, on the other hand, has achieved great successes with several crops, with pesticides application cut by as much as 50 percent, for example in China, Nicaragua, Peru, and the United States.

There are also significant opportunities for increasing the availability of food through simple improvements in storage and transportation. In some countries, losses due to organic degradation, chemical contamination, and pests and rodents are reported to be as high as 20 percent. Such losses can and have been stopped. In China and Ghana, for example, notable successes have been reported, through the construction of simple environmentally sound silos, using local raw materials, mainly mud and straw.

Moreover, crop residues, animal wastes, and human wastes, can be transformed into sources of energy, manure, and other uses, a classic illustration of an integrated approach to environment and development. In the short space of 25 years, systematic conversion of rural wastes into organic fertilizer and bio-energy has enabled China to more than double its food production, and introduce and sustain economic growth in rural areas.

In the field of health, a relatively new problem is the possible contamination of human milk by chlorinated hydrocarbons on a global scale. No comprehensive, adequately controlled survey of levels of chlorinated hydrocarbons in mother's milk is available. However, there are some indications of elevated levels resulting in possible intakes by suckling children of amounts higher than those internationally regarded as acceptable. While it would be irresponsible to sound a premature alarm, we need to improve the data, broaden the coverage, and establish trends, so that a better assessment of levels can be made, while at the same time intensifying work on our understanding of the possible effects on children.

Another major area of environmental stress and opportunity today is industrialization. On the basis of aggregate projections of global environmental stresses and constraints, inferences have been drawn about slowing down of economic growth. But in the developing countries such a suggestion is not only meaningless, but can even be mischievous. Developing countries, excluding the centrally planned ones, will by 1990 barely account for 20 percent of gross world production though they will contain 57 percent of world population.

With the most optimistic projections of socio-economic development, the World Bank estimates that the extent of "absolute poverty" will still be about 600 million people by the year 2000. So there is no doubt that industrial development needs to accelerate significantly in the developing countries.

However, the urbanization which accompanies industrialization has led to severe environmental degradation. Today, about

250 million of the total of 840 million urban dwellers in developing countries lack reasonable access to minimal nutrition, safe water, basic sanitation, education, and shelter. Unless serious steps are taken to alter the present trends, by the year 2000, 600 million people will be living in these inhuman conditions in the developing countries.

There is no doubt that the entire world stands to benefit from a more rational mobilization and use of the world's physical and human resources. The developing countries need more purposeful and augmented development assistance to learn from past environmental mistakes of industrialized countries, and to realize the environmental opportunities that they have. Availability of environmentally prudent and developmentally satisfactory technology is not enough to improve the state of the Earth. In order that the dangers are kept at bay, and promising opportunities are actually made use of, economic and institutional reforms in international relations have to be brought into existence. If only a real relaxation of tension between the East and the West, and a genuine belief in interdependence between developed and developing countries, can be achieved, there will be a world of a change in the prospects for improving the quality of life everywhere. □

Dr. Tolba is Executive Director of the United Nations Environment Program. The remarks above are excerpted from an address by him to the Club of Rome Conference Oct. 3, 1979, in West Berlin.



steel cleanup

By Richard Wilson



Since June, 1977, EPA has reached agreements with nine major steel companies requiring hundreds of millions of dollars worth of pollution clean-up at their plants.

We concentrated on the steel companies because we found that they were among the worst industrial offenders against environmental protection laws. A tremendous number of steel companies were failing to comply with water and air pollution control rules, air particularly.

Using the leverage of the law, EPA has filed 77 suits against pollution at steel company plants. The suits have had a highly successful result: they have been a catalyst for negotiated settlements, including agreements reached with the first, fourth, and eighth largest steel producers in the country.

With these agreements the steel industry is taking the crucial step of including major spending for environmental protection in its long-term plans. Although only about 23 percent of the Nation's steel processing facilities are now in compliance with air pollution regulations, an additional 31 percent are on judicially enforceable schedules of compliance. These figures are up from 12 percent and 17 percent respectively, from July, 1978. This insures that pollution control will be a day-in, day-out part of the industry's affairs.

These agreements—some involving steel industry commitments to spend hundreds of millions of dollars for cleanup—have been approved by the Federal district courts in which the suits were filed. Several State environmental agencies have been asked to support the settlements.

Here are the highlights of the EPA agreements with the steel companies:

First, in what EPA described as the biggest environmental control agreement in steel industry history, U.S. Steel, the Nation's largest producer, agreed to bring nine of the company's western Pennsylvania plants into compliance with air and water pollution regulations between now and the end of 1982.

U.S. Steel will install new pollution control equipment at its plants in the Monongahela River Valley near Pittsburgh. It will build a new iron-making blast furnace and new coke-producing facilities in the Valley to replace a number of aging units and will rehabilitate other existing blast furnaces and coke batteries.

The agreement was reached by U.S. Steel, EPA, the U.S. Dept. of Justice, the

Commonwealth of Pennsylvania, and Allegheny County, Pa. This pact modifies a 1976 consent decree which covered U.S. Steel's coke-producing facilities at the Clairton Works.

The agreement covers approximately \$400 million of air and water pollution control projects including a number of control projects already under construction. The \$400 million of expenditures is in addition to more than \$200 million which U.S. Steel has already spent or committed to air and water quality projects in the Pittsburgh area, according to the company.

The agreement will result in nearly a 50 percent reduction in remaining particulate (dust material in the air) emissions in the Pittsburgh area. Overall, the agreement will result in a reduction of particulate emissions from the plants covered by approximately 22,000 tons per year. In improving water quality the decree will result in a 90 percent reduction in the discharge of remaining water pollutants from the plants covered, including suspended solids, phenols, cyanide, ammonia, and oil and grease.

Through earlier control programs, the company has already curtailed significant amounts of air and water pollutants at these facilities.

Second, the Agency and Republic Steel have announced a new cleanup agreement that will modernize outdated facilities and insure continued employment for thousands of steel workers in the Warren and Youngstown, Ohio, areas. The agreement will mean compliance by 1982 with all present clean air standards. (EPA Journal, Nov.-Dec., 1978)

Under the agreement, Republic will replace some steelmaking processes at the Warren and Youngstown plants as part of its modernization plan for the Mahoning Valley.

The major effect of this agreement will be considerable reduction in the amount of particulate pollution emitted by the Warren and Youngstown facilities. At present, these facilities emit approximately 2,700 tons per year of particulates. This agreement will cut these emissions by almost 50 percent to approximately 1,400 tons per year. Additional benefits relating to sulfur oxides control and water pollution control will also be achieved. The company estimates that its modernization plan will cost more than \$250 million by 1982.

The cleanup investments, and other modernization expenditures, are expected to significantly stabilize the Mahoning Valley area's economy. The steel industry directly accounts for about 14 percent of the Mahoning Valley's total employment.

The company will build a new electric arc furnace shop, a new sinter plant and a new hot metal desulfurization unit at Warren.

Republic will close the two existing coke batteries and the existing sinter plant at Warren and will close one coke battery and three blast furnaces at Youngstown. It will also stop the use of dirty water for quenching at both plants.

Coke plant wastewater—previously used for quenching—will be treated at a new facility to be built at Warren by the end of 1981. Republic will also control the release of particulate matter into the air from its blast furnaces at Warren.

Republic is the fourth largest steel producer in the United States with some 41,000 employees in 1977.

Third, EPA, Pennsylvania, West Virginia, Ohio, and the Wheeling-Pittsburgh Steel Corporation, the eighth largest U.S. steel producer, reached a major agreement on a program to bring the company into compliance with air and water pollution control regulations. The agreement, which covers all of the company's plants, will protect nearly 15,000 jobs in these three States. The agreement will mean compliance by all Wheeling-Pittsburgh plants between now and 1982 with all present clean air and water standards.

Under the agreement, Wheeling will considerably reduce its sulfur dioxide and particulate air pollution emissions by installing pollution control equipment and by upgrading existing coke batteries, sinter plants, boilers, blast furnaces, and basic oxygen furnaces.

To reduce water pollution, the company will construct wastewater treatment systems at all its facilities to fully control discharges of suspended solids, oil, grease, ammonia, cyanide, phenolic compounds, and a variety of metals. In addition, the company will improve water treatment facilities at its Martins Ferry, Ohio, and Beech Bottom, W. Va., plants. The Martins Ferry plant is also committed to improving its control of zinc discharges.

Wheeling estimates that it can comply with the air and water requirements of the agreement with expenditures of approximately \$84 million.

Fourth, EPA, the U.S. Dept. of Justice, Bethlehem Steel Corporation, and the Pennsylvania Dept. of Environmental Resources reached an agreement on a program to modernize the company's plant at Johnstown, Pa., and substantially reduce air pollution.

This consent decree assures that Bethlehem's Johnstown plant, which was severely damaged by a catastrophic flood in 1977, will be able to continue operation with modernized steelmaking operations. The decree will help maintain a good employment base in Johnstown, while substantially reducing air pollution.

The terms of the agreement, which calls for a major reduction in particulate (dust material) air pollution, must be met by the end of 1982.

The compliance plan calls for Bethlehem to install an electric furnace melt shop to replace the Johnstown's plant's existing coke oven battery, blast furnace, open hearth furnaces, and sinter plant. The furnace will cost Bethlehem approximately \$100 million.

Fifth, the Agency and Copperweld Steel Company reached agreement on a program to completely eliminate water pollution discharges from the firm's Warren, Ohio, plant.

Copperweld, headquartered in Pittsburgh, has agreed to totally eliminate discharges of oil, grease, and suspended solids (big particles of dirt that do not degrade in water) from its Warren plant into the Mahoning River by June 1, 1980.

Copperweld, which currently employs about 2,500 people, serves a nationwide market and is one of the largest specialty steel firms in the U.S. The company uses ingots to make hot rolled and cold finished alloy and carbon steel bars, which are used in construction and other applications.

To reach the zero discharge goal, Copperweld will dig a horse-shoe shaped lagoon, into which will be dumped all its pollutants. The solid pollutants will settle at the bottom of the lagoon and the oil and grease will be skimmed off mechanically, leaving clear water on top. This clean water will then be pumped back to the plant for reuse. The lagoon will be dredged occasionally to get rid of excess accumulation of settled pollutants, and to renew its usefulness.

The company estimates that the cost of meeting the zero discharge water pollution requirement will be approximately \$1.8 million.

Sixth, EPA, the U.S. Justice Dept., and the State of Illinois reached agreement with the Wisconsin Steel Company on a program that will bring the company's southside Chicago plant into compliance with air and water pollution control regulations by 1982, and that will release Federal and private loans to help protect over 3,800 steelworker jobs.

Wisconsin Steel, headquartered in Chicago, is a middle-sized manufacturer, and in 1978 produced about half a million tons of steel and had sales of approximately \$250 million.

The terms of the agreement will result in an approximate 50 percent reduction in particulate (dust material) air pollution from the Chicago plant, and complete elimination of cyanide, oil, grease, ammonia, phenol compound, and suspended solid discharge into south Chicago's Calumet River. These water pollutants will

henceforth be discharged into a municipal sewage treatment plant.

Seventh, EPA and Crucible Steel Company signed an agreement to bring the firm's Midland, Pa., plant into compliance with air and water pollution control regulations.

The plant, located northwest of Pittsburgh, has agreed to install pollution control equipment and to adopt interim pollution-control measures, while simultaneously changing its steel-making process from its present heavily-polluting blast furnace and coke oven operation to the use of electric arc furnaces. The modernization and cleanup agreement, estimated to cost Crucible \$50 million in capital expenses, will mean compliance by the Midland plant with all present clean air and water standards between now and 1982.

The project will result in an approximate 75 percent reduction in sulfur dioxide and particulate emissions from the Midland, Pa., facility.

Eighth, the U.S. Steel Corp. agreed to spend approximately \$35 million to clean up its integrated steel works at Fairfield, Ala.

The settlement called for U.S. Steel to install additional pollution controls on:

- two existing basic oxygen process steel making vessels and on one new vessel;
- a new coke oven battery;
- one existing coke oven battery and one blast furnace.

The company agreed to close four coke oven batteries in conjunction with completion of the new facilities.

Ninth, CF&I Steel Corporation reached agreement with EPA and the Justice Department to meet a new set of stringent air pollution control requirements at its Pueblo, Colo., coke plant.

The agreement called for some particulate air pollution standards more stringent than any previously agreed to by any existing domestic coke plant. As a result, the company installed new control equipment. They also agreed to intensive controls on existing facilities through exemplary maintenance and operating practices.

EPA estimated that to comply with the terms of the settlement agreement, CF&I will spend nearly \$10.3 million at the Pueblo plant. Of this amount, \$8.5 million was to be used to install enclosed quench car pushing controls. (Pushing emissions occur when coke is discharged from a bank of ovens into special railway cars called quench cars.)

The settlement called for CF&I to achieve additional pollution controls at its coke plant for charging, oven door leaks, battery stacks, and topside emissions.

Tenth, National Steel Corp. agreed to take necessary steps to clean up water pollution caused by wastewater discharges at its Weirton, W.Va., facility.

The agreement—which comes in the form of a consent decree—resulted from negotiations among EPA, the U.S. Department of Justice and National Steel. Compliance with this agreement will result in improvement in the quality of the waters discharged by the company into Harmon Creek and the Ohio River.

The agreement established wastewater discharge limitations and called for the installation of approximately \$21.6 million worth of water pollution control equipment at the Weirton Steel Division. The equipment will be installed to meet best practicable control technology and water quality standards established under the Clean Water Act.

Eleventh, EPA, in conjunction with the U.S. Steel Corp., reached a settlement of two long-standing air and water pollution disputes at the Gary Works. Region 5 of EPA announced that consent decrees had

been entered in the U.S. District Court in Hammond that will end major discharges of cyanide, phenol, and ammonia into Lake Michigan by August 1, 1980.

U.S. Steel estimated that new water pollution control facilities would cost almost \$70 million and include the recycling of 65 million gallons per day of waste water.

Compliance with air pollution control requirements at U.S. Steel's Universal Atlas Cement Plant and Tin Mill Boiler House was expected to have a positive impact on air quality in the Gary, Ind., area. Stack tests taken by EPA in late October, 1976, indicated that emissions at the Cement Plant were approximately 409 pounds of particulate matter per hour. With compliance, particulate emissions were not expected to exceed 154.6 pounds per hour.

With the help of such agreements, substantial cleanup progress has already been achieved. The number of steelmaking furnaces, coke batteries, and other processes in compliance with air cleanup requirements nearly doubled from July, 1978, to September, 1979, from 60 to 113 at specific steel plants.

The processes in violation of air standards but on a compliance schedule also nearly doubled in the same period, from 84 to 156. The processes in violation and with no compliance schedule were reduced 33 percent, from 344 to 229.

Steel plants in compliance with water pollution requirements have increased six percent from July, 1978, to Sept., 1979, from 74 to 82. Plants in violation but on a compliance schedule have more than doubled, from 12 to 27. Plants in violation and with no compliance schedule have been reduced by almost two thirds, from 36 to 13.

The biggest problems have been and are meeting air pollution requirements. Nevertheless, substantial progress has been made in the air area, as shown by the 33 percent reduction in steel processes at individual plants in violation without a compliance schedule.

Although the agreements with the steel companies are significant progress, the job isn't finished. We hope there are changing attitudes among steelmakers which would bring the commitments needed to clean up the industry. □

Richard Wilson is EPA's Deputy Assistant Administrator for General Enforcement.

U.S. Steel Cutbacks

U.S. Steel Corp. recently announced cutbacks in steel mill operations in eight States, citing environmental cleanup requirements as one reason. EPA officials said the evidence "indicates that the U.S. Steel closures and layoffs are predominately based on economic, not environmental reasons."

The Agency officials pointed out that only two of the sixteen facilities U.S. Steel announced in late November it would close are violating current environmental requirements.

Meanwhile, support for continued pollution abatement efforts in industry was expressed in provisions of the AFL-CIO's executive council report approved by the labor group at its annual convention last November.

The executive council report said: "The balance struck between pollution abatement and maintenance of employment and economic growth, thus far, has been an equitable one. We shall continue to support such a balance in the implementation of existing and development of future programs."



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Charlie Brown and Clean Air

“Charlie Brown Clears the Air” is the title of a new film created by Charles M. Schulz, famed cartoonist and father of the Peanuts family. The film was produced by the American Lung Association under a grant from EPA.

In the six-and-a-half-minute film, Charlie and his friends show how air pollution affects people and emphasize that personal involvement in cleaning the air can make a differ-

ence. The final portion of the film, a 30-second excerpt with specific air pollution advice from Charlie Brown, was developed as a television spot and distributed last spring for Clean Air Week.

EPA and the American Lung Association are providing 500 copies of the film for local lung associations and EPA Regional Offices, where the films will be loaned free. In addition, the story, complete with pictures, has been reproduced in booklet form for distribution throughout the Nation. A teaching guide linked to the film has also been prepared to

accompany the booklet. Both will be available from the Lung Association and EPA Regional Offices.

Schulz, Lung Association National Christmas Seal chairman for 1979, was asked by the Association to develop an animated film in which Charlie Brown comes to the aid of a Nation besieged by air pollution. □



Toward a Cleaner Environment

How are we progressing in efforts to achieve a cleaner, healthier environment? To what extent have we succeeded in protecting public health and the environment from the pollutants that are byproducts of our highly technological society?

The following case histories are examples of what has been accomplished over the past decade in the nationwide effort to show that there is hope for a stressed and threatened environment. They also illustrate that while science and technology do not yet have all the answers, workable pollution controls do exist and can make a difference when they are used.

The list is not intended to catalog every pollution control accomplishment, however. The focus is on examples of water clean-up, although we do cite some examples of accomplishments in other program areas. The EPA Journal will report progress in air quality, solid waste control, and other areas in later issues.

Our report includes the status of pollution control in the Great Lakes, waste recycling in Hawaiian sugar mills, the return of the Atlantic salmon on the Penobscot River in Maine, the resurgence of aquatic life in the Savannah River, control of industrial pollution in the Mobile-Tombigbee River System in Alabama, an innovative pollution control approach in Muskegon County, Mich., action on the dumping of wastes in the Gulf of Mexico and the Atlantic Ocean, positive air cleanup results from a

vehicle inspection and maintenance program in Portland, Ore., cooperation in dealing with the hazards of methane gas in Denver, and safer controls over the tussock moth that damages Douglas fir forests in the Pacific Northwest.

While EPA has made enormous efforts over the past decade to improve environmental quality, in some of these cases EPA's role has primarily been to devise a strategy, to establish standards, or to help bring about a climate

in which others—State and local agencies, private corporations, the courts, citizen groups, and individual citizens—could take steps to improve the quality of the environment.

The examples in this list show how such a partnership can work for a better environment. Some recount triumphs of States and cities. Some are examples of outstanding accomplishments of individual citizens or of communities working together to deal with a common problem.

The list contains few unqualified successes. Hard-won gains are always subject to unexpected setbacks. The unresolved problems are many. And new ones are constantly being uncovered.

But while much remains to be done, these accomplishments, both large and small, offer evidence that with time and continued efforts, much more can be done to achieve a cleaner and more healthful environment.

The cases were prepared by EPA's Regional Offices and consolidated by the Office of Planning and Management in EPA headquarters.

Water pollution, emphasized in these cases, became serious and widespread with the tremendous industrial and population booms of the last one hundred years. The pollution rapidly worsened following World War II when use of man-made chemicals became more widespread. Industries and cities increasingly used rivers and lakes as dumping grounds for their wastes. By the mid-1960's water pollution in many areas had reached intolerable levels. These conditions led to the massive cleanup efforts in the 1970's. While many rivers and other waterways are still heavily polluted, cities and States around the country, usually with substantial assistance from EPA, are scoring significant gains in reversing the pollution tide. Here are some examples of what has been achieved:





The Great Lakes

The five Great Lakes—containing 65 trillion gallons of water and covering 95,000 square miles—are the world's largest reservoir of fresh water.

For more than a century many of the Midwest's largest and most successful cities and industries have depended on this water as a vital element in their growth. Billions of gallons of sewage and industrial and agricultural chemicals have

been discharged into these lakes because it was the most economic and convenient way to get rid of these wastes.

These discharges have prematurely aged some of the lakes, killed fish, and forced the closing of many bathing beaches.

While Lake Erie's condition became notorious, parts of

Lake Michigan and Lake Ontario also became seriously polluted. Most beaches on these lakes were closed. Millions of fish were killed. Although problems are less severe in Lake Superior and Lake Huron, even these bodies of water have some pollution problems.

In 1972, the United States and Canada signed an agreement to continue their joint

long-term attack on the sources of pollution. Updated in 1978, this agreement views the Great Lakes as an ecosystem of interacting components—water, land, air, and living organisms. It calls for control programs to protect this complex system by dealing more effectively with pollution from all sources including agricultural and other drainage wastes as well as

direct discharges from industrial and municipal pipelines.

In the most severely polluted lakes—Erie, Ontario, and Michigan—major pollution ills still exist, but progress is being made. A total of \$5 billion has been spent by EPA in the last decade to help clean up the Great Lakes. Additional billions of dollars have been spent by State and local governments and industries in the effort.

A 1978 survey of people who live and work along the lakes found that nearly all of them noted visual improvements in the lakes. At the same time, many shoreline property values are increasing rapidly. Recreation industries—sport fishing, boating, and vacation resorts—have been booming and several beaches long closed to swimmers have been reopened.

The prognosis for the Great Lakes then is cautiously optimistic. Here are some specifics:

Lake Michigan. This lake's industrial pollution created public alarm 10 years ago. A *Chicago Tribune* reporter's hand dunked into the Calumet River, a Lake Michigan tributary, emerged pitch black—and the photograph was sent around the world.

EPA conducted intensive water quality studies on Lake Michigan during 1976-77. Trends were developed by comparing results of that study with a 1962-63 study by the U.S. Public Health Service and with data from various universities during 1970 and 1973. In short, the report concludes that: (1) There have been continual improvements in nearshore conditions in the southern end of the lake which are strongly linked to remedial programs. The programs include the diversion away from Lake Michigan of the discharges of 12 municipal plants and one industry in Lake County, Ill., between 1973 and 1978; Indiana's phosphate detergent ban in 1972-73; and pollution abatement programs by northwest Indiana industries and municipalities through 1979. (2) The 1969 DDT ban has been very effective, with levels in Lake Michigan fish

reduced approximately 90 percent since that year. Although results of a PCB ban are inconclusive so far, there is some evidence that a downward trend has started.

(Lake Michigan was hardest hit by PCB contamination.) (3) During 1976, when the worst trophic conditions were found, Lake Michigan was still classified as oligotrophic (clean, clear) in all but the nearshore areas and in Green Bay, Wis.

In sum, there are some initial signs of progress on Lake Michigan.

Several other parameters of water quality suggest the need for further attention, including chloride levels, which are increasing more rapidly than in the past in the open lake, and changes in plankton.

Lake Erie. This is the shallowest of the Great Lakes (210 feet maximum depth as compared to Lake Superior's 1,333 feet, Michigan's 923 feet, Huron's 750 feet, and Ontario's 802 feet maximum depth). Lake Erie became overloaded with nutrients, largely from municipal wastes and rural runoff but also from industrial wastes and urban runoff. By 1966, 65 percent of the bottom water in the lake's central basin was without oxygen in the summer months. Bathing beaches were closed, and the recreation industry suffered most from nuisance algae.

EPA's Great Lakes National Program Office is in the midst of its second year of intensive water quality monitoring of Lake Erie (1978-79), designed to determine the effectiveness of remedial programs. There is some indication that Lake Erie is improving. All bordering States but Ohio have banned high-phosphate detergents; the appearance of Lake Erie and its tributaries has improved enormously, and winter 1978-79 Program Office tests at selected research stations conducted by boring through the ice revealed that oxygen content had improved.

In recent years aircraft pilots flying over Lake Erie began to notice that sheets of algae that had previously covered

large expanses of the lake were now significantly reduced in size. Sport fish planted in the lake survived, and gulls—a harbinger of cleaner waters—began to be spotted once again. The beaches, most of which had been closed by 1975, began to be reopened. And deep water in the central basin was without oxygen only five percent of the time.

Lake Superior. This lake has been plagued by asbestos-like particles, found in the tailings from taconite mining. These particles have gotten into drinking water in the western arm of the lake and have caused communities that once drew drinking water with virtually no treatment to turn to bottled water and to install filtration plants, which previously were not required on Lake Superior. EPA and the State of Minnesota were able to get the Reserve Mining Company to agree to stop dumping taconite tailings into the lake and to place them instead in a landfill. Discharges of taconite tailings into Lake Superior are expected to cease in 1980.

Lake Huron, next to Lake Superior the least polluted lake, has had serious problems in the Saginaw Bay area. Bay City, the Saginaw River, and its tributaries suffered from heavy industrial pollution, including discharges from the chemical industry. However, both scientists and local residents have noted substantial improvement in the quality of Saginaw Bay during the last several years.

Lake Ontario. A massive cleanup effort has been launched along the shores of Lake Ontario, the most eastern of the Great Lakes, and, next to Lake Erie, the most polluted.

EPA construction grants have provided millions of dollars to help build treatment systems in communities whose wastes used to pollute Lake Ontario. Today the sewage generated by over 95 percent of the population on the U.S. side of the lake is treated before being discharged into

the lake or its tributaries. Most of the systems provide secondary or tertiary treatment. This has significantly reduced the load of nutrients and oxygen-consuming wastes pouring into the lake.

Another part of the cleanup effort has been the ban on phosphates in detergents in Canada and New York State. Phosphate levels have decreased substantially—and more quickly than computer models had predicted. Because it is downstream from the other four Great Lakes, Lake Ontario has also benefited from the reduction in phosphate levels in the other lakes.

And, of course, the discharge restrictions in permits required by the Federal Clean Water Act have compelled industries as well as communities discharging into Lake Ontario to improve their treatment systems.

The Tributaries of the Great Lakes

The Great Lakes ecosystem consists of dozens of major and hundreds of lesser tributaries within the United States. This is an update of some of the most dramatic improvements that have occurred within the eight-State Great Lakes drainage basin:

The Cuyahoga River (Ohio). No river in the U.S. has a more notorious national reputation than the Cuyahoga, which flows through Akron and Cleveland on its way to Lake Erie. By the mid-1960's it ran muddy brown; gas from fermenting organic material on its bottom bubbled to the surface, and the river's waters were so thick with oil that more than once the surface of the river caught fire. The Cuyahoga also had a bacteria count, especially after a heavy rainfall, matching that of raw sewage.

A detailed EPA study concluded several years ago that, even with the implementation of all planned pollution controls, the Cuyahoga will still be able to support only the most pollution-tolerant forms of life. Nevertheless, conditions have improved signifi-

cantly. The visible oil has nearly disappeared, and oxygen-demanding waste, cyanide, phenol, and phosphorus levels all have been reduced.

Problems still exist, however. Some debris and sewage still float on the river's surface, and the river continues to have excessively low levels of dissolved oxygen. Only if these problems can be solved will the Cuyahoga once again be fully healthy. Nonetheless, conditions have improved so markedly that plans are under-way to build parks and green strips along the river's banks.

The Detroit River (Mich.). The Detroit River, which connects Lake St. Clair and the upper Great Lakes (Huron, Michigan, and Superior) to Lake Erie, is a major—if incomplete—cleanup success. Before the Civil War, the river supported a rich and varied population of fish. But, with increasing industrialization and with the rapid increases in the amount of human wastes to be disposed of, the Detroit River's quality quickly deteriorated.

By the late 1940's, 35,000 gallons of oil per day were dumped into the river's waters. A quarter-inch-thick coating of oil covered its shoreline, and grease balls 8 and 10 inches thick washed up on its banks. Finally, in the cold winter of 1948, 20,000 ducks diving into openings in the ice cover came up coated with oil and died. Massive duck kills, with as many as 40,000 dying a year, continued into the 1960's.

Now the obvious pollution problems are almost gone. Only a few hundred gallons of oil reached the river's waters in 1976. No large duck kills from pollution have occurred since 1968, and some local fishermen are calling the Detroit River's once-again blue-green water "the world's biggest trout stream."

At the lower end, however, the City of Detroit still discharges large volumes of inadequately treated sewage, and there is still considerable, if invisible, contamination by toxic substances.

The River Rouge (Mich.). The River Rouge is the Detroit River's most industrialized tributary. Its color had become a rich orange because of pickling liquor, a steel-processing acid that was dumped into it. Its surface was so thoroughly coated with oil that it looked black; the orange color could only be seen momentarily, in the wake of passing boats. A State of Michigan biologist at that time once drew a bucketful of water from the Rouge, and in an hour and a half, acids had eaten away the bucket's bottom.

But the industries along the Rouge have now greatly reduced their discharges, and the river now flows green again. Egrets are returning to its banks.

Yet, while many of the pollutant sources from industry have been removed, further cleanup is expected when the City of Detroit implements a combined sewer-overflow program. In the upper reaches

of the Rouge, impoundments have aided in attainment of water quality. Further studies on best management practices for treating urban stormwater should significantly aid in attainment of fishable, swimmable waters.

At times, dissolved oxygen would be totally unmeasurable for a distance greater than 20 miles. Pollution controls installed in recent years have reduced the problems. Bay Beach, a park and beach area near the mouth at the City of Green Bay, had been closed since 1936 because of high bacteria

The Fox River and Lower Green Bay (Wis.). The Fox is the largest river flowing into Lake Michigan and has been one of the Nation's most polluted waterways. Until recently it suffered annual fish kills due to wastes from municipalities and from the largest concentration of paper manufacturing in the U.S.

control efforts, the Grand River still suffered from severe problems in the mid-1950's. In 1966 two major fish kills occurred.

Now, with the upgrading of most municipal discharges by secondary treatment plants and the elimination of 90 percent of the waste previously discharged by the metal plating industry, the Grand River's waters are significantly improved. Trout are plentiful, and fishermen come out in force to catch the salmon migrating to spawning grounds upstream. There is still an occasional spill from the metal plating industry.

Ironically, cleaner water has produced a problem. During 1978 lampreys were observed moving upstream toward Lake Winnebago, and it is feared that if they become established in that lake, its sport fishery will be severely damaged. In the past, the polluted Fox River was an effective barrier to these pests.

The Indiana Harbor Canal (Ind.). The Indiana Harbor Canal carries wastes from the heavily industrialized cities of Gary, Hammond, East Chicago, and Whiting into Lake Michigan. The canal is made up almost exclusively of industrial and municipal wastes and is the most significant discharge to southern Lake Michigan. In the early 1970's a boat could not navigate the canal without blackening its hull with oil, and a hand carelessly dangled in the water would emerge with a black film. Lake Michigan waters surrounding the mouth of the canal were constantly discolored by iron-red discharges from the nearby steel industries.

Now oil is a rarity in the canal, and the iron-red stain is no longer visible in Lake Michigan. Beyond that, fish are occasionally seen jumping in the canal.

The steel mills and oil refineries have cleaned up their discharges reasonably well but several of the municipalities—specifically Gary, East Chicago, and Whiting—still have discharges that are not adequately controlled. And the canal, though considerably improved, still does not meet water quality standards.



of the Rouge, impoundments have aided in attainment of water quality. Further studies on best management practices for treating urban stormwater should significantly aid in attainment of fishable, swimmable waters.

The Grand River (Mich.). Despite vigorous pollution con-

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Pollution controls installed in recent years have reduced the problems. Bay Beach, a park and beach area near the mouth at the City of Green Bay, had been closed since 1936 because of high bacteria



Other Waterways

In addition to the Great Lakes and its tributaries, there are many other rivers and lakes around the country where progress has been made in reducing pollution.

Starting in February, EPA Journal will begin a series of reports on progress and problems in correcting pollution maladies in some of the Nation's better known rivers. Meanwhile, here are some examples of gains made in reducing pollution in some of our smaller rivers and lakes:

Northern Rivers

The Naugatuck River (Conn.) was so grossly polluted due to wastes

from 57 industries and seven cities that no fish could survive on certain reaches. Now, because 95 percent of the industries have pollution controls and there are seven new wastewater treatment plants, the water is clean enough to support small-mouth bass, bluegills, and bullhead.

The Pemigewasset River (N.H.), which runs through an important recreation area, was so polluted by the mid-sixties that few fish could survive in it and it was spurned by tourists. It was discolored, ugly, and gave off a terrible stench. Now with pollution controls both on industries and municipalities, 55 miles of the river are suitable for both fishing and swimming. The river is now the centerpiece of a successful vacation area.

The Stevens Branch of the Winooski River (Vt.) suffered from a fine granite powder that gave it a milky color. This powder, discharged by the granite and gravel industries, caused gill scour in fish and smothered their spawning beds. The various abrasives used by these industries also contributed to the problem. Now, both these industries are using an inexpensive treatment method that results in zero discharge to the river. The river, once suitable at points only for industrial use, is now suitable for swimming and other water-contact sports.

Along the Kenduskeag Stream and the Penobscot River (Maine) into which it empties, Atlantic salmon had, by 1947, virtually disappeared due to the discharges from seven pulp mills and from numerous

towns and cities along the Penobscot. With substantial control of all these pollution sources, salmon now thrive as far up the Penobscot and the Kenduskeag as the City of Bangor.

The Mohawk River, which flows through the heavily industrialized Utica-Rome area, was until recently so polluted that only "rough fish"—carp, bullheads, and suckers—could survive there. Now, with more than 75 percent of the dischargers controlled, more highly sought-after sportsfish like large- and smallmouth bass, walleye, perch, sunfish, and even trout, which are highly pollution sensitive, have returned.

The Hackensack River by 1971 was officially declared to be a "highly disturbed and truncated ecosystem" that was "virtually dead." Many of the fish, shellfish, and crustaceans that had thrived in it for thousands of years had, over the span of a mere 40 years, been driven out. The river had become filled with garbage, rusting auto bodies, and industrial oil slicks. After an intensive five-year cleanup effort, the Hackensack Meadowlands Development Commission was able to report in 1976 that the river was coming back to life. Ribbed mussels have been introduced into its waters and have survived. Blue claw crabs are back in abundance. Waterfowl and shore and wading birds now frequent its banks, and stripers, alewife, and herring are turning up in fishermen's nets again.

The Smyrna, St. Jones and Mispillion Rivers and Silver Lake (Del.). These waters are all located in Kent County, Del. Construction of a regional wastewater treatment plant has dramatically improved water quality in all three rivers and has reduced considerably the rate of eutrophication of Silver Lake in the City of Dover.

The Wisconsin River (Wis.). The Wisconsin River's condition in the late 1960's was very grave due to the combined impacts of suspended solids and oxygen-demanding wastes from both municipal and industrial dischargers. The most critical industrial dischargers were pulp and paper mills. The river's quality had not markedly improved by 1975, although the rate of oxygen-consuming discharge had been lowered to 200,000 pounds per day. By mid-1976 the levels had dropped to 35,000 pounds and definite improvement was

discernable. Nevertheless, the State Department of Natural Resources now estimates that critical low flows in the Wausau segment might require a reduction of point source discharges to 4,000 or 5,000 pounds per day. This premise has not, however, been tested by an actual low flow, and it is suspected that even more stringent loading requirements may be necessary to obtain the planned objectives.

Wilson's Creek (Mo.), runs through Battlefield National Park, a popular outdoor recreation area. Until early 1978, municipal wastes from the City of Springfield caused such severe pollution of the creek that it was dark in color, gave off an offensive odor, and was unable to support any aquatic life. In 1978, however, an advanced wastewater treat-

ment plant was put into operation in Springfield. Within months the stream had a clear sparkling appearance with no odor and was providing support for at least two species of fish—carp and catfish—as well as such other wildlife as turtles, muskrat, and wild ducks. None of the park's employees had ever seen any of these animals along the stream prior to the opening of the treatment plant; they are impressed by the extent of the changes they have been witnessing and by the suddenness with which the transformation has occurred.

Southern Rivers

The Pearl River (Miss., La.), which forms the lower boundary between Louisiana and Mississippi and into which Bogue Lusa Creek flows,

Innovative Technology: Finding Something Better

Muskegon County (Mich.), adopted a form of alternative wastewater treatment to solve its worsening water pollution problems.

Near the end of the 1960's, each of the many independent communities in the county were trying to deal separately with their own municipal and industrial wastewaters in small, over-burdened treatment facilities. Several of the main industries and principal communities were still discharging inadequately treated wastewater directly into the county's lakes.

As a result, the three main

recreational lakes were becoming severely polluted. The specific problems encountered included severe algal blooms, encroaching weeds, and periods of foul odor. Swimming and boating were becoming unpleasant and unsafe. Older industries were closing or leaving rather than rebuilding, and new industries and businesses were not coming to replace them.

Muskegon County's solution was first to persuade its many independent communities to agree on a unified approach to the problem—then to develop a common wastewater treatment system. Working with authorities at the State and Federal levels, they designed and built a large scale spray irrigation system that would reliably and safely handle up to 43 million gallons of wastewater per day.

This land treatment system has removed about 98 percent of the oxygen-demanding wastes (BOD), suspended

solids, and phosphorus, and 70 percent of the nitrogen from the 27 million gallons of wastewater treated daily in the county. It is protecting and enhancing the quality of the county's lakes and streams as well as benefiting Lake Michigan. In 1975, the system also used its treated wastewater to irrigate over a quarter million bushels of corn grown on what had been sandy, unproductive soil. The project has served as a keystone in the county's effort to revitalize its economy.

Although the primary purpose of the Muskegon system is wastewater treatment, corn watered with the effluent yielded an average of 60 bushels per acre. That nearly equals the average 65 bushels per acre yielded by Muskegon County's privately owned farms—and the land treatment site has some of the poorest soil in the country. Sale of the corn reduced the cost of treating the wastewater by \$700,000.

Hawaii. Frequently, pollutants can be recovered and put to good use. The sugar industry in Hawaii is one example. Until EPA intervened in 1972, five sugar mills on the northeast coast of Hawaii were dumping 4,000 to 5,000 tons-per-day of sugar waste into the Pacific Ocean. Thick sludge banks accumulated on the ocean floor and red plumes of water fanned out in a thin film over the sea. As a result of EPA's enforcement actions, operating permits now require an end to these discharges and a reduction in suspended solids in the mills' effluents. With the addition of control equipment, the mills have achieved substantial compliance. In addition three mills discovered that they could use the wastes as a fuel to generate electricity and are now selling power to the Hawaiian Electric Company. Other companies are using the cane wastewater to reclaim land for cultivation.

was grossly polluted. This pollution was due in great part to wastes flowing in from Bogue Lusa Creek. Dead and dying fish could regularly be found on the Pearl as far as 30 miles downstream from its confluence with Bogue Lusa Creek. But much of the Pearl's problem was coming from other points on the river as well. Municipal wastes from the City of Jackson, Miss., for example, contributed floating sewage and noxious odors.

With the installation of a new treatment plant in Jackson, the floating sewage and the odors are gone. The same kinds of fish now found in Bogue Lusa Creek are also found in the Pearl both below and above the point where the Bogue Lusa joins it, and sea trout are now found in the river's tidal areas.

Bogue Lusa Creek (La.). In the early 1960's Bogue Lusa Creek was so grossly polluted that a scuba diver in its waters checking some equipment at a paper company's outfall suffered severe chemical burns. The water was so corrosive that it stripped the paint off a thermometer placed in the creek's water to measure its temperature. The Bogue Lusa shoreline was barren of vegetation and both its shoreline and its waters were devoid of all signs of life.

But beginning in the mid-sixties, public outrage was so great that the paper mills, chemical company, and municipal dischargers contributing to the problem began to clean up their pollution. Bogue Lusa Creek's color has now improved; fish have returned and are now free of the turpentine taste that formerly permeated their flesh. Catfish, bream, and crappies are once again to be found in the creek's waters.

Sope Creek (Ga.), a tributary of the Chattahoochee River in Atlanta, had suffered greatly from an explosive surge of suburban development. It had become little more than an open sewer. Abandoned by all pollution-sensitive aquatic life, it was populated only by ugly, highly pollution-tolerant or-

ganisms known as bloodworms. Swimming and fishing in its waters were forbidden.

With adequate treatment of the municipal wastewater that had brought on these problems, Sope Creek improved immediately. Within two months, all the bloodworms had disappeared, the odors were gone, the creek's color had improved, and fishermen were catching bream and largemouth bass along its banks.

A Mountain River (N.C.). In the early 1970's the French Broad River in the mountains of western North Carolina was grossly polluted. Many portions reeked with foul odors and ran black under a cover of foam. The cause of the problem was dissolved oxygen levels near zero due to raw sewage from the City of Asheville, together with metal precipitates and industrial salts from the Olin Corporation and the American Enka Company.

The two companies were very responsive to the new cleanup requirements called for in their 1974 discharge permits. After some initial resistance, the city has also been cooperative. The results have been remarkable. The odors and foam are gone and the water's natural color has been returning. Dissolved oxygen levels were improving rapidly and, by 1976, fish had already started to reappear. The only remaining problem is that wet weather causes overflows from the city's treatment works. A planned addition to the treatment works will eliminate this problem as well.

The Neches River (Tex.). On the Neches River in south-east Texas, the bass are back after 15 years and as one fisherman reports, they are "scrappy ones, and tasty, too." In 1976, a tarpon was caught in Lake Sabine on the Neches—the first caught there in 30 years. Other aquatic life has been reappearing in the tidal areas of the Neches as well. Shrimp have moved up the Neches in large enough quantities to plug

up industrial water intakes, and commercial crabbers have made money working the river.

Tar Creek (Okla.). Tar Creek, a little prairie stream in north-eastern Oklahoma, was once a watering place for buffalo. But it became heavily polluted in this century. Its cleanup is now underway and long absent wildlife are beginning to return to its banks.

Little Deep Fork (Okla.). Not far to the south, Oklahoma's Little Deep Fork, once a clear stream while flowing to Lake Eufaula, was also running dark and discolored by wastes. A new treatment plant went on line in the town of Bristow in 1975 and the waters of the stream are once again clear and free of odor.

Smaller Lakes

Annabessacook Lake (Maine). Prior to 1972, Annabessacook Lake was one of the four most polluted lakes in Maine. Algal blooms lasted 70 days a year, and it was rare for a person looking into the lake to be able to see more than three feet below its surface.

The main problem was inadequately treated wastewater from two towns and two woolen mills.

The solution adopted was to collect the wastewater from these four sources and transport it to a secondary treatment plant in Augusta, on the Kennebec River. Once treated there, the additional wastewater would have minimal impact on the river, and would greatly reduce pollution into the lake.

Although problems remain, Annabessacook Lake is substantially improved. By 1976, algal blooms lasted no more than 15 days per year, and it was possible to see 15 feet below the lake's surface. Work is now underway—aided by an EPA grant—to control runoff from the remaining non-point sources of pollution. These sources are primarily the dairy

and poultry farms in the lake's watershed.

Lake Minnetonka (Minn.). Lake Minnetonka is Minnesota's tenth largest lake and, due to its location only 15 miles west of Minneapolis, is heavily used for all forms of water-oriented recreation.

By the early 1960's however, the lake's quality had become unacceptable. Green scum and weeds were abundant; several fish kills had occurred; and many species of bottom organisms important in the food web—snails among them—had disappeared. Weeds and algae were thriving and consuming the dissolved oxygen necessary for fish to survive.

The problems were due primarily to the inability of the lake to absorb the effluent even from the secondary treatment plants that surrounded it. The solution was to transport the sewage to a new regional treatment plant on the Minnesota River, which could better accommodate the secondary effluent. By 1976, four years after the diversion, nutrient levels were dropping and surface algae were disappearing.

Lake Hamilton and Lake Catherine (Ark.). Hot Springs, Ark., has long been noted as a vacation area. But by the early 1970's, residents began to be distressed over the pollution of nearby Lake Hamilton and Lake Catherine. Raw sewage discharges were causing odor problems and presented a potential health problem that endangered the recreation industry, which is the lifeblood of the Hot Springs area.

The problem was due primarily to inadequate municipal wastewater treatment facilities, but septic tank overflows also played a major role.

Improvements to the treatment facilities are partially completed—others are still underway. But the water quality in the two lakes has already improved and the

Continued on page 25

Other Cases

Abandoned Car Project (Ky.). Eastern Kentucky earned the nickname "Detroit's Graveyard" because of the large number of abandoned vehicles in the area. Kentucky's Department of Natural Resources and Environmental Protection set out with trucks equipped with a winch and loading ramp to haul in the abandoned vehicles and recycle them. The State agency relied on local service organizations to arrange for vehicles to be brought to a central collection point in each county. In a year-long demonstration project funded by the State and EPA, a total of 5,045 cars was collected. The State has since continued the effort, with some minor changes.

Chattanooga (Tenn.). Municipal officials believed 150,000 gallons of oil and sludge in tanks contaminated with pesticide posed a threat to the city's water supply. They feared that the tanks, left behind by the National Waste Oil Company when it filed for bankruptcy in 1978, would spill over during heavy rains. If such a spill were to occur, Chattanooga's municipal water supply would have been contaminated. The State, with technical support from EPA, filed charges, and the owner cleaned up the site, eliminating a major threat to the city's drinking water supply.

Detroit (Mich.). The expansion plans of the Marblehead Lime Company were threatened when the Wayne County Health Department Air Pollution Control Division found itself unable to issue a building permit. The problem was that a kiln the company wanted to purchase and convert was located in the city of Detroit in a heavily polluted area and would add an additional 91.2

tons of dust per year to the air where air quality standards were already seriously violated. Marblehead could get permission only if it found a way to offset the additional pollution it would cause. It finally came up with a plan to do so. By improving collection efficiency at an existing Marblehead plant and resurfacing nearly one mile of roadway owned by another company, the company would reduce emissions to the area's air by more than 144.7 tons a year. This would more than offset the emissions of the converted kiln. As a result of the actions to be taken, air quality would actually improve. The settlement also means an increased tax base for a beneficial impact on the balance of trade since lime previously had to be imported from Canada.

Camp Grayling (Mich.). The National Guard base here was aware that some local real estate agents were selling property bordering the base, which contained a tank firing range. It was also known that prospective buyers had no way to judge the noise level emitting from the range. The Guard contacted noise program staff in EPA's Region 5, who after conducting tests, prepared a report showing actual noise measurements at specific locations and providing a formula for predicting levels at any distance. The Guard used the results to relocate the range to reduce the noise levels off the base. Both landowners and prospective buyers are now benefiting from this cooperative venture. Noise levels off the base are lower and prospective home buyers can get the facts about noise conditions.

Denver (Colo.). As organic material in municipal garbage decays underground in landfills, methane gas is produced. While methane is a clean fuel, it can also be an explosion hazard when it reaches particular concentrations in enclosed spaces. In the Denver area, four children were seriously burned in 1976 in a flash methane fire at a con-

struction site where they were playing and in 1977 two workmen were killed in a methane explosion while working on a sewer.

In cooperation with the Colorado Department of Health, EPA's Denver regional solid waste office hired a contractor to examine 22 old metro-area landfills. Nineteen were found to be generating sufficient methane to be hazardous. The situation was complicated further by the fact that many of the former landfill sites have been built on. Schools, churches, shopping centers, and apartment buildings now sit above the former landfills.

With increasing recognition of the potential problem, local, State, and Federal agencies organized the Intergovernmental Methane Task Force to collect and disseminate the most up-to-date information to builders, developers, communities, and governments.

In March, 1979, more than 200 participants from 29 States, Australia, and Canada met in Denver to share information on the problems and promise of methane . . . promise, because methane can be used as fuel. In fact, a Department of Energy study is now underway to establish the feasibility of "piping" seven landfills together and collecting the gas.

Additional sites are now set for examination and policies are being developed to guide further public protection measures.

HCN Cylinders: (New Jersey). During the 1950's and 1960's, the American Cyanamid Company filled and distributed cylinders with liquid hydrocyanic acid (HCN), a fumigant used widely in the grain industry to control insects and rodents. Some 100 of the old cylinders are unaccounted for, causing safety concerns. The chemicals become unstable as the cylinders age, and if moved, the containers might explode. In cooperation with

EPA, American Cyanamid, headquartered in New Jersey, has worked out a new, protective procedure for disposal, using techniques that reduce the threat of danger of explosion as the cylinders are found. Another New Jersey chemical company, as a result of the American Cyanamid experience, has also cooperated in a similar effort.

Portland (Ore.). Vehicle inspection and maintenance programs were shown to be effective in reducing two major urban air pollutants—hydrocarbons and carbon monoxide—by a major EPA study conducted in Portland. The cars in the study which required repair generally only needed minor tune-up work to pass State inspection. And while the average cost of repair for cars requiring it was \$29.47, for half these cars the cost was \$14 or less.

Tussock Moth Outbreaks (Pacific Northwest). The U.S. Department of Agriculture has developed new techniques to control tussock moth outbreaks in the Douglas fir forests of the Pacific Northwest. The USDA research program was triggered by EPA's cancellation in 1972 of most uses of the pesticide DDT. In 1974 the timber industry sought an emergency exemption to allow continued use of DDT in controlling tussock moths. EPA granted the exemption on the condition that a comprehensive research program be undertaken to find alternatives to DDT. By 1978, acceptable alternatives had been developed. Outbreaks of the moths can now be detected before they reach epidemic proportions so that immediate corrective action can be taken on a localized basis. The USDA has also developed methods using Tussock moth-killing bacteria and a new chemical pesticide as alternatives to DDT. Meanwhile, new integrated pest management techniques are thought to be within reach. As a result millions of board feet of valuable timber are being protected at less hazard to the environment. □

remaining problems should be eliminated once all the planned facilities are placed in operation.

Bays and Harbors

Escambia Bay, Pensacola Bay, and East Bay (Fla.). Before nearby industrialization and heavy development, these three large, interconnected bays supported a rich variety of marine life including speckled trout, oysters, shrimp, and even porpoises. There were important commercial oyster and shrimp fisheries. The clean sandy bottoms and clear blue waters also made it pleasant to wade and swim, attracting thousands of tourists each year.

Then, by the late 1960's and early 1970's, the condition of the complex of bays had deteriorated so rapidly that they appeared to be polluted beyond hope of recovery. The oysters and speckled trout were gone—and so were the porpoises. Commercial shrimp landings were down 99 per cent. Those brave enough to wade into the water trudged around in sludge and, if they stayed in too long, were in danger of developing a skin eruption. Furthermore, the entire 140 square mile estuary was in an advanced state of eutrophication, and fish kills were rampant, especially among the gulf menhaden, a small fish of considerable commercial importance. The biggest kill, which occurred in September, 1971, was so large that it had to be measured in miles of dead fish.

The principal polluters were industries that had grown rapidly in the 1950's. Among them were plants producing fertilizer, alcohol, ammonia, polyvinyl chloride, and nylon fiber. Inadequately treated municipal wastewater also played a major role, as did thermal pollution from a manufacturing plant and a power plant. Furthermore, tidal cir-

culation was impeded by a dense barrier of pilings from a railway bridge.

With stringent pollution control efforts and the removal of unneeded bridge pilings, the system of bays was, by 1976, well on the way to a substantial recovery. Shrimp, oysters, and menhaden were all returning to the estuary's waters. Although fish kills still occur, they are much less frequent or severe, and planned pollution controls are expected to eliminate them completely.

Kodiak Harbor (Alaska). Since 1967, the residents of Kodiak had complained of foul odors, which were due to wastes from the town's 15 seafood processing plants. Untreated wastes, including decomposed fish and shellfish, were dumped under the docks and into the inner harbor. As a result, dissolved oxygen levels dropped to about 6 to 10 percent of normal. These low dissolved oxygen levels cannot support a healthy community of marine organisms. Furthermore, 50 acres of harbor bottom were matted over with a black, foul-smelling sludge from which toxic and noxious hydrogen sulfide gas bubbled to the surface.

But since 1973 there has been a drastic reduction in indiscriminate waste disposal by the processors. One company responded to the problem by building a facility to convert solid seafood waste into a dry, packaged protein meal for export as animal feed. Kodiak Harbor should now be meeting all water quality standards.

Grays Harbor (Wash.). provides a point of passage for migrating salmon. Dissolved oxygen levels, however, had dropped so low that salmon could no longer survive the passage.

The harbor was suffering water quality problems due to numerous different pollution sources, among them: bacterial contamination from raw sewage overflows, depleted oxygen due to wastes from pulp mills and runoff from log wastes, as well as wastes from cranberry processors and seafood processors. Agricultural

runoff also played a role.

Recent pollution controls have doubled the dissolved oxygen levels, so the salmon can once again pass freely. And plans are underway to control the municipal wastes as well as the other point and non-point sources responsible for much of the remaining problems.

Waterways Made by People

The Houston Ship Channel (Tex.), was opened in 1913, and in the years immediately thereafter, there were no serious water quality problems. Buffalo Bayou, which winds through the City of Houston and forms the channel's upper reaches, was a lazy little stream notable for its Sunday swimming and canoe races.

But with Houston's growth into the Nation's third largest port and with explosive industrial development along the channel's banks, water quality began to deteriorate. By the early 1970's, EPA called the channel one of the ten most polluted major waterways in the Nation. Since then, significant reductions in discharge levels have been achieved. Oxygen-demanding waste (BOD) discharge levels, which were 400,000 pounds a day in 1970, were expected to have decreased by 90 percent by the end of 1979. The result is the return of dolphins to the lower end of the channel and the return of fish, including tarpon, to within five miles of the turning basin at the upper end.

There is, however, a new worry: heavy concentration of industry along the channel's upper end has led to concern about the possibility of high levels of toxic pollutants.

Dillon Reservoir (Colo.). located high on the Continental Divide, was built to supply drinking water to Denver. In

the early 1960's, only 2,000 people were living in its watershed and its water was of very high quality. But the reservoir itself stimulated the growth of a major resort area and by 1972, there were 55,000 housing units built, under construction, or planned. Furthermore, the recreational use rate, measured in visitor days, rose from 43,000 in 1966 to one million in 1976. The possibility of accelerated eutrophication and related harmful impacts on water quality loomed.

By 1976, four of the ten wastewater treatment plants above the reservoir had been upgraded to advanced treatment and four others had been phased out. These reductions in pollution from point sources helped, and will continue to help, maintain high water quality in the reservoir. Constant vigilance will be needed to protect the quality since the reservoir remains susceptible to accelerated eutrophication that could be fueled by increasing growth pressures in the immediate and surrounding area.

Preserving the Wetlands

The Tulalip Landfill (Wash.). Until last year, 5,000 tons per week of Seattle solid waste was disposed of in a large dump on the Tulalip Indian Reservation. The dump, located on vulnerable wetlands adjacent to Puget Sound, posed a significant threat to the fisheries and wildlife resources of the entire Sound and endangered the quality of nearby waters used by water-skiers, boaters, and scuba divers.

Legal complications arose because the Tulalip Reservation does not fall within the jurisdiction of State or local authorities. So EPA itself had to intervene, finally obtaining a consent decree requiring closure of the dump by April of 1979. The fragile ecosystem of the Puget Sound wetlands is now safe from these hazards to which it was too long exposed.

The New Decade

1980's

The 1970's were a decade
of historic environmental
achievement.

How will the 1980's compare?
EPA Journal has asked
that question of a wide spectrum
of leaders who are concerned
about the environment.

Here are their answers:

Rene Dubos

*Professor Emeritus
Rockefeller University
Pulitzer Prize-winning author
on environmental subjects*

“My belief is that the right to a good environment is now taken for granted by the immense majority of the population. Because of that it seems to me that people will not accept some of the conditions that they took for granted only ten years ago. They will not accept the amount of soot and sulfur dioxide that was in the air of New York City only 10 to 15 years ago. They will not accept the amount of garbage that there was in the Hudson River or Jamaica Bay.

Even if the controls over environmental pollution are relaxed, I think the present gains will be maintained. Moreover, some of the labor organizations are beginning to demand that environmental quality be maintained within the factories, which means that there will be if anything a further improvement in the places of work.

What I'm not so sure of is whether people will develop sufficient concern for the esthetic aspects of the environment. So my conclusion would be that there will not be a loss of environmental quality with regard to pollution, but I only can express hope that the concern for environmental quality will extend to its esthetic aspects.”

U.S. Senator

Edmund S. Muskie

Chairman, Subcommittee on Environmental Pollution

“Near the beginning of the last decade, I said in a speech that America was awakening to a new age. I said it would be an age when we in America finally realize that our world is not a cornucopia. There would be limits to resources, limits to air, water, and land, limits to the ability to sustain human life.

Going into the 1980's, these limits will surely not expand and the quality of our environ-

ment will still depend on how we respond to pressures that will come from those who would bypass environmental law in the name of energy and emasculate important regulations in the guise of cutting red tape.

The beginning of a new year, or a new decade, does not necessarily change the status of our environment or what we must do as a Nation to maintain its quality. But the 1980's will present us with a new environmental challenge. We made tremendous progress in the 1970's with the enactment of the Clean Water Act, the Clean Air Act, the Toxic Substances Control Act, the National Environmental Policy Act, the Safe Drinking Water Act, and many other landmark pieces of legislation. But our environment in the 1980's will be best served if we take on the challenge of implementing the legislative victories that we have already achieved.”

Philip Caldwell

President, Ford Motor Company

“The outlook for the environment is very promising for the decade of the eighties because we now know that it is possible to reverse environmental damage. Much has been done to make our air and water clearer and cleaner. We have a better understanding of the roles our forests and wetlands play in the maintenance of our ecosystems. The American people will demand that environmental considerations continue to be weighed in our future economic expansion.

To facilitate weighing these considerations, we are developing more effective systems for measuring both the costs and the benefits of alternative plans for controlling pollutants. The task ahead is to maintain the country's economic health as we improve the environment. That task requires achieving an optimum balance among public health needs, environmental considerations, energy objectives, and economic goals. Making such judgments is never easy, but I am convinced we are learning to make them more effectively.”

Janet Welsh Brown

*Executive Director
Environmental Defense Fund*

“Things are likely to get worse before they get better, but they will get better in the 1980's. Steady pressure in the name of energy development and inflation control will continue in the early 1980's to roll back some standards protecting the environment. We will see further selective erosion of laws and degradation of the environment. In some cases this will be steady and incremental—as in the increase in acid rain and carbon dioxide—and in others the damage will be dramatic and irreversible—as in the destruction of land and contamination of water associated with huge strip mining and synfuel ventures, okayed for the “fast track” by the Energy Mobilization Board.

But public awareness of the health, environmental, and economic costs of misusing our air and water and land will not diminish. It will continue the phenomenal growth it had in the 1970's. As more and more citizens—and their elected officials—increase their understanding of the relationship between the environment and human welfare, as the cost of degradation becomes clearer, as people realize that synfuels are not filling their gas tanks while renewable resources take on their share of the job, then we will see a remarkable and permanent nationwide turn toward environmentally sound solutions to our energy and other resource problems. It will bring by the end of the 1980's a reversal of policies and strategies that now threaten the hard-won gains of the 1970's.”

Gloria Steinem

*Editor
Ms. Magazine*

“As Americans who stand largely outside the technological establishment, women may be better able to see the cost to this country and this Earth of the drive toward the technological profiteering of the powerful few.

As the majority of com-

munity leaders, we are also more likely to support populist concerns within the environmental movement, instead of the more elitist concerns that are important but have limited appeal.

For both these reasons of an outsider's clarity of vision plus inside community involvement, I believe that the women's movement and the environmental movement will and must become more synonymous in the 1980's. Women have always been the troops of environmental work, but have tended to be displaced when salaries, organizations, and hierarchy have been introduced.

In the 1980's, women will be in the leadership as well as in the ranks of environmental preservation.”

Cecil D. Andrus

Secretary of the Interior

“The next decade presents a stern test for those who care deeply about environmental values. The American public has signalled many times that it is seriously concerned about our environment and is willing to pay for its cleanup and protection. But we must understand that no one can sign a blank check for open-ended costs. Our national economy and our resilient political system have their limits too. As we struggle to break free of over-dependence on OPEC oil, and try at the same time to maintain high living standards and control inflation, we face growing internal pressures. Public impatience with seemingly endless delays based on environmental purity could lead to a bitter backlash from voters who need jobs and understandably want to proceed toward energy independence. Environmentalists must learn to forego the dubious battles for lost causes, and concentrate instead on the big opportunities to win new ground and defend gains already won. Development and technology can co-exist with a clean environment and in fact can help achieve one, if we are wise enough to strike the right balances. Man and his natural

surroundings are fated to live together in tension, not perfect timeless harmony. Let us make that tension creative and turn it to worthwhile ends.

Frank Wallick

Co-Chairperson
Urban Environment Conference
Editor, *United Auto Workers
Washington Report*

There are setbacks—but on balance I think the environmental movement is making great strides to clean up and making us all aware of the air where we live and work. I hope the old-line environmentalists will increasingly realize that the worst, most polluted environment is where millions of men and women work. This clean-up of the work place will take the skills and insights of the best environmentalists among us.

Vernon E. Jordan, Jr.

President
National Urban League

Environmentalism in the 1980's will have to become increasingly involved with the needs of people living in urban areas. This is where the majority of Americans are located and where environmental problems pose the greatest danger to health and well-being. And the urban environment has to be seen as more than air or water quality, for it also embraces economic and housing opportunities as well. These latter two elements cannot be viewed as unconnected to environmental issues in the 1980's as they have been in the 1970's, if our cities are to be made livable for all our citizens.

William G. Milliken

Governor of Michigan

The environment will fare well in the 1980's because environmental consciousness has been firmly established in governmental decision-making processes. The National Environmental Policy Act, the Endangered Species Act, and Clean Air and Clean Water Acts are examples of actions which require consideration of the impacts of

our decisions on our natural world.

Perhaps one of our greatest challenges in the upcoming decade will be to reconcile the need to move toward energy independence with the need to protect our ecosystem.

Those of us who are conservation minded must be diligent in our efforts to assure that we do not retreat from the progress we have made, for our children—and theirs—share a right to the bounties of the Earth that is equal to our own.

Lloyd McBride

President
United Steelworkers of America

The easy answer is that we will see slow but steady progress in cleaning up the environment during the 1980's. The more significant answer, though, is that we are probably at a crossroad right now that will determine whether the progress will be far slower and far less steady than it ought to be. For the most part the laws we need for environmental controls in the workplace and in the general environment are on the books. What remains to be seen is if we have the political resolve to enforce those laws both by retro-fitting existing pollution sources and by assuring that future economic, industrial, and energy development be carried out in an environmentally sound manner.

I fear that our national will to do so is very close to being weakened. Politically attractive calls for regulatory "reform" threaten to beguile us into regulatory paralysis, and energy programs may needlessly be allowed to stampede over substantive environmental safeguards. While regulatory programs are often claimed to be impediments to economic and energy solutions, those problems require far more basic and structural solutions than tinkering with or even removing regulatory programs.

A loss of our environmental will would indeed be shortsighted. It would mean more health suffering and other social costs that accompany pollution; it would increase the

costs of controls that ultimately will have to be imposed; and it would continue mismanagement of our depletable resources. We have the tools to make the 1980's a decade of solid environmental progress. It only remains to be seen whether we will be forward thinking enough to use them.

Maggie Kuhn

National Convenor
Gray Panthers

I am optimistic about the health of the environment in the future, if we utilize our resources and energies to look to new solutions. Personal problems and needs cannot be dealt with without fundamental social, economic, and political change.

In a modern society of competing, conflicting special interests and aggregates of power, mediating forces must be found and utilized. Alternatives must be found and made legitimate.

We should press for alternative sources of energy, safe decentralized sources such as solar systems, windmills whirling in backyards, solar greenhouses on every house. These could supply our energy, a path endorsed by 94 percent of the American people according to a recent Harris Poll.

I rejoice in the new interest in neighborhoods. The neighborhood can indeed be a mediating, highly unifying force in the reordering of our national life and the survival and revival of urban places.

The pollution created by oil refineries, the poisoning of land and water by varied chemical wastes, must be exposed.

We can take the first step forward by being responsible critics of what we are now doing, by supporting and building alternatives, and by creating support groups. Coalitions with environmentalists and safe energy groups are essential for survival. We should be alert to the environmental dangers to our physical health and well being. We are the best possible stewards and protectors of the environment.

S. David Freeman

Chairman, Board of Directors,
Tennessee Valley Authority

America woke up in the 1970's to the realization that its life-sustaining resources were endangered. The challenge for the 1980's is to avoid going back to sleep. We are at a dangerous fork in the road. The energy shortages should reinforce our awareness that all of our resources are finite. Yet there is a nasty backlash in the air, aided by the red tape with which some environmental laws have become encumbered. The challenge for the 1980's is to advance environmental protection, especially the protection of our land—a job that has hardly been initiated. The prospects are by no means bleak if we focus on substance.

Esther Peterson

Special Assistant to the
President for Consumer Affairs

A fresh breeze is blowing that bodes well for the 1980's. Not only can we understand that statement in its literal sense—our efforts to reduce air pollution are having some effect—but many consumers are thinking "environment" as they evaluate what they buy. Assuming this trend goes on, we can expect less noise around the home, more small cars and bicycles on roadways, fewer broken bottles and torn plastic packages in our landfills and on our streets.

As the media now animatedly share news and documentaries on environmental traumas such as oil slicks, toxic chemical seepages into backyards and drinking water, so we can expect the media to build such concerns into their television dramas, talk shows, and syndicated columns during the next decade. Affected consumers, themselves, will probably become major media focuses. The viewers/readers will be that much more motivated to act in the interest of their survival, their health, and the ultimate cost that society would incur from not protecting our environment.

The consumer movement may well help our 1980's environment by taking advantage of the economic benefits in

returnable containers and recycled products. The more consumers support such choices, the more employment will be generated by environmentally "healthy" business. "

U.S. Representative Bob Eckhardt

*Chairman
House Commerce
Subcommittee on
Oversight and Investigations*

"I am concerned about the Administration's absorption with the intermediate situation concerning energy production problems in the environment and its failure to first address the immediate problems and then most seriously consider the long term problems. The most counter-productive program with respect to both inflation and the long term problem of environment is a crash program of producing synthetic fuels.

Also, Congress and the Presidency have caught the deregulation fever. The failure to establish standards of control and restraint has already sowed mine beds of hazardous waste and the relaxation of air quality standards now threatens to make of the Earth a poisoned hothouse where life is at best uncomfortable and at worst unbearable. Too much attention has been given to the unpredictable intermediate future and not enough to the observable present and predictable final result of a failure to plan and regulate intelligently. "

Gus Speth

*Chairman, President's Council
on Environmental Quality*

"I am confident that the 1980's will see a continuation of the progress we have made during the past decade in protecting our environment and natural resources. Despite our short term economic and energy problems, the basic commitment of the American people to a clean, safe, and healthy environment remains strong. Americans want their cities to be free of air pollution, trash, and noise. They want natural areas nearby where they can

fish and hunt and hike. They want to be able to work and play without worrying about ill effects from toxic chemicals or nuclear power plants. More than ever before, the American people appreciate that this is the only planet we have, and that we must walk softly on it. "

Anthony Wayne Smith

*President, National Parks and
Conservation Association*

"The state of the environment today is notoriously poor, and the prospects for improvement are dim. The plunge toward coal and nuclear power is dangerous; we should move into the oil to natural gas to methane and hydrogen sequence in the pipelines for cities, industries, and power plants; we should go from gasoline to gasohol to alcohol for autos and airplanes; we should go for cogeneration, wind turbines, windmills, and the mass production of photovoltaic cells. We should get urban sprawl under control, partly by focusing Federal programs on urban renovation. We should expand protection for parks, forests, wildlife, rivers, and countryside, and spend the necessary public funds. "

Ruth C. Clusen

*Assistant Secretary
for Environment
U.S. Department of Energy*

"The state of America's energy supply and the state of her environment will be bound even more closely in the 1980's than ever before. National policy calls for using more and more coal in place of oil while the development of alternative energy sources continues. Coal is dirty, but plentiful. Feasible but expensive environmental control technologies will have to be used in direct and indirect coal burning. Conservation will provide a bridge over the economic maelstrom until renewable energy sources are able to power the United States. Environmentalists will have to take a more moderate role if they

want the gains of the sixties and seventies to last. Environmental groups should continue actions in Congress, in statehouses, in courthouses, and city halls to protect existing environmental laws; get their priorities in order so that the more critical issues will receive major attention; make a better case for the economic advantages of conservation and environmental protection. The environmental ethic is established firmly in the American consciousness, and what will be needed is a more responsible partnership between decision-makers and activists to permit us to cope with the energy crisis without environmental degradation. "

James H. Evans

*Chairman
Environmental Task Force
The Business Roundtable
and Chairman
Union Pacific Corporation*

"In the sixties we recognized that our air and water resources are finite. In the seventies Congress passed a series of laws and EPA issued regulations to protect and enhance our national environmental resources. By the end of the seventies, we learned that there are technical and financial limits to our ability to achieve absolute environmental goals. We also learned that some environmental strategies can pose obstacles to the achievement of other, equally important, national goals.

In the 1980's Congress and EPA should continue to reassess existing environmental priorities and programs. Environmental goals determined to be ineffective should be modified to make resources available for more efficient environmental programs.

A critical reevaluation of existing and new regulations should emphasize the scientific and technical justification for each control strategy and explore cost-effective comparisons of alternative environmental programs.

During the 1980's we should strive to select balanced environmental strategies and goals which permit achievement of the Nation's economic

and energy goals, while at the same time continuing to enjoy an improving level of environmental quality. "

Jack Lorenz

*Executive Director
Isaak Walton League of America*

"The environment is not likely to improve in the 1980's. It is possible that we will lose some of the ground gained in the 1970's.

Key factors are pressure for rapid energy development, a faltering economy, unstable political conditions in energy-rich Third World nations, growing resistance to environmental regulation, and public dissatisfaction with the Federal Government.

These conditions are working together to force the environmental community to establish strategies that will hold the line on the progress of the past decade.

New proposals will and should come forth, but they must be built on those that preceded them. Retention of that foundation will be our greatest challenge. "

Ruth J. Hinerfeld

*President, League of
Women Voters of the U.S.*

"With each passing day the public has grown more aware that our natural resources are very limited. And with this realization comes the acceptance that the 1980's will require continued efforts to abate pollution, deal with hazardous wastes, preserve farmlands, encourage wise land use, and influence other major environmental decisions.

A personal environmental ethic has evolved—one which we believe will flourish in the 1980's if nurtured. People no longer talk about energy and environmental conservation in the abstract—they practice it. They recycle solid waste, conserve energy, and do their part to help save our resources.

The public has become increasingly aware of the danger of assuming that major problems we face in coping with high inflation, energy needs, limited food supplies, and other

areas can be easily solved at the expense of the environment.

Society will always face conflicting values and needs. But citizens have begun to realize that we must be on guard lest environmental protections be sacrificed in the rush to confront complex national and international problems.

The issues of the 1980's will include: preserving American farmland to insure adequate food supplies; coming to grips with the impact of various forms of energy development; learning much more about hazardous materials; focusing on the impact of diffuse sources of pollution from urban and rural areas on water quality; dealing with the acid precipitation issue.

We have learned through experience that protecting the environment is a dynamic process and citizens must continue to play a role in this vital effort.

U.S. Representative Toby Moffett

Chairman of the Environment, Energy, and Natural Resources Subcommittee

Industry's neglect of environmental dangers will surely haunt us more and more in the 1980's. It is conceivable that the energy shortage of today could be the clean water shortage of the 1980's. New and different distinctions must be made in mapping out energy-environmental policy: How can our existing energy supplies be used more efficiently? What costs are being displaced to the consumer? What hidden, deferred costs are involved in a particular energy source or process? In our drive to produce more energy from depletable resources, we too easily ignore the cleaner, safer, renewable energy sources. The frightening irony is that we are sacrificing strong environmental protection precisely when the risks are highest... and when better alternatives are available.

Russell Peterson President National Audubon Society

The environmental deterioration of the past century is largely energy related. The digging and burning of coal, the transporting and burning of oil, and the indiscriminate cutting and burning of trees, have had a devastating impact on our life-support systems.

The end of the petroleum era is fast approaching. Now is the time to dedicate ourselves to using our remaining fossil fuels more efficiently, while developing renewable solar resources that will provide future generations with safe, clean, endless energy.

This dual approach—more efficient use of energy and development of solar energy—provides an environmentally sound path into the future. Success in this venture will permit us to make the nuclear fission period a brief one and thereby minimize the threats to life currently accumulating from this alternate energy path.

U.S. Representative Joseph L. Fisher

Co-Chairman, Environmental Study Conference

The 1980's will see continuing pressure on the natural environment, both urban and rural. But the pressure may diminish somewhat with slower population and economic growth and if progress toward cleaner air, water, and industrial products mandated by laws passed in the late 1960's and the 1970's can be maintained. In the early part of the 1980's a strategic retreat on a few fronts may be necessary to enable the speedy laundering of a synthetic fuels program and an acceleration of investment generally. The best energy bets for the 1980's are conservation, solar applications, as well as research and development, renewable sources, and, at least a few new, environmentally sound, big ticket items. One hopes that the environmental movement has come of age and that the American people will expect and be willing to pay for a cleaner, healthier, safer environment in the 1980's and beyond.

David R. Brower Chairman of the Board Friends of the Earth

The 1980's will be the either/or decade. We could choose the soft energy path, a concept invented by Amory Lovins. It can lead to a recovery of the senses. It is a world energy strategy for attaining a sustainable global society fueled by renewable energy, phasing out the use of fossil fuels in half a century, and requiring no nuclear energy at all. It minimizes the need for costly electricity, for hard to get capital, for vulnerable overcentralization, and for waste. It matches the energy needed with the most logical source.

Or we could choose the hard path which is just the opposite. Mr. Lovins has made clear the many reasons for choosing without further delay the soft path.

Many individuals and some corporations are already making that choice. By concentrating on energy productivity and conservation, they have made available, in the last five years, two and one half times as much new energy supply as has been provided by alternative hard path routes, including energy imports.

The Congress and the Administration have been slow to perceive the importance of the soft path. They are rushing down the hard path seeking strength through exhaustion, providing energy for a brief America.

A swift change in course, profiting from the soft path energy studies here and abroad, can vastly improve the world's chance to enhance equity, create jobs, reduce the triple threats of inflation, acid rain, and nuclear proliferation, and preserve irreplaceable resources inanimate and living.

Michael McCloskey Executive Director The Sierra Club

The shape of environmental work in the 1980's will be forged by the course of arguments over the scarcity of high-grade resources. The depletion of oil, in particular, will fuel high rates

of inflation and economic instability. The high cost of exploiting low-grade resources will produce two sets of quite different pressures on the environment: severe pressures on one hand to improve productivity by trying to cut environmental investments and less consumption and throughput of raw materials on the other hand. Thus, the economics of scarcity may push us towards becoming a "conservative society" because we can not afford conspicuous consumption anymore. But there will also be loud voices claiming that we can not afford to install new pollution control devices. One can hope that slower growth in pollution will offset growing resistance to pollution controls.

M. Rupert Cutler Assistant Secretary for Natural Resources and Environment Department of Agriculture

The people of America know full well that environmental protection cannot be sacrificed if we are to remain a thriving, productive Nation.

Farmers, ranchers, and urban dwellers realize that the quantity and quality of water, soil, forests, and other natural resources must not be degraded.

People will not tolerate further pollution that is hazardous to their health.

There are many other benefits from environmental protection, but those which have economic and health values will serve as substantial bulwarks against emerging pressures to gouge our natural resources and lower standards against pollution.

We must dedicate ourselves to carrying out the people's will.

Allan Grant President, American Farm Bureau Federation

We have reached a cross-roads in environmental regulation. Adequate laws are now on the books to assure protection of the air, water, and land. However, these laws will survive Congressional oversight only if EPA imple-

ments them reasonably, responsibly, and within clearly defined boundaries of scientific knowledge. The day is past when EPA will be allowed to initiate regulatory action in response to unsubstantiated demands.

Implementation and enforcement of environmental regulations will have to be in harmony with intelligent economic growth and development so that environmental decisions show a dedication to the greatest good for the greatest number in our overall society.

Without a healthy economy, and the resultant employment opportunities, industrial expansion, and reasonable profits, the country will be unable to achieve any of its long-term financial objectives, be they environmental enhancement, social security, or national defense.

Denis Hayes

Director, Solar Energy Research Institute

“The 1980's promise to be a decade of transition during which energy-related environmental problems will call urgently for resolution. Wisdom dictates an energy economy resembling a climax forest ecosystem in which energy is allocated in efficient, sustainable patterns. Solar and other renewable energy sources, with their benign environmental impact, offer us an opportunity to move toward such an economy. Shortsighted fixes would carry dire and perhaps irreversible consequences for the environment. This is a time for us to take the longer view and accelerate our switch to renewable energy.”

Thomas Ehrlich

Director, U.S. International Development Cooperation Agency

“The outlook is positive. The developing countries of the world have changed their perception of environmental concerns dramatically since the Stockholm Conference in 1972. Most now see the necessity of environmentally-sound development and the pursuit of programs to restore or protect the natural resource base on

which future development depends.

The problems and priorities of desertification, water management, deforestation, habitat, species loss, and environmental education are gaining widespread recognition. Several developing nations have established ministries of the environment; others are learning more about the extent of their problems.”

Thomas L. Kimball

Executive Vice President National Wildlife Federation

“Emphasis in the 1980's will center upon energy shortages and economic shortcomings, with environmentalists being hard pressed to hold gains recorded in the past decade. Our studies indicate that the qualities of our air, water, soil, forests, minerals, wildlife, and living space resources are either deteriorating or barely holding steady. Unless the Nation adopts a conservation ethic particularly in light of our expanding human population with its increasing needs, we are not optimistic about the state of the environment for the future. Such an ethic will require that we adopt simpler life styles, doing more with less.”

Gray Jacobik

Project Coordinator Year of the Coast

“The fact that a new public education campaign that will involve hundreds of thousands of people has recently been launched, and that this campaign—'1980: Year of the Coast'—brings together the support of fishermen, sports and recreation users of the coast, and labor and urban groups as well as the environmental community, is a good indication that environmental issues will continue to have high visibility during the 1980's.

Environmental organizations are still quite strong at all levels: local, State, and national. The Coast Alliance feels that during the 1980's coastal zone issues will be a major concern. Environmental issues regarding the coastal zone have not been

adequately addressed and the full impact of the further degradation of the shoreline in recent years is just beginning to be experienced. Specific concerns such as offshore oil and gas leasing, onshore facilities siting, and coastal water quality will continue to be central. Loss of food-producing land due to dredge and fill operations and the health of fisheries in general due to commercial development as well as overfishing will become an increasing concern to Americans. Pressures are not going to let up on the coast.”

Dr. David Rall

Director, National Institute of Environmental Health Sciences and National Toxicology Program

“Legislative tools now in place, the Toxic Substances Control Act, the Resource Conservation and Recovery Act, etc., were major accomplishments of the 1970's. The need now is to assure that we have the scientific information needed to use these tools most effectively. The Department of Health, Education, and Welfare in establishing the National Toxicology Program, has taken a significant step to coordinate and strengthen the development of this necessary scientific base. The actions we take will be critical for the environment in the 1980's and the 1990's.”

Dr. Hope S. Dougherty

National Director of 4H

“Young people have a major stake in how our Nation faces up to the problems of our environment and energy. Moreover they want a meaningful role in helping to solve these problems as we enter the eighties. To do so they need opportunities to 1) become involved in individual and group projects which contribute to environment, 2) provide initiative and leadership in a wide range of environmental improvement efforts conducted

by local, area, and State environmental organizations and agencies, 3) explore careers and educational opportunities in environmental related fields, and 4) become gainfully employed in furthering the development and maintenance of natural resources. Accordingly a recent national 4H goals document has recommended that the 4H environmental improvement program must have high priority and resources allocation must be commensurate with the need. Conservation and wise use of our energy resources must be the theme of 4H programs and related to all pertinent subject matter areas. These recommendations are currently being implemented in all State 4H programs throughout the Nation.”

George H. Lawrence

President, The American Gas Association

“Increased use of natural and supplemental sources of gas in the future are keys to protecting and enhancing our environment. Gas energy is the cleanest major source of energy available today. Combustion of gas produces generally less air pollutants than combustion of either coal or oil using the best available control technology. The increased use of gas in stationary installations has contributed significantly to the improvement of the Nation's air quality since the 1960's.

New discoveries of domestic gas as well as increased supply from Mexico and Canada and expanding imports should continue to make gas energy the centerpiece of future energy planning. For example, increased use of gas energy during peak pollution periods can make it possible for us to use 30 percent more coal by using just five percent more gas than today and still comply with current air quality standards. Indeed, the selective use of clean gas energy could be the key to overcoming the Nation's current standoff between our national needs to increase coal use while continuing to comply with the Clean Air Act.” □

State of the Environment: A Fact Sheet

Air

Nationally, sulfur dioxide is down 17 percent since 1972. Dirt and smoke are down 8 percent. Carbon monoxide is going down at a rate of 7 percent a year.

Overall, the Nation's air quality is improving. Combined data from 25 major metropolitan areas show that the number of unhealthful days declined by 15 percent between 1974 and 1977 while the number of very unhealthy days declined 32 percent.

Nine of the more populous and more polluted areas in this group showed even greater improvement, with a 35 percent reduction in the number of unhealthful days since 1974. These improvements are mainly attributable to a reduction in automobile pollution.

Data from about 50 of the most polluted counties across the country show that violations of ambient air quality standards generally either stayed constant or decreased between 1974 and 1977.

The greatest improvements were made in reducing violations of the carbon monoxide and sulfur dioxide standards. Violations of the primary ambient air quality standard (established to protect human health) for these pollutants declined by 43 percent and 54 percent, respectively, during the 4-year period.

Air pollution has by no means been eliminated. In 1977, the air in 2 of the 41 urban areas for which reliable data were available still registered in the "unhealthful" range for more than two-thirds of the days of the year. These two, the New York and Los Angeles urban areas, together contain almost 8 percent of the Nation's population.

Water

There were significant improvements in dissolved oxygen levels (the primary indicator of pollution from sewage and other organic matter) in the Northeast, South, and Great Lakes regions of the country from 1971-2 to 1977-8.

Phosphorus levels also improved across the country, especially in the Great Lakes area (where an international agreement with Canada limited phosphorus discharges) and in the Southwest.

For most cities where data go back far enough, analysis shows definite improvement in ambient water quality. For example, a study of coliform bacteria levels in rivers near 24 cities between 1968 and 1976 showed higher levels in only 4, no change in 2, and lower levels

in 18. (Fecal coliform bacteria are a common measure of water pollution.)

EPA has found more than 70 examples of clear-cut improvements in ambient water quality, from Hawaii to Maine, and from Alaska to Texas.

On July 1, 1977, about 50 percent of all major municipal dischargers had achieved secondary treatment; about 80 percent of all major industrial dischargers were using the "best practicable" technology. For industrial discharges alone this means a reduction of from 50 to 80 percent in key pollutants since 1972.

As of September 30, 1979, EPA had made grants of \$24.2 billion to cover the Federal share of 17,000 municipal waste-

water treatment projects. About 11,000 projects, representing \$22.1 billion, are in progress.

In the 6 years from 1973 to 1978, ocean dumping dropped from about 10.9 million tons a year to 8.3 million tons—a 24 percent decrease. This does not include dumping of dredged material. Federal law requires a halt to the dumping of all harmful municipal sewage sludge by the end of 1981.

In October, 1979, EPA set pre-treatment standards to control discharges from the electroplating industry. This industry is the largest single contributor of metal wastes to public sewer lines and treatment plants, accounting for over 70 percent of the cadmium and over one-third of the cyanide known to be discharged.

Toxics, Pesticides and Radiation

EPA has begun reviewing new chemical substances before they are manufactured for commercial purposes to evaluate any risks which they may present to human health and the environment. The program officially began July 1, 1979.

The Agency has also published the country's first comprehensive inventory of chemicals produced in the U.S. or imported here. This initial listing of chemical names, published June 1, 1979, has 43,278 compounds.

Nearly 400 new chemicals are introduced into the market each year. For the first time, the government will be able to review these substances before their exposure to people or the environment.

EPA's review program, authorized by the Toxic Substances Control Act, requires chemical manufacturers to notify the Agency at least 90

days before they manufacture new substances.

One of the highlights in the pesticides area last year was action by EPA on a new program to encourage the use of a class of pesticides called biologicals. These include bacteria, viruses, and naturally-occurring biochemicals such as insect sex lures. These pesticides work on the target pest by means other than poisoning and generally affect a narrower range of life forms.

The Federal pesticide law authorizes EPA to help promote the development and use of such biologically integrated alternatives for pest control. A number of these agents already have received approval by EPA for either regular or experimental use. These biologicals now comprise less than one percent of the 35,000 pesticide products marketed in the United States.

In the radiation area, Agency scientists early last year monitored radiation levels in the wake of Chinese nuclear testing and found no evidence of radioactive fallout in milk samples taken from EPA's national monitoring network or in air particle samples. Researchers reported no increase in background radiation levels because of the testing. On another front, Administrator Costle warned that some Florida residents may suffer increased risk from cancer due to radioactive gases emitted by phosphate-rich soils under their homes. Last fall EPA sent a team of scientists to assist at the site of the Three Mile Island Nuclear reactor accident. This team has been awarded a gold medal for outstanding performance and dedication in establishing and conducting a comprehensive environmental radiation monitoring program at the Three-Mile Island site.

Except where footnoted, these figures are from EPA-sponsored studies or the latest annual report of the President's Council on Environment Quality

Noise	Hazardous and Solid Wastes	Economics
<p>In the past decade the number of local noise control ordinances has increased dramatically. In 1972 only 59 municipalities had some type of noise law. By 1977 that number had grown to 1,607. Today, more than 50 percent of the U.S. municipal population lives in localities having some degree of noise legislation.</p> <p>If current regulations controlling noise emissions from aircraft are implemented, and if special take-off procedures are used, the number of adversely affected people is expected to decrease from about 6 million to about 3.6 million by the year 2000, although it then may grow again with increasing air traffic.</p> <p>It is estimated that as many as 20 to 25 million people—about 1 in 10 in the United States—are exposed to noises of duration and intensity sufficient to cause a permanent reduction in their ability to hear. Of these, 10 to 15 million are estimated to be workers exposed to excessive noise on the job.</p> <p>Even now an estimated 13.5 million people in the United States are exposed outdoors to an average noise energy level of 75 decibels or more from transportation or recreation vehicles, a great enough level to cause risk of permanent damage to hearing.</p> <p>In the past two decades there has been a dramatic increase in the number of noise sources. There are more cars, trucks, motorcycles, and other vehicles; there are more office typewriters, houses equipped with air conditioners and labor saving devices, and more industrial plants.</p>	<p>The Love Canal disaster made the hazardous waste problem clear to everyone. An estimated 90 percent of hazardous wastes is being disposed of in ways that do not adequately protect public health or the environment.</p> <p>Working with the States and the Justice Department, EPA has investigated 300 hazardous waste disposal sites; seven major legal actions have been initiated and many more are under preparation. This effort will be substantially expanded during fiscal year 1980.</p> <p>The hazardous waste regulations will be promulgated over the next several months. As rulemaking progresses this initial program will be strengthened and expanded on the basis of information now being developed and assessed.</p> <p>Standards for disposal of other solid wastes on land were issued by EPA in September, 1979. States will use these standards to identify facilities that need to be upgraded or closed because of the adverse effects they might have on health or the environment.</p> <p>EPA grants will aid 63 communities in planning and developing projects to recover materials and energy from municipal solid waste.</p> <p>In addition to high interest and activity in waste-to-energy projects, there has been growth in recycling programs. In 1978, at least 218 cities had programs for separate collection of recyclables; 178 collected newspapers only, the others collected two or more materials which could be recycled. More than 500 buildings had office paper recycling programs.</p>	<p>In many cases, environmental regulation improves output and productivity by speeding up the reexamination of production processes.</p> <p>While it is nearly impossible to completely quantify this positive aspect of regulation, some examples make the point:</p> <p>(1) <i>Great Lakes Paper Company</i>—installed an \$8 million closed cycle waste treatment system, which they expect will save \$4 million a year in lower costs for chemicals, water, and energy while containing contaminated effluents.</p> <p>(2) <i>Long Island Lighting Company</i>—used a magnesium fuel additive to reduce sulfur trioxide concentration. This not only solved the environmental problem but also produced vanadium, a marketable by-product. In 1978, the company sold 362 tons of recovered vanadium for \$1.2 million, saved \$2 million in fuel because of increased thermal efficiency, and saved \$400,000 due to reduced boiler corrosion.</p> <p>(3) <i>Dow-Corning</i>—found that a \$2.7 million capital investment in equipment to reduce the amounts of chlorine and hydrogen lost to the atmosphere reduced operating costs by \$900,000 a year.</p> <p>(4) <i>The Georgia-Pacific Corporation</i>—developed a special scrubbing system to eliminate "blue haze" emissions caused by plywood production. Collection of the airborne pitch produced a thick liquid that has a BTU rating equivalent to #6 fuel oil. The company now uses this residue as a fuel supplement and collects enough to replace 51,000 gallons of #6 fuel oil each year.</p> <p>According to a 1979 study, if 1970 levels of air pollution were decreased by 60 percent, the health benefits would total about \$40 billion annually.</p> <p>In addition to studying health benefits, the 1979 study attempted to quantify the esthetic benefits that result from air pollution control in Los Angeles. Findings indicated that Los Angeles residents would pay \$650 million per year for a 30 percent improvement in air quality.</p> <p>Data Resources, Inc. (DRI) estimates that from now through 1986 the unemployment rate will be 0.2 to 0.4 percentage points lower with the pollution control program than it would have been without the program. Every decrease of 0.2 percentage points in the unemployment rate results in 200,000 additional jobs.*</p> <p>The DRI study also concluded that the costs of air and water pollution clean-up required by Federal legislation will add no more than 0.1 to 0.2 percentage points to the average annual inflation rate over the next eight years.</p> <p>Firms making equipment used to clean up air and water pollution had sales of \$1.8 billion in 1977 and are growing about twice as fast as the rest of U.S. industry.**</p> <p>EPA's program to construct wastewater treatment facilities totals \$44 billion authorized by Congress between 1973 and 1982. Each billion dollars spent for construction produces approximately 12,500 workyears on the construction site and about 19,300 offsite. (A work-year is the equivalent of one person working one year.)</p> <p>A 1978 survey for Resources for the Future showed that 62 percent of the public was willing to accept higher prices to protect the environment while 18 percent were opposed. □</p>

*1979 report for EPA and CEQ by Data Resources, Inc.

**Arthur D. Little, Inc. Study for EPA

The State of a State

By Bob Graham
Governor of Florida

Florida's sunny climate combined with the beauty of its many other natural resources attract millions of visitors and add 250,000 new residents each year.

Such growth, however, has brought us more than a healthy economy. Among its cumulative consequences have been increased demands on other sectors of the State's economy, on all levels of government and most significantly, on our natural environment.

In the late 1960's and early 1970's the State's residents and elected representatives began to realize that Florida's rapid growth was threatening its most valuable asset—the environment.

The State's constitution, revised in 1968, reflects this concern: "It shall be the policy of the State to conserve and protect its natural resources and scenic beauty. Adequate provisions shall be made by law for the abatement of air and water pollution and of excessive and unnecessary noise." (Article II, Section 7) Over the next several years, the legislature responded by enacting comprehensive environmental laws controlling air, water, noise, and solid waste pollution. Other new legislation created mechanisms relating to water and land use planning and development.

This increased regulation resulted in the obvious need for improvement in the administration of the State's environmental laws. Legislative interest was aimed at reducing the duplication among State environmental agencies and simplifying the permit process. Consequently the legislature passed the Environmental Reorganization Act of 1975 creating the Department of Environmental Regulation (DER) as the central authority to implement State environmental laws and policies.

At this point we can look back and see how rampant growth struck the State and how it began to impact nearly all aspects of its unique natural setting. We can also

view with a certain degree of satisfaction how we have responded with environmental laws that are both effective and reasonable. But we can also see that, despite our strides, we have some distance to go before we can feel assured that future generations of Floridians will be able to enjoy Florida as we do today.

Water, for example, is primary among our most valuable natural assets and assuring it continues to be available in high-quality abundance for domestic agricultural, industrial, and recreational uses presents some formidable and complex problems.

Water Quantity

Florida receives more rainfall than any other State in the continental United States except Louisiana. Over one-fourth of the State is classified as wetlands and there are over 1,700 streams and 8,000 lakes. The groundwater resources are immense, as most of the State is underlaid by one of the most productive aquifers in the world. Additionally, Florida has almost 11,000 miles of shoreline. Water is definitely—without question—one of Florida's most abundant and important resources.

With so much water, it is hard to imagine a water shortage, yet localized shortages have already occurred in areas where population has concentrated and where heavy agricultural and industrial demands exist.

Some 75 percent of the State's population resides along the coast where groundwater is least abundant and most susceptible to salt water intrusion. Prior to 1972, water resource legislation had been essentially reactive—a series of partial solutions to successive contingencies. Realizing that water demands would continue to increase with an expanding population, the legislature enacted the Florida Water Resources Act of 1972. This Act, cited as a model statute by the National Water Commission in its report to the President, provides a

comprehensive system for the conservation, management, and control of Florida's water resources.

Water Quality

Florida's plentiful waters serve diverse purposes. Surface and groundwaters are used for drinking; lakes, streams, the Gulf of Mexico and Atlantic Ocean are used for recreation, including fishing, swimming, and other water sports. Waters are also used for agricultural irrigation and to carry off wastes from domestic and industrial activities. All of these activities have the potential to pollute Florida's waters, and water pollution became a reality as Florida's population and industry increased. Through the adoption of State water quality standards and implementation of Federal water programs Florida is experiencing a gradual improvement in the State's water quality. The newest amendments to the State water quality standards include regulation of groundwater quality. This is particularly significant since underground aquifers supply 86 percent of Florida's public water supply. Stormwater runoff is also being regulated for the first time. Based on studies conducted under Section 208 of the Federal Clean Water Act we know that the stormwater runoff is a significant source of pollutants. The new amendments also created a category of "Outstanding Florida Waters" which receive special protection. Waters in parks, wildlife refuges, wilderness areas, sanctuaries, aquatic preserves, and in other specially designated areas are now protected from degradation below existing ambient levels.

Federal, State, and local governments along with industry have invested over a billion dollars to treat municipal and industrial wastes in this State. This money has been used to plan and construct the best, most cost-effective, and environmentally sound systems to abate pollution.



Florida, unfortunately, has provided the world with textbook examples of what not to do with submerged and wetland areas. Thousands of acres of these lands were lost in the past for development of waterfront property for homes and multifamily living structures such as condominiums. Fortunately, Florida has progressed from encouraging coastal development through the sale of submerged lands, to a program reflecting concern for wetland preservation and protection. A classic example of past exploitation is Boca Ciega Bay in Pinellas County, where miles of waterfront property were created by dredging and filling to create a system of canals. The cumulative effect of these activities devastated the natural bay ecosystem. Florida now regulates dredge and fill activities in these areas and never again will we allow an entire ecosystem to be destroyed.

A management program with great promise is the State's Water Resource Restoration and Preservation Program. With matching funds from the Environmental Protection Agency, the State is in the process of restoring a number of Florida lakes and bayous to their pre-pollution condition. Lake Jackson, a 4,000 acre lake in Tallahassee, typifies lakes chosen for rejuvenation. It is situated in a metropolitan area where urban runoff has seriously degraded the water quality and most of the property surrounding the lake is owned by private parties. After 18 months of difficult negotiation, the State finally succeeded in purchasing a key parcel of land necessary for the location of a 25-acre sediment and treatment facility. As part of this facility, an experimental marsh biofiltration system will be constructed and will serve as a national model for other State restoration programs.

Land

Regulating land use is the key to ensuring that development is in harmony with sound ecological principles and environmental guidelines. The Florida Land and Water Management Act of 1972 provided the vital step toward consistent statewide land use planning and development. The most innovative provision of the Act authorizes the designation of particularly sensitive areas as key areas of critical concern. The Green Swamp, Big Cypress Swamp, and the Florida Keys were so designated, thus ensuring the protection of the natural and economic resources of these areas in a manner consistent with the State's interest.

Under the Federal Coastal Zone Management Act, the State can receive matching Federal funds to acquire, develop, and operate an estuary. Florida is the only State to acquire two estuarine sanctuaries through the Federal program—Rookery

Bay and Apalachicola Bay and Lower River. These areas will be primarily used for long-term scientific research and educational purposes.

One other notable achievement in the field of land resources management is the Land Conservation Act designed to protect environmentally unique and irreplaceable lands. The resulting \$200-million Environmentally Endangered lands program has aided substantially in preserving valuable natural resources. Purchase of these particularly sensitive lands was the best means of providing them adequate protection. Big Cypress National Preserve and the lower Apalachicola River tracts are significant acquisitions.

Power Plant Siting Act

The Florida Electric Power Plant Siting Act has proved to be an environmentally acceptable process for balancing the need for low cost electrical energy against the environmental impacts of the construction and operation of the power plants. Rather than require the utility to seek separate permits from each agency, one application is filed with the Department of Environmental Regulation. Thus, all environmental impacts can be examined in a single procedure. Such a comprehensive examination eliminates numerous problems for the utilities and the regulating agencies, and provides public accessibility to the permit process. Since adoption of this act in 1973, ten power plants representing approximately 6,000 megawatts of electrical generating capacity have been successfully licensed in Florida.

Even with all these accomplishments, there is no cause for complacency. Florida still faces its most pervasive reality, population growth. Environmental problems are a direct result of increased demands on limited resources by increasing numbers of people. Florida is growing faster than any other populous State in the Nation, but its fragile and unique environment may be the least able to absorb this growth. Unplanned growth has caused urban sprawl that is encroaching on the unique Everglades and on prime agricultural land. As mentioned earlier, certain areas of the State (especially coastal areas and the Florida Keys) periodically have water shortages. Portions of the shoreline resources have been destroyed as more people move to Florida and settle along its coasts. Florida has a serious problem with unplanned growth and needs to develop a managed growth policy.

Another area of increasing concern is air quality. As cleaner fuels become more expensive and less available, industry is requesting variances from State and Federal air standards to burn dirtier fuels. Florida utilities, presently operating under an emergency provision allowing the use of dirty oil, are violating the State's partic-

ulate emission standards in some areas. Until a decision is reached on the best way to maintain air quality while burning high sulfur fuel, air quality may suffer.

Finally, there is a need for the Florida legislature to enact a hazardous waste management program. Over 500,000 metric tons of potentially hazardous wastes are generated each year in Florida, yet present regulations provide no means to trace where these wastes are going. Due to the high groundwater table and porous soil throughout most of the State, Florida's groundwater is particularly vulnerable to improper disposal of these wastes. A State program would assure adequate control over hazardous wastes from their creation to their disposal.

After considering the achievements and problems of various environmental programs, the question remains whether Florida is fulfilling the constitutional mandate to preserve and protect the environment. The record compiled so far indicates that we are improving, but continued improvement faces serious challenges. Due to present inflation and energy shortages the affordability of environmental protection is questioned by many. Should the public pay the higher price or accept less stringent standards? Public polls indicate that Florida citizens still rank environmental protection as a top priority. A highly regarded public opinion research firm found that even in the midst of our energy crisis, 71 percent of the Florida voters polled opposed "ending environmental controls as a solution to the energy problem."

Thus, the commitment expressed by Floridians in the 1968 constitution—and supported by the Legislature through the enactment of strong environmental laws—remains strong. This commitment provides a clear direction for State policy. We shall continue to protect the environment, but in the most efficient manner possible. Each dollar spent must bring a maximum return in a cleaner environment.

As a first step towards providing more effective environmental protection at a lower cost, I appointed a task force to examine the existing resource management laws and programs. After identifying the major problems in administering the programs, the task force will recommend solutions to eliminate duplication, overlap, and inefficiency. Also, Florida has recently entered into an EPA agreement to streamline water and waste management. By integrating solutions to environmental problems, this program promises to achieve a cleaner environment at a lower cost.

The quality of life is important to the citizens of this State. I feel confident they will support the protection of their environment provided their money is spent wisely. □

A Day at a Winter Beach

A stimulating way to begin experiencing the world of nature in the new year is to visit one of the wild, isolated Atlantic barrier beaches where the ocean, the source of all life, plays its ceaseless music.

A recent visit to Assateague, the off-shore island protecting the Virginia-Maryland shores, provided rewards never found in the glare of summer.

Gone, of course, are the vast crowds who flocked to the beach in balmy months. Yet for thousands of years the lure of a lonely shore has attracted thoughtful human beings who have paced the tide-swept beaches.

On a recent winter dawn at the Chincoteague Wildlife Refuge on Assateague a pale lemon sun loomed over the white-capped waves of a stormy sea. Clusters of gulls and sandpipers patrol the tide line searching for tidbits. The tides also leave a rich legacy of sea shells, often including magnificently sculptured conical whelk shells. Taken home and placed next to your ear these beach ornaments seem to carry with them the roar of the ocean wind.

Also scattered on the beach are mermaid's purses, the little black pillow-shaped egg cases of the skate, a broad flat fish resembling a sting ray. Elsewhere, dead horseshoe crabs dot the ocean edge.

Tidal pools glisten in the morning light and their clear water reflects the clouds scudding above. The edges of these pools are often delicately etched where the water has receded and advanced.

Overhead a flock of snow geese sweeps by and lands on still another tidal pool behind the front line of dunes. By creeping on your belly up a sandy incline, you can spy on these birds through the waving dune grasses. Suddenly, however, the human intruder is spotted and the flock explodes into flight with a babel of excited alarm calls that can be heard for miles.



"A year indoors is a journey along a paper calendar; a year in outer nature is the accomplishment of a tremendous ritual."

The Outermost House by Henry Beston.

The topography of the Chincoteague refuge consists of wide sandy beaches backed by a series of low dunes which fall away to extensive salt marshes bordering Chincoteague Bay.

Driving away from the ocean beach, we suddenly notice a photographer frantically taking photos on the bank of a roadside canal. The object of his attention is a large river otter perched on the opposite bank who is calmly eating a fish.

After swallowing the last morsel of its meal, the otter dives into the water and within minutes returns with another fish in its mouth. Resuming its former perch, the otter quickly gobbled its latest catch. Then, alarmed by a sudden movement of the photographer's young son, the otter submerges again and begins swimming. Its course can be followed for

several feet by a trail of air bubbles streaming to the surface until it turns into a tributary creek and disappears behind some shrubbery.

It was on this same waterway that we had seen last fall a black skimmer, a large bird with a long protruding lower bill. The skimmer was flying just above the canal surface with slowly beating wings like a giant black butterfly. As it advanced its lower bill plowed a path through the water. If it did not catch a fish in its first sortie, the skimmer abruptly reversed its course and began checking to see what creatures may have been attracted to the wake left in its passage.

While skimmers are rare in winter at Assateague, many shore birds and waterfowl gather on the ponds of the Chincoteague Wildlife Refuge at this time of year.

Great Blue Herons stand motionless on their stilt-like

legs in the chilly water waiting patiently for the passage of some unwary fish. One swift jab with its bill and the Great Blue usually has a meal before resuming its statue-like pose.

Stately whistling and mute swans sail the pond waters between clusters of mallard, pintail and black ducks. Coots, a white-billed chicken-like water bird, dart back and forth with sudden bursts of speed.

On the rocks near a cove lie the broken remnants of clam shells dropped by gulls determined to have a tasty meal. Examining the icy rocks with minute care with its stout bill is a bird known as the Ruddy Turnstone. This creature received its name because of its habit of turning over stones in its quest for food.

Garbed in mottled red, black and white plumage, the turnstone looks like a marble cake in spring and summer, but in fall and winter wears a more subdued attire.

Driving to the ocean beach in the evening our car headlights shine on a white object in a tree as the auto rounds a curve. Halting the car, we realize that it is an egret that has tucked its head under its wing and retired for the night. Disturbed by the continued light, the egret sleepily raises its head and begins to look around from its lofty perch as we drive off hoping that this exotic bird can resume its slumbers.

On the moon-lit beach, ocean waves crash rhythmically and send sprays of salt water flying. Far out at sea a light blinks from a passing ship and then is swallowed in the darkness.

Over the dunes whirs a flock of brant geese and as they pass by their silhouettes can be clearly seen against the full moon. Disappearing into the night, the geese gabble to each other reassuringly and then their voices gradually fade into silence.—C.D.P.

1 REGION

New Hampshire

EPA has signed four environmental agreements with the State of New Hampshire that should lead to closer cooperation in the solution of environmental problems. The agreements set a working relationship with the State to more efficiently resolve several key environmental issues. Governor Hugh Gallen of N.H. said, "The agreements between EPA and the four environmental resource agencies define specific issues which these agencies and EPA will attempt to resolve during the coming year." He continued, "Included are issues relating to water quality, air quality, pesticides, and hazardous wastes which we feel warrant attention at the highest levels of State and Federal Government. By establishing priorities and responsibilities, we hope to solve some complex environmental problems through a closer working relationship between the State and EPA."

Bottle Law Stays

Voters in Maine overwhelmingly supported the State's 21-month old returnable bottle law. The law places a minimum five-cent deposit on all beer and soft drink bottles and cans. Surveys have shown strong public support for the law, which has greatly reduced roadside litter, cut down on trash totals, and led to recycling. Studies show that bottle and can litter is down 78 percent and overall litter is down 32

percent. Municipal waste hauled to dumps has been cut by 6 percent. Governor Joseph E. Brennan and the State's congressional delegation all campaigned to keep the law, as did a coalition of environmental groups, farmers, and labor and municipal officials.

2 REGION

Recycling Grants

Region 2 has funded grants totalling \$946,383 to ten communities in New York and New Jersey for solid waste recycling and resource recovery projects. The grants are part of the Urban Policy Program. They will give the communities an opportunity to plan ways to produce energy, conserve resources, and alleviate waste disposal problems. Grant recipients include New York City, the Port Authority of New York-New Jersey, Camden, and Newark, N.J. and Westchester County, N.Y. Some of the projects to be developed with the funds include: refuse-to-steam plants, marketing studies for refuse-derived fuel, city-wide source separation of refuse in Newark, and the feasibility of co-disposal plants (power generators that burn refuse and sewage sludge.) EPA is taking an active role in helping the grantees to plan their projects to enhance the likelihood of success. The Urban Policy Program provides funds to assist communities in addressing the complex technical, financial, legal, and institutional issues involved in implementing resource recovery.

3 REGION

Groundwater Contamination

Region 3 is helping communities in suburban Philadelphia to cope with widespread contamination of underground drinking water sources by trichloroethylene (TCE). TCE is an organic chemical compound widely used as an industrial and commercial solvent and degreaser which may be contained in many consumer products. The National Cancer Institute has established TCE as a cancer-causing agent in mice. Approximately 120,000 persons in Bucks and Montgomery Counties have been exposed to the chemical. According to Regional Administrator Jack J. Schramm, the Agency has a "two-pronged strategy . . . to take immediate action to protect public health and the longer range investigation into the possible sources of contamination." EPA will place major emphasis on assisting the Commonwealth of Pennsylvania and the 19 affected communities to reduce public exposure to TCE. The Regional Office recently sponsored a seminar on the latest technology for removal of TCE from water supplies for local water supply and industry officials. Agency staff have been checking private labs to ensure they can perform accurate tests for homeowners, advising residents on the effectiveness of home drinking water treatments, and distributing fact sheets about the scope of the problem. Regional personnel also began an intensive sampling program of contaminated water systems in six com-

munities. The results will help EPA to evaluate TCE levels and serve as a basis for future investigations of sources. Sources appear to be local industry using improper disposal techniques as well as the normal use of commercial products containing TCE.

Delaware, D.C.

Region 3 Administrator Jack J. Schramm recently signed State/EPA Agreements with Delaware and the District of Columbia to streamline the management and reduce the costs of environmental cleanup. The agreements define State/EPA roles in the management of more than \$21 million in Federal grants for Delaware and \$40 million for the District. The grants are made under the provisions of the Clean Air Act, the Clean Water Act, the Resource Conservation and Recovery Act, and the Safe Drinking Water Act.

4 REGION

TVA Pact Set

A consent decree entered by a Federal District Court in Birmingham resolved the dispute over Clean Air Act violations by sulfur dioxide and particulate emissions from two Tennessee Valley Authority steam plants in Alabama. The agreement contains interim emission limits, and monitoring and final compliance schedules. It also establishes an implementation committee comprised of all parties in the suit, which

was filed jointly in 1977 by EPA, the State of Alabama, the Alabama Lung Association, the Sierra Club, and the Natural Resources Defense Council. The court awarded costs and attorneys' fees to the plaintiffs. Still pending is another consent decree in Federal District Court in Nashville for eight TVA power plants in Tennessee and Kentucky that violate Clean Air Act regulations.

5 REGION

PCB Action

In an action separate from EPA's long-standing litigation with Outboard Marine Corporation, Region 5 Administrator John McGuire announced recently that the Agency will act to prevent PCB residues from the company's former operations from being washed into Lake Michigan. The company is the manufacturer of Johnson Motors in Waukegan, Ill., where the harbor has the largest concentration of PCB's on the Great Lakes. Company officials report they stopped using PCB's in hydraulic fluids in an old die-casting plant in 1971, but residues remain in the sediments of a discharge ditch on OMC property. Known as North Ditch, it carries stormwater runoff directly into Lake Michigan. McGuire said action is necessary to prevent a possible 400 pounds of PCB's from being flushed through the ditch into Lake Michigan with next spring's rains and snowmelt. The revolving fund created under Section

311 of the Clean Water Act of 1977 provides Federal funds to prevent threatened water pollution. The Outboard Marine Corp. was granted the opportunity to prevent further PCB discharge into Lake Michigan under the terms of Section 311, but they decline to accept the responsibility. To protect public health EPA, in conjunction with the U.S. Coast Guard, may act to prevent such threatened water pollution. Region 5 estimates that the cost of cleanup, perhaps using a culvert to divert storm-water away from polluted sections of the North Ditch, could cost \$300,000 to \$400,000.

6 REGION

Test Burns

The Energy Systems Co., El Dorado, Ark., and Rollins Environmental Services, Deer Park, Tex., have conducted test burns for incineration of PCB's. Six-hour burns were run for three consecutive days at each location. The data gathered will help officials determine whether burning at extreme temperatures will destroy polychlorinated biphenyls (PCB's). The further sale or new use of PCB's was banned by law in 1979. The chemicals are used in transformers and capacitors.

State Clean Air Grants

Region 6 recently made more than \$5 million in grants to State air pollution control agencies, assisting the States in meeting their primary responsibilities to abate and control air pollution under the Clean Air Act. The awards were as

follows: Arkansas Department of Pollution Control and Ecology, \$779,775; Louisiana Air Control Commission, \$579,000; New Mexico Environmental Improvement Division, \$638,507; the Texas Air Control Board, \$2,240,512, and Oklahoma State Department of Health, \$912,075.

7 REGION

Gotchal

Region 7 is using time-lapse photography to catch polluters. Recently in the course of one month Tony Wayne of the Enforcement Division and Sammie Feeback, the Region's Audio-Visual Specialist, turned cameras on three major air polluters in Kansas, and five in the Kansas City, Mo. areas. Using time-lapse imagery, the team was able to "get the goods" on the eight polluters by shooting continuously with high-speed film in a 16-mm camera equipped with a telephoto lens, which they borrowed from the State of Missouri. The camera was set on one frame per 30 seconds and ran at 13-hour intervals during non-business hours. Using time lapse photography EPA personnel could view 24 hours of film in 2 minutes and 42 seconds, and six-minute violations were viewed in as little as one second. Although this evidence may not as yet be admissible in a court of law, the results will give the Enforcement Division additional surveillance presence at minimal cost to Regional resources. The technique

also could be used for observing asbestos demolition projects, land-fill operations, oil spills, or other waste cleanup operations, as well as to monitor progress at construction grants projects.

8 REGION

Fine Paid

As a result of legal action by Region 8, Magna Corporation recently paid a \$6,600 fine for causing a large fish kill in 1976 near Lyons, Colo. Magna was charged with violating the Federal Insecticide Fungicide and Rodenticide Act by misuse of Magnicide "H," a herbicide used to control floating and submerged weeds and algae in irrigation canals. The company was cited for releasing irrigation water treated with the pesticide into St. Vrain Creek too soon, and for failure to consult the Colorado Department of Natural Resources before applying the pesticide. Magnicide "H" contains acrolein, a chemical highly toxic to fish, which breaks down and becomes harmless after about six days. The label requires that treated water be held and that the State Fish and Game Agency be notified prior to application. It is a violation of Federal law to fail to follow pesticide label directions. Magna did, however, attempt to neutralize the treated water before it entered St. Vrain Creek. As directed by Region 8 Administrator Roger Williams, the company paid the civil penalty to the U.S. Treasury.

9 REGION

Violations Issued

Region 9 recently issued violation notices to 205 sources of air pollution in the Los Angeles area for failing to submit Air Pollution Episode Plans. Last September, second stage alerts were called on ten different days, when ozone readings reached levels three times greater than Federal standards. EPA required the State of California to develop Air Pollution Episode Plans in its State Implementation Plan by January, 1972. In March, 1975, the California Lung Association sued EPA to compel the Agency to develop an Episode Plan for the basin, believing the State's plan inadequate. A provision in the 1977 suit settlement was that EPA approve acceptable portions of the State plan and write regulations to supplement or replace deficient ones. In part, final rules required that certain air pollution sources submit plans to curtail and abate emissions resulting from traffic to and from their facility no later than August 28, 1978. Some 2,500 sources received written notices in early 1978; half of them responded. The remaining sources have been notified repeatedly and advised of legal action that could result if they again fail to submit plans. Such failure could make a source subject to further enforcement action.

10 REGION

Birds, Seals Threatened

The after-effects of a marine accident in the remote Pribilof Islands could threaten more than 190 species of birds and 1.5 million fur seals. Late last year a Japanese fishing-factory ship accidentally grounded on one of the islands in the Bering Sea. Diesel oil escaping from the fractured hull of the vessel entered Salt Lagoon on St. Paul Island, killing marine organisms, which are a vital food source for Asian and North American birds that use the lagoon as a stop-over point on their annual migrations. Full effects of the oil spill damage won't be known until spring when the birds and seals return to their rookeries. Ray Morris of EPA's Alaska Operations Office in Anchorage was at the scene within hours after the grounding and remained to direct early damage assessments and beach cleanup operations. Recurrent storms that battered the grounded vessel made it impossible to recover the oil that continued to leak from the ship. □



Top: Workers install gas pipeline as part of an air pollution control project in Sarajevo, Yugoslavia. The World Bank has loaned \$38 million to help convert heating systems in homes and businesses to natural gas, a clean-burning fuel.

Right: Monitoring sulfur dioxide in the air in the Netherlands



Environmental Quality in the Western World

By J. W. MacNeill



What is the state of the environment in the industrialized countries of the Western World? Has there been a deterioration as a result of economic growth? Have the policies initiated by public authorities improved the situation?

These are the questions that the Paris-based Organization for Economic Cooperation and Development (OECD) was asked to answer on the basis of an intensive review of existing studies, statistics furnished by member countries, and the results of a special survey carried out by a group of experts on the state of the environment.

Its report, "The State of the Environment in OECD Countries," was submitted to the meeting of the OECD Environment Ministers on May 7 and 8, 1979. It assessed changes in the state of the environment over the past decade since environmental improvement became an essential goal of public policy. Countries in the OECD are Australia, Austria, Belgium, Canada, Den-

mark, Finland, France, Federal Republic of Germany, Greece, Iceland, Ireland, Italy, Japan, Luxembourg, The Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, the United Kingdom, and the United States. Yugoslavia is an associate member.

Responses to pressures on the environment

The rapid economic expansion of the decade that ended in 1975 and the pressures on the environment that most OECD member countries experienced resulted in increasing demands for action to protect the environment and improve environmental quality. Public authorities responded to these new demands by creating new ministries and specialized administrative bodies, and by promulgating new laws and regulations.

Measures were adopted to encourage more environmentally conscious behavior by private industry and by the public at large. Environmental impact statements, for example, are now required for a wide range of projects in Australia, Canada, France, Ireland, New Zealand, Sweden, and the United States.

Both public and private enterprises have had to conform to new laws and regulations and to adapt to new market conditions. They have done this by modifying their production processes and, to a lesser extent, by changing the location of their plants.

On the strength of the OECD assessment, it is possible to describe broad trends, successes achieved, and remaining problems, although the conclusions drawn do not, of course, necessarily apply to every member country.

Successes achieved

Significant progress has been made in dealing with those environmental problems

that were identified as most important and that became the object of sustained effort during the late sixties and early seventies. This optimistic note is based on evidence of the following improvements in environmental quality:

- Reduced fresh water pollution by suspended solids and biodegradable oxidizable matter in countries such as France, Japan, Netherlands, Sweden, the United Kingdom, and the United States;
- Reduced urban air pollution by sulfur dioxides (e.g., —50 percent in Japan over 1970-1975), particulate matter (e.g., —50 percent in Germany and France over 1970-1975), and containment of urban air pollution by carbon monoxide;
- Reduced flows into the environment of some persistent chemicals such as DDT, PCB's and certain alkyl mercury compounds, accompanied by a reduction or stabilization of these chemicals in most samples of wildlife;
- Extended protection of outstanding rural environments by their designation and management as national or regional parks;
- Extended protection of the built environment through the creation of pedestrian streets and traffic management in central and residential areas;
- Extended protection and rehabilitation of buildings of outstanding historical or architectural value.

Frequently, however, the importance of these achievements is not reflected sufficiently in the improvement to the environment itself. Their full importance can be appreciated only in comparison with the deterioration that would have occurred had nothing been done.

Studies in several countries indicate that the overall economic impact of environmental expenditures has been moderate, neutral, or positive. During the mid-70's, no country estimated national resources allocated to pollution abatement to be higher than two percent of Gross Domestic Product. The impact on inflation in several OECD countries was estimated at between 0.1 and 0.3 percent per annum, while the impact on total employment, economic growth, and balance of payments was judged neutral to moderately positive.

There is also some evidence that the relationship between resource consumption and output is improving. This appears to be due both to the effects of the market and to changing attitudes about the management of resources and wastes by government, industry, and the public. Reductions in resource consumption relative to gross domestic product are particularly apparent in the case of energy. They are beginning to appear as well in industrial processes where resource-efficiency stand-

ards have been defined, where materials are being recycled and where products are being recovered and re-used.

Remaining and new problems

Certain environmental problems have worsened or at best have only been checked. These are generally in areas that received less attention from governments or in areas for which policies were (and often still are) difficult to define, and can be characterized as follows:

- The quality of drinking water has become a subject of increasing concern in various places and the eutrophication of lakes has become more widespread in many countries;
- Air pollution by photochemical oxidants has also become of concern in certain areas and emissions of nitrogen oxides have increased;
- Noise has become more pervasive and insistent, with between 15 to 20 percent of the inhabitants of OECD countries now being exposed daily to levels considered as the upper limit of "acceptability";
- Good quality farm land has been lost to urban uses and some land has deteriorated due to erosion, increased aridity, and abandonment.

Changes in the state of the environment during the 1970's may be further characterized as follows:

- Concern for the environment previously focused on a limited set of pollutants, whereas today it includes a wide range of substances, including "new pollutants" such as heavy metals and organochlorides and micropollutants.
- The emission of pollutants from point sources has often declined or stabilized, but emissions from diffused sources have generally increased (e.g., urban runoffs, and fertilizers and pesticides used in agriculture).
- The degree of concentration of pollutants has often been reduced or stabilized where it was high (e.g., for sulfur dioxide —30 percent in London, —50 percent in Tokyo, —75 percent in Toronto over 1970-1976). Some pollutants, however, such as sulfur compounds, which are transported over long distances, now affect much wider areas. Global effects of some pollutants on climate and on the stratosphere are also of greater concern.
- Acute ill-health and death caused by short-term exposure to intense loads of pollution have generally decreased, but more attention is being given to the long-term effects on human beings of exposure to substances that may give rise to genetic changes, cancer, and deformities at birth.
- Critical tracts of land are now well-protected, but greater attention is being

focused on better nationwide land management.

- Accidental pollution by toxic substances such as oil, nuclear radiation, and some chemicals is now of major concern.
- Economic and social changes are taking place that have major implications for the environment. Notable among these are further increases in incomes, mobility, and leisure, and trends to suburban expansion, second homes, and more spread-out forms of industrial production. All of these are likely to increase pressures on land and energy.

The need for better environmental information

In the course of preparing the OECD review of the state of the environment, it was essential also to assess the state of environmental statistics. As might be expected, there are many gaps in information and data, even in traditional areas of concern like air and water pollution. Moreover, available data often lack harmonization between countries, making international comparisons difficult or, at best, tentative. What is more, the data available are not always directly usable in policy analysis and evaluation.

This first international assessment of the state of the environment thus demonstrated that improvements in the collection, interpretation, and publication of environmental facts are essential to the further control of pollution, the successful management of natural resources, and the improvement of quality of life. Accurate, appropriate, and internationally comparable data are necessary in order to assess past actions, take new initiatives, and harmonize national policies.

In light of this, the Environment Ministers of the OECD adopted a Recommendation on Reporting on the State of the Environment. They recommended that member countries should prepare periodic national reports on the state of the environment and generally should improve the basis for providing information on environmental matters. They also called for the preparation by the OECD of a periodic international report on the state of the environment of the OECD region and for a co-ordination by the OECD of national efforts to improve the international comparability of environmental data and information. The OECD and member countries are currently working to implement this recommendation. □

J. W. MacNeill is Director of the Environment Directorate, Organization for Economic Cooperation and Development (OECD).

News Briefs

Protection for U.S. Scenic Areas

The scenic beauty of over 29 million acres of national park and wilderness areas would be protected from encroaching air pollution under regulations now being developed by EPA. A final list of 156 areas where protection of visibility is particularly important is included as part of the proposal. The States would have the responsibility for running the visibility protection program under EPA guidelines.

Savings for Homeowners

A new, highly-efficient oil-fired furnace that can cut fuel needs by more than 15 percent, and reduce nitrogen oxide air pollution by 65 percent, has been developed with the aid of an EPA research grant. "The EPA Integrated Furnace" was developed under contract by Rockwell International of Canoga Park, Calif. The firm tested six of the furnaces during the winters of 1977-'78 and 1978-'79. This 15 percent fuel reduction could mean an annual saving of about \$110 for an average home. For further information, write Blair Martin, (MD-65), Industrial Environmental Research Laboratory, U.S. Environmental Protection Agency, Research Triangle Park, N.C., 27711, or phone him at (919) 541-2235 (FTS 629-2235).

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

AIR

Auto Painting

New clean air regulations proposed by the EPA would reduce smog-forming pollution from new auto assembly plant painting operations by 80 percent.

Only new auto and light-duty truck surface coating (painting) operations, or existing ones that have been modified or reconstructed would be covered by the proposed regulations. The annual model changeover would not be considered a modification.

The proposed rules would reduce volatile organic compounds (primarily hydrocarbons) which can seriously affect eyes, mucous membranes, and the respiratory system. Emissions of the compounds would be limited to 0.1 kilogram of carbon per liter of paint solids for the prime (first) coat, and .84 kilogram of carbon per liter for the guide (second) coat and top (third) coat.

By 1983, the rules would increase capital cost to the auto industry by \$19 million, and would add less than one percent to the price of autos and trucks produced at new assembly plants.

Energy Supply

EPA Deputy Administrator Barbara Blum recently challenged the national advertising campaign by Union Carbide Corporation which claims environmental actions contribute to energy supply problems. Blum said Union Carbide's case "simply does not square with reality."

The advertisements, which have appeared in

numerous newspapers, claim that environmental regulations hinder increased coal use. Speaking to the Gas Men's Roundtable in Washington, D.C., Blum pointed to Union Carbide's own public opinion poll which shows that 50 percent of the American people do not feel environmental actions contribute to energy shortages. That is an "amazing figure when you consider the barrage of criticism and finger-pointing aimed at EPA over the energy issue," she said.

Blum agreed that cleanup costs are higher for Carbide's industrial scale boilers using coal instead of oil. "But the bigger point is this," she said. "Today there are huge quantities of home-grown coal that can be mined and burned, providing American jobs and stemming the dangerous trend of buying more and more of our oil from uncertain foreign sources. To use coal, however, the public must have reassurance that it is being burned in a way that will not endanger their health and safety."

Air Hazards

EPA is proposing procedures for identifying, assessing, and controlling airborne carcinogens, specifically those emitted into the atmosphere from stationary sources. This proposal is the first step in carrying out the Federal Regulatory Council's new directive on the strategy to be followed by Federal agencies in controlling all types of cancerous substances.

The procedures outlined in EPA's policy are intended to guide the Agency in identifying and controlling air carcinogens. The policy itself does not impose requirements on industrial sources but does provide

a framework for EPA decision-making.

Air Pollution

Sulfur dioxide and nitrogen dioxide air pollution would be substantially reduced from 250 new and modified stationary gas turbines by 1982, under final regulations just issued by the EPA.

Gas turbines produce power for a variety of industries including electric utilities, offshore oil, and gas drilling platforms, and transportation of oil and gas through pipelines.

EPA estimates that the new regulations will increase capital and operating costs of gas turbines no more than one to four percent per year.

ENFORCEMENT

Auto Industry

EPA has concluded that a majority of the auto industry can meet the more stringent carbon monoxide auto emission standards that go into effect in 1981.

The Agency also denied requests by four foreign auto makers for a two year delay in meeting the 1981-82 standards. They include Fuji Industries (Subaru) for its 97 and 109 Cubic Inch Displacement engine, Nissan (Datsun) for its 75, 85/91, 119, and 146/168 CID engines and its EF-A and EF-B engines, Renault for its 85 CID engine and Toyo Kogyo (Mazda) for its 70 CID engine.

At the same time EPA granted a waiver of the 1981 standards to the Mazda 91 and 120 CID engines.

The waivers for ten engine families were denied because either the engine could incorporate effective control technology, driveability,

and fuel economy to meet the new standards, or the manufacturer failed to provide sufficient information to establish that such technology is not available.

Two Toyo Kogyo waivers for one year were granted because the only way that the standard could be met would be to require the owner to have the catalytic emission control changed within the first 50,000 miles. Placing this extra burden on the consumer was not deemed to be effective control technology.

NOISE

Quiet Program

A new program to encourage Federal, State, and local governments to buy quieter products has been announced by the EPA. The program is part of the Federal urban noise initiative outlined in President Carter's environmental message August 2, 1979.

The Buy Quiet Program, as it is called, is being supported by a task force composed of EPA, the National Bureau of Standards, the General Services Administration, the National Institute of Government Purchasing, and the National League of Cities, as well as a number of State, county, and regional groups.

As a start, the Federal Government is loaning power lawnmowers to a selected group of city and other local governments. The mowers are both quiet and competitive in price with other mowers and will serve as a model in purchasing not only mowers but other products as well.

Garbage Trucks

The EPA has announced standards which limit the noise from newly manufactured garbage

trucks. As a result, all truck-mounted solid waste vehicles manufactured after October 1, 1980, will not be allowed to emit a noise level in excess of 79 decibels measured at seven (7) meters (23 feet). The permissible level is reduced further to 76 decibels for vehicles made after July 1, 1982.

Reduction of the noise of garbage trucks should reduce urban and residential noise levels and the long-term impact on people exposed to the noise, as well as the disruption of speech communication and sleep. EPA estimates that this regulation will result in a 74 percent decrease in the extent and magnitude of the adverse effects from refuse vehicle noise by 1991.

The new regulation will also bring the extra benefit of saving fuel. The reason for this is that a principal method for reducing the noise of the vehicle during compaction operations is to reduce the speed of the engine running the compactor. When all the refuse collection vehicles meet the noise standard, the operators will be saving, every year, about two million gallons of gasoline, and over a million gallons of diesel oil.

Cooperative Agreements

EPA has announced the funding of 26 noise control cooperative agreements between the Agency, 15 States, the District of Columbia, and 10 universities totaling \$1,384,681.

With this step, EPA is creating a network which will work in partnership with the Agency in assisting local communities to establish effective noise control programs.

The creation of this network is a major step in the implementation of the Quiet Communities Act of 1978.

PESTICIDES

Insect Lures

The romantic impulses of two of the country's most destructive insects are being used to control them.

The EPA has approved two new pest-control products that use the sex-attracting scents or "pheromones" of the gypsy moth and the cotton boll weevil to prevent them from destroying trees and cotton. The products are the latest in a series of relatively new pest-controls that work by interfering with insects' natural processes rather than simply poisoning them.

Different pheromone chemicals are emitted in extremely small amounts by both female gypsy moths and boll weevils to attract males of their species for mating. But the new pest-control products, both made by Herculite Products, Inc. of New York City, use man-made duplicates of these two scents to discourage reproduction. This means that fewer caterpillar offspring of these pests will be created to eat valuable vegetation.

Before approving the new products, EPA required tests to ensure that they would have no "acute" toxic effect on people. Certain other tests on how the pheromones behave in the environment were waived by EPA because the products mimic substances already found in nature.

Control Pact

The National Park Service and EPA plan to introduce a new form of pest control to Washington, D.C., area parks.

Under an interagency agreement, EPA is providing the Interior Department's National Park Service \$70,000 to

develop and carry out a model program for controlling park pests such as insects and rats while reducing unnecessary pesticide use. This initial funding covers October, 1979, to October, 1980.

The program, probably the largest of its kind ever undertaken, will emphasize the use of natural pest controls—beneficial insects preying on destructive ones, for example—over some of the more conventional inherently toxic forms of chemical pest control. However, chemical controls may not be ruled out entirely. This combination of pest control measures, generally known as "integrated pest management" (IPM), already is being used successfully in certain parts of American agriculture.

New Pesticide

EPA has authorized a one-year test of a new pesticide to control stinging fire ants on 110,000 acres in nine southern States. The new product is a chemical compound made by the American Cyanamid Company of Princeton, N.J., and identified as "AC 217,300."

The test, to end October, 1980, will include treatments on livestock grazing land as well as on non-crop areas such as military bases and power line rights-of-way.

A number of pesticides have replaced the banned fire-ant insecticide Mirex for use around homes or farm buildings. These include diazinon, propoxur, and chlorpyrifos. But none of them is practical for use on large cropland areas. If it proves environmentally acceptable, this product may fill the gap.

Whether EPA will approve this experimental insecticide for routine

use depends both on the product's long term human health effects and the field trials.

DBCP Action

EPA has temporarily halted all remaining uses of the pesticide DBCP—a suspect cancer agent and source of reduced sperm levels—except for treatment of Hawaiian pineapple groves.

The remaining uses of DBCP (dibromochloropropane) stopped by EPA include treatments for peach trees, citrus fruit trees, grapes, soybeans, certain other crops and golf course turf.

By suspending these, EPA prohibits any sale or use of DBCP for these purposes during the year or more it may take the Agency to hold more in-depth "cancellation" hearings to consider a permanent ban on the pesticide. This temporary halt will become permanent unless manufacturers or users request cancellation hearings.

EPA stopped most vegetable uses of DBCP in 1977 because it was thought to leave a residue on these goods.

EPA exempted pineapples grown in Hawaii from its wider ban because DBCP does not leave a residue upon them and because almost two years elapse between DBCP treatments to pineapple soil and harvesting of the fruit. This lengthy time period minimizes health risks to farmworkers gathering the fruit.

Review of EPN

EPA is reviewing the economic benefits and the possible human health risks of the pesticide "EPN."

EPN is used primarily to kill boll weevils and boll worms on cotton. Some EPN is used to control other pests on corn and soybeans, often rotated with cotton crops. It is also used on some

fruit, vegetable, and nut crops.

The EPA review is based on existing evidence that EPN causes nerve disorders in some laboratory animals, and may pose health risks to aerial and field applicators, as well as to unprotected bystanders. There is also some evidence that EPN may present an acute hazard to aquatic organisms.

Pesticide Allowed

The EPA has decided to allow growers to continue using the pesticide pronamide on such crops as lettuce, alfalfa, and berries.

In doing so, the Agency decided to classify pronamide as a "restricted" pesticide which can be purchased and used only by applicators with special training. The restrictions are designed to protect the health of farm workers and the general public.

Herbicide Review

Three Federal agencies, including EPA, have launched an investigation into claims that a herbicide registered for use in the U.S. may be responsible for heart-related birth defects among children fathered by workers who manufactured the substance and for severe skin rashes among the workers themselves.

The claims were detailed at a meeting between members and officials of the International Chemical Workers Union and officials of the Occupational Safety and Health Administration, the National Institute for Occupational Safety and Health, and EPA.

TOXICS

Agencies Consider New Asbestos Rules

EPA and the Consumer Product Safety Commission are both considering

regulations that could restrict or prohibit many uses of asbestos still allowed in the United States. Asbestos is a mineral fiber that has been linked to a variety of diseases including several types of cancer.

The agencies said that human exposure to a multitude of asbestos sources may present an unreasonable health risk to the general population. Nearly 750 thousand tons of asbestos are used in an estimated 2,000 to 3,000 products each year, including various items commonly found around the home.

The two agreed to share information and coordinate their efforts.

AGENCYWIDE

"Bubble" Policy

The EPA recently issued a new innovation-inducing, cost-cutting "bubble" policy allowing industry management to figure out the best way to clean up air pollution at individual plants, provided that overall clean air requirements are met.

"If businesses can find better ways of cleaning up their air pollution than detailed environmental rules now permit, the Environmental Protection Agency encourages them to innovate," said EPA Administrator Douglas M. Costle.

Costle gave an example of the bubble concept in practice: "If the owners of an auto paint shop decide that it is more cost-effective to control hydrocarbon air pollution from grease removal rather than from painting operations, they could apply for State approval to reduce controls at the painting end in exchange for a compensating increase in controls at the degreasing process. The key consideration is to maintain or improve air quality." □

Ninth Annual Awards Ceremony

Five individuals and three groups were awarded gold medals for exceptional service last month at the EPA annual awards ceremony. The individuals honored were: Leo Azarraga, for outstanding achievement in the development of a system for analysis of organic pollutants in water; Aubrey Altshuler, for dedicated leadership and outstanding contributions to the atmospheric sciences research program; Robert Knox, for outstanding leadership in the Minority Business Enterprise Program for Construction Grants in Region 2; Murray Strier, for outstanding scientific contributions to the development of EPA Effluent Limitations Guidelines for toxic pollutants, and Mae Walterhouse, for outstanding leadership of a program to improve the status of women at EPA.

A gold medal went to the EPA Region 3 Monongahela Valley Steel Group for outstanding contributions to the improved compliance with environmental regulations by U.S. Steel's facilities in the Valley. The group includes: Bernard Bloom, Douglas Farnsworth, Geoffrey Grubbs, Robert Koegel, Thomas Maslany, Donna Thomas, Terry Oda, Virginia Pruden, Edward Reich, David Rochlin, and Richard Wilson.

The Environmental Monitoring Systems Lab at Las Vegas, Nev., received a gold medal for outstanding performance and dedication in radiation monitoring work at the Three Mile Island reactor accident. The group includes: Wayne Bliss, Erich Bretthauer, Edward Compton, John Coogan, Willis Corkern, Charles Costa, Gerald Doran, Dan Fitzgerald, R. Frank Grossman, Richard Hopper, Gordon Howard, Donald James, Frederick Johns, Howard Kelley, Herbert Maunu, Jr., Lee Miller, Anita Mullen, Jerre Ott, William Phillips, Ottis Reed, Jr., Donald Rockwell,

Samuel Ronshaugen, Allan Smith, Daryl Thome, Jack Thrall, Jack Vandervort, Daniel Wait, and Lee Ziegler.

A gold medal also went to the Utility NSPS Regulatory Analysis Group for outstanding achievement in designing and implementing a model analysis of the issues related to alternative New Source Performance Standards for electric utility steam generating units. Members of the group are: John Crenshaw, John Haines, David Shaver, and Robert Statnick.

Ten individuals and four groups received silver medals for superior service. The silver medals went to, Ronald Bradow, Research Triangle Park, N.C.; Richard Cocozza, Headquarters; Nicholas DeBenedictis, Region 3; Roy Ellerman, Region 10; Gerald Klug, Region 9; Bill Lamoreaux, Region 10; Susan Lepow, Headquarters; John Lyon, Headquarters; Michael Trutna, Research Triangle Park, N.C., and Frederick Le Young, Jr., Region 6. Silver medals also went to: the Staff of the EPA Journal, Charles Pierce, Truman Temple, John Heritage, and Christine Perham; the Pesticide Emergency Exemption Group, Patricia Critchlow, Hoyt Jamerson, Gracie Robinson, Donald Rodier, Donald Stubbs, Jannie Williams, and James Touhey; the Region 6 Emergency Response Group, E. Wallace Cooper, William Davis, Robert Forrest, John Henderson, David Lopez, Richie Marple, Roger Meacham, Richard Peckham, and Oscar Ramirez, Jr.; and the Land Disposal Facilities Staff, Ronald Anderson, Truett DeGeare, George Dixon, Mark Greenwood, Emery Lazar, David Noble, Alessi Otte, George Prince, Chris Rhyne, Kenneth Shuster, John Skinner, Robert Tonetti, Burnell Vincent, John Walker, and Bruce Weddle.

The Administrator's Award for Excellence was given to Gail V. Brooks, Headquarters; Romona McQueen, Region 3; Nicolie Meyer, Region 10; Bonita Ronshaugen, Las Vegas, Nev.; Patricia Savage, Headquarters, and to the Processing Unit, Personnel Management, Headquarters, including

Christine Bell, Alex Lichtenstein, Marie Newman, Randy Phoebus, Regina Rawl, and Lucy Tanner.

Winners of the Public Health Service Meritorious Service Medal were, Richard Blanchard, Montgomery, Ala., and Paul B. Smith, Region 8. Distinguished Career Awards went to Alexander Greene, Headquarters; John Nader, Research Triangle Park, N.C.; Albert Rodriguez, Region 10; and Eugene Sawicki, Research Triangle Park, N.C.

Michele Beigel Corash

She has been named General Counsel for EPA. Corash brings to the job a background both in private practice and in government. She comes to EPA from the Department of Energy, where she was Deputy General Counsel for Regulations, in charge of the regulatory aspects of all DOE programs. Before that, she spent six years at the Washington, D.C. law firm of Wilmer, Cutler and Pickering, working on regulatory and anti-trust issues. She has also served as special assistant to the Chairman of the Federal Trade Commission and as an associate in the New York law firm of Weil, Gotschal, and Manges. Corash is a graduate of New York University Law School and Mount Holyoke College.

Kenneth Canfield

He has been named Special Assistant to Administrator Costle, with responsibility for the Administrator's weekly report to the President. Canfield comes to EPA from the Department of Justice, where he was a Special Assistant to the Assistant Attorney General in the Civil Division. Previously Canfield was a law clerk for Judge Frank M. Johnson, Jr., now on the U.S. Court of Appeals in Montgomery, Ala. He is a graduate of Dartmouth College and Yale University Law School.

Rebecca W. Hanmer

She has been named Administrator for EPA's Region 4 office in Atlanta, Ga. In announcing her appointment Administrator Costle said, "Ms. Hanmer will bring a wealth of environmental and managerial experience to her new job. She has learned first-hand the problems and needs of local officials. . . ."



Hanmer has been Deputy Regional Administrator of the Agency's Boston office since 1977. From 1975-77 she served as Director of the Office of Federal Activities at Headquarters. Hanmer began her Federal career in 1964 with the Department of Health, Education, and Welfare. In 1966 she joined the Office of Program Planning and Evaluation in the Federal Water Pollution Control Administration. Later she served as Staff Assistant to the Assistant Commissioner for Environmental and Program Planning in the Federal Water Quality Administration. She came into EPA at its inception and served in the Office of Federal Activities from 1971 on. Hanmer was awarded EPA's Silver Medal for Superior Service in 1974. She has a B.A. in political science from the College of William and Mary, Williamsburg, Va., and an M.A. from American University, Washington, D.C. in 1966.

John Freshman

He has been named Special Assistant for External Affairs to Administrator Costle. He will advise the Agency about the political, institutional, and organizational impact of EPA

programs and actions upon the government and public and private sectors, and monitor the responses to Agency policy from the Congress, State and local governments, and various citizen constituencies. Freshman comes to EPA from the U.S. Regulatory Council where he was Associate Director for Congressional and Public Affairs. Previously he was with the Office of Management and Budget where he had been Deputy Director for Congressional Liaison in 1978-79, and was Assistant Director of the Natural Resources Division.



Magazine has been a member of the Fairfax County (Va.) Board of Supervisors; past Chairman, Northern Virginia Transportation Commission; member of the Executive Board, Virginia Association of Counties, and has served on the Board of Directors, Metropolitan Washington Council of Governments. He earned a bachelor's degree from Monmouth College, Ill., a master of public administration from Kent State University, Ohio, and a Ph.D. from the University of Maryland.



Previously he was a staff member of the Senate Public Works Committee, 1976-77; staff assistant at the National Commission on Water Quality, 1973-76, and legislative assistant to Senator Robert Stafford, 1971-73. He earned a Bachelor's degree in political science from Middlebury College, Vt., in 1970.

Dr. Henry F. Enos

He has been named Director of the Environmental Research Lab at Gulf Breeze, Fla. Dr. Enos was with the Agency from its inception through 1977, as part of the research team at Headquarters and at the Athens, Ga., lab. He was most recently Director of the Chemical Epidemiology Division, University of Florida School of Medicine. Dr. Enos earned Bachelor's and Master's Degrees from the University of New Hampshire and a Ph. D. from Pennsylvania State University.



Alan H. Magazine

He has been named Director of the Office of Intergovernmental Relations. Magazine's government experience includes serving as Deputy Assistant Director of the U.S. Commission on Federal Paperwork and as a management intern at the Department of Housing and Urban Development. He was National Policy Coordinator for the International City Management Association; Executive Director, National Center for Public Service Internship Programs; Senior Consultant, Real Estate Research Corporation, and Administrative Assistant to the Speaker, Maryland House of Delegates.

Innovative Research Awards

Four Agency scientists have been chosen to receive the Office of Research and Development's Innovative Research Awards. The awards were established in 1978 to give R&D scientists and engineers a chance to conduct independent research vital to the Agency's long-term goals. Award recipients go on sabbatical, to conduct research free of the usual job pressures and responsibilities, and receive funding for conduct of the project as well as equipment, supplies, and personnel. Research proposals for the projects must show that they would identify a present or future problem, describe a new approach to solving a problem, or advance frontiers of knowledge in an environmental science.

Awards for this year's successful proposals went to: Michael Strutz, Industrial

Environmental Research Lab, Cincinnati, Ohio, for research to develop a new process for water re-use in the pulp and paper industry; Daniel Dahling, Environmental Monitoring and Support Lab, Cincinnati, Ohio, to investigate the parameters in the recovery of viruses to develop a standard cell line and procedures for viral assays; Gordon Ortman, Regional Services Staff, Research Triangle Park, N.C. to develop an ozone analyzer which may predict severe pollution episodes, and Richard Callaway, Environmental Research Lab, Corvallis, Ore., to develop an analytical procedure to determine the distribution and fate of constituents in estuaries. The total funding for these proposals is approximately \$380,000.

Proposals for the 1980 Awards may be submitted before February 29 to Dr. Morris A. Levin, (RD-676), EPA, Washington, D.C. 20460.



Michael Strutz



Daniel Dahling



Gordon Ortman



Richard Callaway

Dr. Alan Hirsch

He has been named Deputy Assistant Administrator for Environmental Process and Effects Research in EPA's Research and Development Program. Hirsch was Senior



Ecologist and Chief of the Office of Biological Services at the U.S. Fish and Wildlife Service from 1974-79, where he established and directed programs to improve the Agency's information base and analytical capability for assessing ecological impacts of development. From 1972-74 he was Director, Marine Environmental Protection Office, National Oceanic and Atmospheric Administration. Hirsch was Director of Program Development at EPA in 1971 and 1972, and had previously held Assistant Commissioner posts with the Federal Water Quality Administration, an EPA predecessor agency. He taught in the Conservation Department at the University of Michigan, Ann Arbor, and was a Fulbright Scholar at Canterbury University, Wellington, New Zealand. Hirsch earned bachelor's and master's degrees in zoology from Michigan State University in 1951 and a Ph.D. in Natural Resource Planning from the University of Michigan in 1961.

Dr. Courtney Riordan

He has been named Deputy Assistant Administrator for the Office of Monitoring and Technical Support in the Research and Development Program. Most recently Riordan was Associate Deputy Assistant Administrator for the Office of Environmental Processes and Effects Research.

During his term at EPA he has been Director of the Division of Media Quality Management, also in R & D; a Branch Chief in the Office of Radiation Programs, and staff engineer in Technical Analysis, Enforcement, and the General Counsel.



Before entering government service, Riordan taught for four years at Cornell University in areas of Environmental Policy, Public Investment Analysis, and Quantitative Methods for Decision-Making. He earned a B.S. from Northwestern University in 1963 and a Ph. D. from Cornell in 1968.

Dr. Tudor T. Davies

He has been named Director of the Environmental Research Lab at Narragansett, R.I. Dr. Davies is the former Deputy Director of the Gulf Breeze Lab. He has been with the Agency since 1973. Before joining the government service he was a postdoctoral fellow at the Bedford (Nova Scotia) Institute of Oceanography and was Associate Professor of Geology at the University of South Carolina. Dr. Davies has a Bachelor's Degree and Ph. D. from the University of Wales.



Tina Hobson, (left), Director of Consumer Affairs at the Department of Energy, and Joan Nicholson, (right), Director, Office of Public Awareness at EPA, display the Golden Eagle Award their offices shared with the Department of Defense for the joint production "Solar Energy: the Great Adventure."

The three agencies pooled funds and personnel for the film about alternative forms of energy production. The Golden Eagle Award is presented by the Council on International Nontheatrical Events for excellence in motion pictures selected to represent the U.S. in international film events.

Dr. Vilma R. Hunt

She has been named Deputy Assistant Administrator for Health Research in the Office of Research and Development. Most recently Dr. Hunt was an Associate Professor of Environmental Health at Pennsylvania State University. She has served on the staff of EPA's Science Advisory Board and

has been Assistant Professor of Environmental Health at Yale University and Research Associate at the Harvard School of Public Health. Dr. Hunt is a graduate of the University of Sydney, Australia, with a degree in dental surgery. She earned a graduate degree in Physical Anthropology from Harvard University in 1956 and was a Scholar at the Radcliffe Institute. She has written a book on occupational health and is the author of a report to the Secretary of Health, Education, and Welfare on the occupational hazards of pregnant women.



Opposite: Molten steel being worked inside the mill. (See story on P. 12.)

Back cover: Setting sun silhouettes pelicans in the Florida Everglades. (See story on P. 34.)



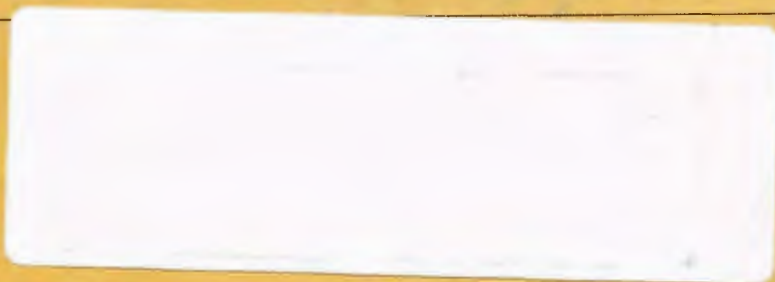
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